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The Role of Sensory Attributes in Stimulating Healthy Food Choices

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Submitted to Dr. Marion Garaus

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AFFIDAVIT

I hereby affirm that this Master's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

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ABSTRACT

The obesity rates have nearly tripled in the last 50 years and are one of the root issues of many illnesses like heart diseases, diabetes, strokes and numerous cancers. The reason for this increase is the food consumption behaviour of individuals. Previous research has investigated the unhealthy-tasty intuition which implies that individuals tend to choose unhealthier food items since they seem to be tastier. As a consequence of the unhealthy-tasty intuition, the marketing of healthy dishes is especially difficult. With the rising popularity and effectiveness of sensory marketing, using the five senses – see, hear, smell, taste and touch – there has been an insight that the food decision-making process can be influenced. Sensory marketing, the addition of sensory attributes, might be useful in stimulating healthy eating options. However, changing the food consumption behaviour is quite complex as it is dependent on the previous experiences, attitudes toward a healthy lifestyle and the current environmental cues.

As the trend of dining in restaurants has tremendously increased during the last years, this thesis solely focuses on food choices in restaurants. Recent research has already dealt with the effectiveness of the addition of sensory descriptive attributes to food items in order to influence the food decision-making process in restaurants, however, sufficient research In the area of expertise is still missing.

For this purpose, an experimental research design has been implemented to investigate the effectiveness of sensory descriptive attributes on food choices. Respondents received dessert menus with dishes described using either a multisensory attribute, a health attribute or no attribute. The results of the experiment provided ambiguous findings regarding the unhealthy-tasty intuition. On the one hand, taste and health expectations did not directly correlate and on the other hand, respondents seem to associate health with taste attributes. Additionally, the study supports the main claim that the usage of sensory attributes can increase the tastiness expectation. Moreover, the experimental study revealed that taste expectations have a higher impact on purchase intention compared to health expectations. Overall, health attributes are not necessarily correlated with worse taste and descriptive sensory attributes can stimulate taste expectations which influences purchase intention. Thus, the results of this study contradicts with the prevailing notion of the unhealthy-tasty intuition.

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LIST OF ABBREVIATIONS

BMI – Body Mass Index

UK – United Kingdom

USA – United States of America

WHO – World Health Organization

1 INTRODUCTION

1.1 Background of the Thesis

The obesity rate worldwide has nearly tripled since the 1970s. In 2016 the World Health Organization counted 1.9 billion adults overweight, whereas 650 million of them were obese (World Health Organization, 2021). In Europe at least 52% of the adults are overweight with a body-mass index of over 25 (Eurostat, 2019). Being overweight or obese can increase major health risks for several illnesses like heart diseases, strokes, diabetes Mellitus type 2 and numerous cancers (Huang & Wu, 2016; Kucharczuk et al., 2022; Mai & Hoffmann, 2015). With the rising diseases caused by obesity and a wrong diet, the health care system will eventually be overwhelmed and collapse in the future. Moreover, life expectancy is projected to decline tremendously throughout the twenty-first century based on the before-mentioned rising diseases (Mai & Hoffmann, 2015). Especially in the COVID-19 pandemic, the danger of obesity was clearly shown since obese individuals were categorized as higher-risk patients (Bailor, 2021). Additionally, obese people were more likely to have a harder course when infected compared to people with a regular body-mass index (Pearson, 2006). Besides the numerous health issues resulting from unhealthy eating behaviours, food accounts for over a quarter of the global greenhouse gas emissions (Poore & Nemecek, 2018). Consequently, the promotion of a nutritious diet is more important than ever to prevent these diseases, relieve the environment and promote a healthier lifestyle.

Food policymakers are being confronted with an obesity crisis, although an increasing interest in a healthy lifestyle was be observed over the past years (Duarte et al., 2021; Wunsch, 2022). Generally, it is quite difficult to put the theory into practice and change an individual's food consumption behaviour (Mai & Hoffmann, 2015). Many different aspects play a role in the development of these consumption patterns such as prior experiences and environmental cues (Pilgrim, 1957). Furthermore, the human intuition neglects healthy food and is rather attracted to energy-dense and unhealthy food (Raghunathan et al., 2006) which evolved from our survival instinct (Mulier et al., 2021). This intuition varies between different cultures, whereas countries with lower food pleasure orientation, such as the United States or the United Kingdom, are more likely to follow this behavioural pattern (Huang & Wu, 2016).

As dining out has gained a remarkable amount of popularity in the past years, the marketing of food dishes on the restaurant menu has become more crucial. According to the Restaurant Success Report in 2019, 45% of US citizens have dinner outside of their homes multiple times a week. Another 20% of the population dines out once a week with a rising tendency (van Duyne, 2022). Furthermore, most of the adults are full-time working, indicating that they either have to eat in a canteen or restaurant close by their workplace or bring their prepared

food. Therefore, individuals who follow a balanced diet have difficulties following their desired meal plan based on limited opportunities (Bellisle, 2006). Moreover, with the COVID-19 crisis, ordering food delivery has become more popular than ever (Mehrolia et al., 2021). With all these above-mentioned dining possibilities, consumers have to make a decision and choose something from the menu. Thus, the importance of menu engineering is vital to provide the customer with some health nudges and more opportunities to choose healthy over unhealthy food. These health nudges subliminally influence people to choose the healthier option even if choosing a healthy option is not their priority.

Therefore, so-called health nudges have shown to be successful in interfering with routinely food consumption behaviour. However, labelling a food item as healthy might not have the desired effect to make it more attractive. On the contrary, based on the unhealthy-tasty intuition, healthy food is perceived as less tasty and subsequently makes it less attractive to purchase since taste is the most important criterion in the food decision-making process (Raghunathan et al., 2006; Turnwald et al., 2017).

This thesis focuses is on sensory attributes which can be defined as using the five senses – see, hear, smell, touch and taste – to evaluate food quality (Sinesio, 2005). In addition, these sensory attributes are used as added labels in the description of food items on a restaurant's menu to help the consumer get a better feeling of the listed food item. Since food items on restaurant menus cannot be tasted beforehand, it is crucial to provide the consumer with as precise information as possible in order to meet their expectations. Consequently, this will lead to a more positive experience and higher repurchase intention.

Since obesity can be preventable, it is vital to gain a deeper insight into the possibilities to stimulate healthier eating habits. Mai and Hoffmann (2015), describe the dilemma of short-term indulgence and long-term health as the key contributor to the increasing numbers of adiposity. This can be counteracted by the promotion of healthier and more nutritious food consumption behaviours and the consciousness of the individuals' health.

1.2 Aim of the Thesis

The aim of this thesis is to examine how sensory attributes can stimulate healthier food choices. This research explores how different descriptive sensory properties, such as attributes referring to the texture (e.g. crunchy) or taste (e.g. sweet) of a food impact food choice. Moreover, the study is aiming to test how the unhealthy-tasty intuition (i.e. food is perceived to be tastier when it is unhealthy) can be addressed by using sensory attributes in food descriptions (Raghunathan et al., 2006). In the experiment of the thesis, the effectiveness of descriptive sensory attributes will be compared to health attributes and a not labelled condition. On the one hand, the results of this research will be of major importance to marketers by providing guidance on the use of sensory attributes for food products. On the other hand, results will

have a social impact on society itself by supporting a healthier lifestyle and preventing future health diseases. Finally, it will provide a deeper understanding of the effectiveness of sensory attributes on healthier food choices. Thus, the research question of this thesis can be formulated as the following:

RQ: How do sensory attributes stimulate healthy food choices?

As primary research, a quantitative method is used through conducting an experiment where the participants are exposed to different restaurant menus. For this experiment, four well-known desserts will be chosen and the healthy dessert will be manipulated. The respondents will randomly get assigned to either treatment group 1 with the multisensory descriptive attributes, treatment group 2 with the health attribute or the control group with no condition. With this experiment, the influence of these different attributes on taste and health expectations and subsequently on positive purchase intention will be investigated. The goal of the experiment is to survey at least 200 participants to provide a credible result. Lastly, the purpose of the experiment is not only to examine the influence of descriptive sensory attributes on healthy eating behaviour but also aims to investigate other correlations within this comparison such as age, gender, food consumption behaviour and frequency of dining out.

1.3 Outline of the Thesis

This thesis consists of five main chapters. After the introduction, there is an thorough literature review where the main theories are described and connected. The main umbrella terms of this thesis are unhealthy-tasty intuition with the explanation of food consumption behaviour, the restaurant industry and specifically menu engineering and sensory marketing where the stimulation of the five senses is used to create a better perception of the product.

Moreover, the methodology will cover the research design, procedure, experiment structure and sampling methods in order to answer the proposed research question. Afterwards, the data preparation process and tools for the analysis will be explained in detail. Subsequently, there the hypotheses will be tested and further additional insights into the data will be given.

At the very end, there will be a discussion of the results in comparison to the information from the literature review. The outcome will be presented in descriptive and inferential statistics to better showcase the relationships between the tested variables to answer the research question. Finally, there will be an overview of implications for relevant stakeholders and possible future research concepts.

2 LITERATURE REVIEW

In order to understand how sensory attributes stimulate a healthy food choice, a foundation has to be set to define the before-mentioned terms. First of all, the main characteristics of the fierce restaurant industry will be described. Within the chapter, the motivation to visit a restaurant and the healthy options offered on the menu will be further evaluated. In the next chapter, the main theory "the unhealthy-tasty intuition" will be explained. Accordingly, this section of the literature review will give a brief overview of various factors which impact food consumption behaviour. The consideration of food consumer behaviour is essential in the context of food purchase behaviour since it is the foundation of the decision-making process. Moreover, the term sensory marketing must be explained in the context of food. Within sensory marketing, there will be a focus set on sensory attributes in regard to restaurant menus. Additionally, the relationship between food and a healthy lifestyle will be defined and clarified. Lastly, the relationship of how much power sensory attributes have in comparison to health claims in food decision-making will be investigated.

2.1 Restaurant Industry

The hospitality industry has experienced tremendous growth in the last decade. Within the last 30 years, the restaurant industry especially has become a sector of interest for many scholars (DiPietro, 2007). The prior research in the restaurant industry can be split into three perspectives: from the customer's, the management's and the hospitality industry's point of view. From the customer's perspective, the research was focused on restaurant and brand perception, service, atmosphere, loyalty and food quality which ultimately lead to customer satisfaction (Gupta et al., 2007), whereas from the management point of view, the focus was on profitability (Thompson, 2009). From the hospitality perspective, the main research area was in information sources, motivation on consumer preferences regarding the restaurant choice and the attitudes of tourists (Batra, 2008; Rodríguez-López et al., 2020).

In order for a restaurant to survive in this hyper-competitive market, flexibility and fast adaption of new trends are essential. Restaurants aggressively respond to the changes of their competition to stand out and be successful (Sun & Lee, 2021). Nicolopoulos (2020) even described the competition as the biggest challenge for all kinds of restaurants from traditional to new emerging concepts. Furthermore, he explained that customer traffic will be a major issue for restaurant owners, however, the rising competition for labour will push the labour cost which will negatively affect the profitability (Nicolopoulos, 2020). Rising trends within the restaurant industry are the interest in unique flavours from different ethnicities, healthier menus and more local and organic ingredients (Sun & Lee, 2021).

Motivation for individuals to visit a restaurant can be categorised into food-related, other food-related and non-food related attributes. Clark and Wood (1998) and Jeong and Jang (2011) identified food-related attributes, such as food quality, menu size, service excellence and ambience, as key determinants for behavioural intention. However, other scholars likewise have found evidence that other food-related attributes have a positive impact on behavioural intention (Ponnam & Balaji, 2014). These other food-related attributes like nutritional dishes (Howlett et al., 2009), healthy food choices (Namkung & Jang, 2007), food descriptions (Wansink et al., 2005), and sensory properties (Rozin et al., 1999). were identified to have a remarkable impact as well. Moreover, as non-food related attributes, restaurant environment, restaurant service and menu pricing were identified. Especially menu pricing is commonly used as an indicator of food quality, especially prior to the purchase (Ponnam & Balaji, 2014). While evaluating the restaurant for a dine out, these attributes are evaluated, however, for a decision certain trade-offs are made depending on the personal experiences and values (Bettman et al., 1998). In a research conducted by Back (2012), the attributes of food quality and variety, service excellence and ambience were rated the highest, whereas, the variety of healthy options, the size of the portion and the comfort of the atmosphere were rated the lowest. However, scholars do not all agree with the healthy options aspect, since other studies have shown that there is a rising interest in healthier eating behaviour (Kraak et al., 2017; Mintel, 2016). Moreover, it is difficult for consumers to decide on the healthier options in the direct comparison to unhealthier options since unhealthy food is often perceived as tastier than healthy food (Raghunathan et al., 2006). Since food quality is rated as one of the most salient attributes (Back, 2012), consumers rather choose the dish which they perceive with higher quality. Nevertheless, it is crucial to offer healthier options on a restaurant menu to counteract the high percentage of overweight and obese people in the world (World Health Organization, 2021). In the following chapters, the importance of healthy food and its attractiveness will be further described and evaluated.

2.1.1 Healthy Food Options in the Restaurant

A healthy eating lifestyle is a multifaceted concept which relates to different definitions of healthy food consumption associated by the consumers. Due to the fact that healthy eating is a multifaceted concept, the whole construct is quite not fully understood (Delormier et al., 2009). Since every individual has a subjective opinion on what healthy eating is, there is no universal answer which applies to everyone. In prior research, the scholars discovered that personal values and experience have a major influence on the perception of what healthy eating is (Luomala et al., 2006). In the article of Hansen and Thomsen (2018), three relevant studies were identified. The first one was conducted by Velaquez et al. (2011). They conducted a large-scale study with 15,283 adolescents which proved that the self-perception of food consumption was strongly related to the actual food consumption (Velazquez et al., 2011).

Davenport et al. (2014) conducted a study on adolescents as well and confirmed that the ones who perceive their own diet as healthy, are generally consuming more fruits and vegetables and fewer dairy products and sweet drinks. Aligning with the prior research, Sharif et al. (2016) conducted a study with the outcome that self-perceived healthy eating behaviours were positively linked to the consumption of fruit and vegetables and negatively liked to consuming fast food and soda. Based on these studies, Hansen and Thomsen (2018) withdrew three healthy eating definitions which might be the most common among food consumers: healthy and unhealthy eating, mind and body healthy eating and healthy eating guideline.

Healthy and unhealthy eating relate to the construct that the consumer tries to balance the food consumption between healthy and unhealthy food products (Luomala et al., 2006). An example of this definition is to eat a high-fat food item and order additional fruit or vegetables to make the first dish less unhealthy (Hansen & Thomsen, 2018). This reaction can be explained by the "licensing effect" which is defined as the process of "after purchasing virtue categories, consumers are more likely to shop at locations that carry vice categories" (Hui et al., 2009, p.1). In regards to food decisions, the consumer would buy or consume a virtue item like organic food, however, this would give the person the license to get a vice item such as soda or a high-calorie dessert (Hansen & Thomsen, 2018; Hui et al., 2009).

The *mind and body healthy eating* construct is defined as the balance between mental and physical health based on the food associated health (Hansen & Thomsen, 2018). Consumers who support that definition believe that the mind and body are strongly interrelated. Therefore, a healthy diet includes emotional well-being and these two factors are coexistent. This theory neglects the definition of the Cartesian mind-body dualism which strictly separates the body and the mind into two different units (Forstmann et al., 2012).

Besides the personal perception of healthy eating, the health authorities provide another definition for food-related health which is the *healthy eating guideline*. Consumers obeying this description believe that they are risking to be unhealthy if they do not follow the guidelines provided (Hansen & Thomsen, 2018). However, these guidelines usually describe the relationship between food and health in scientific terms (Delormier et al., 2009). The foundation of this definition is based on distinguishing between planned and controlled behaviour based on guidelines and impulsive food behaviour (Hansen & Thomsen, 2018).

The model of Hansen and Thomson (2018) is of high importance due to the fact that the consumers' interest in a healthy diet might affect their personal definition of healthy eating. If an individual thinks healthy food consumption is important to them, they will make a more significant effort to define healthy eating for themselves. Moreover, aligning with the past research findings, if an individual shows interest in a specific topic, the person will attach meaning to that topic (Hansen & Thomsen, 2018). The stronger the beliefs of the individual, the more they try to avoid disconfirming behaviour since they value consistency between what they think and

what they do. The disconfirmation belief can be described as a phenomenon where individuals only acknowledge evidence supporting the former beliefs and fully ignore the other evidence presented. On the contrary, individuals with low levels of interest are more likely to ignore the disconfirming behaviour and justify their actions as inconsistent manners (Todd & Gigerenzer, 2003). Based on the personal belief toward healthy eating, the definitions and interests can vary. However, there is a growing interest in healthier eating options which is in favour of the food policymakers since this might counteract the rising overweight and obesity rates (Mai & Hoffmann, 2015).

Regardless of the different definitions of healthy eating behaviour, healthy food options on restaurant menus are in many cases not the most popular dish on the menu. As a restaurant manager, the main aim is to maximize profitability and if a dish is not well-liked enough or generates enough profit, it has to be taken down or exchanged for another (Thompson, 2009). Therefore, it is quite difficult nowadays to have healthier options in regular restaurants, although, there is an increasing interest in a healthy eating behaviour (Kraak et al., 2017). Additionally, in a study conducted by Mintel (2016) with over 1800 participants, the outcome showed that 64% of the respondents agree that healthy dishes in restaurants are too expensive. Moreover, 62% of the participants stated that taste is more important to them than the nutritious level of the dish while dining out. A trend the study uncovered was that consumers are generally more interested in more vegetable-heavy dishes and are willing to exchange unhealthy side dishes for healthier one's (Mintel, 2016). The outcome from the study of Kraak et al. (2017) stated that only 20% of the respondents were satisfied with the healthy food options while dining out meaning that there is still a lot of space for improvement. The main message based on these studies is that there are generally too few healthy options at restaurants. Moreover, the healthy options available are just too expensive.

Current restaurant owners and managers are focusing their marketing strategy on the marketing mix principles namely product, place, price and promotion in order to create brand awareness and long-term loyalty (Kraak et al., 2017). However, a restaurant owner should not only focus on these strategies and emphasize the importance of making healthy food more attractive, convenient and normal to consume (Wansink, 2015). In most cases, restaurant owners do not fully understand its importance and do not combine their marketing mix strategies with choice architecture strategies which can positively influence the decision-making and behaviours of their customers (Kraak et al., 2017). In order to create a more positive image for healthy dishes, one can apply the nudge theory. Thaler and Sunstein (2008) define the term “nudging” as “any aspect of choice architecture that alters people’s behaviour in predictable ways without restricting any options or significantly changing their economic incentives such as time or money” (p.6). With nudging one can change the behaviour of individuals in their favour without directly making their choices. This theory is often used by the government and policymakers to lead them into the favoured opinion without making any direct restrictions (A.

Oliver & Ubel, 2014). This indirect way of suggesting and influencing an individual's decision can be implemented in restaurants by engineering the menu (Wansink et al., 2005) in a way that the most profitable dishes (Thompson, 2009) or in an ideal case the most healthy dishes will be chosen (Oliver & Ubel, 2014). In a study by Kraak et al. (2017), the results showcased that using nudge strategies to stimulate healthy behaviours is effective to a certain extent, however, it is only successful when the following three assumptions imply. Firstly, individuals will choose the options that involve the least effort mentally or physically. Secondly, their behaviour has to align with the social norms. Thirdly, there has to be an identification with a specific lifestyle behaviour. If these three assumptions apply, the nudging strategy can achieve a high success rate by nudging individuals to more healthy behaviour and lifestyle (Kraak et al., 2017).

2.1.2 Menu Engineering

The menu of a restaurant purposely or un purposely shows the style of the restaurant, the taste expectations, its origins and its perceived status. However, these are not the only functions of a menu. A restaurant menu can present more cues in sense of quality, pricing or even the luxury factor. Worldwide there are so many different menus regarding, style, font or length (Kelson, 1994). In a study conducted by Edwards of the Bournemouth University, there is an ideal amount of items for each section of the menu. In this study he distinguished between fast-food restaurants and fine dining restaurants. In fast food restaurants the consumer wished for six items per category, whereas in fine dining establishments they wanted up to ten main courses. Here it is important to mention that a fast-food restaurant has more categories in general. On the contrary, fine dining establishments summarize their main dishes into one category instead of splitting it up by the different meats, fish and vegetarian (Spence & Piqueras-Fiszman, 2014). On the one hand, having a small menu to choose from might encourage the thought of having not enough choice. On the other hand, a full and long menu might create the feeling that it is too disconcerted and gives the consumer a hard time to decide (Iyengar, 2010).

Generally, a restaurant guest only spends three minutes on scanning the menu. Therefore, the most common strategy in menu design is to focus on the presentation of the menu. The longer the guest is paying attention to a certain item, the more likely this person is to order it (Reynolds et al., 2005). In prior research, scholars have identified these so-called "sweet spots" on the menu where the guest's eyes pass by most frequently. On a two-page restaurant menu the top right corner is one of these sweet spots. However, (Yang, 2012) took it another step further by analyzing the eye movement and creating a whole pattern.

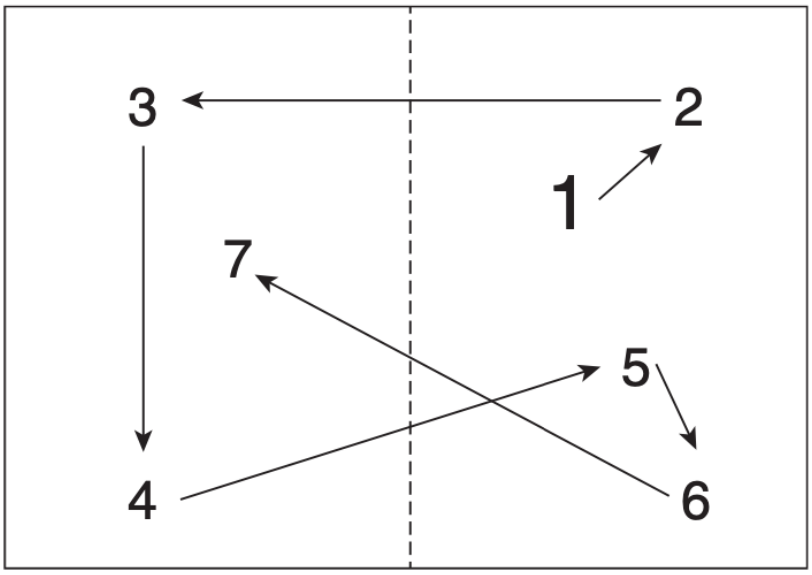

FIGURE 1. MOST COMMON SCAN PATH OF A MENU. (YANG, 2012).

As seen in figure the customer starts on the right top half and moves back to the left page and reads it as if it would be a book. Afterwards, the reader continues on the right side where it initially started and finishes the second half of the page. Due to the psychological primary and recency effect, the defined sweet spots are at 1 and 7. However, position 5 is also considered a sweet spot since the eyes cross that spot the most often. The primary and recency effect describes the phenomenon that a human being is more likely to remember the first or last heard or read item (Spence & Piqueras-Fiszman, 2014). The outcome of the Gallup Organisation's study showed a slightly different result than restaurant visitors read a menu like they would read a simple book which means from left-top to the bottom and continue on the next page (Gallup Report, 1987). Spence and Piqueras-Fiszman (2014) questioned these results by considering the fact that all restaurant menus have the same structure by starting with the starters and light dishes, continuing to the main and heavier courses and ending with desserts. If the order of the conventional menu would be changed, there might be a difference in the outcome. Although these studies showed significant results, other scholars have found opposing ones. In studies conducted by Bowen and Morris (1995) and Kincaid and Corsun (2003), the outcome showed that there is little support for the hypotheses that the positioning of the food items can influence the sale of certain items.

Besides the positioning on a menu, another psychological effect can influence the decision-making process. The Von Restorff effect refers to "a person's ability to recall distinctive items from a list, namely those that are salient or distinctive with respect to the rest of the presented items" (Spence & Piqueras-Fiszman, 2014, p.50). Considering this psychological effect in the menu design, one can highlight a certain item in order to attract more attention from the guest. One can make an item stand out by salient fonts, colour, size, texture, pictures, boxes or highlighting. There are no significant studies yet, that salient items will have a positive impact

on food choice. However, the highlighted item will still draw the attention of the customer (Spence & Piqueras-Fiszman, 2014). Especially images on the menu can draw quite a bit of attention, however, it is perceived as a big taboo in classy restaurants (Poundstone, 2010). In high-class restaurants, it is expected to get surprised by the ordered dish rather than seeing an image of it on the menu. Besides pictures of the dish itself, images can relate to the restaurant logo or a watermark which is more common in more classy restaurants (Freedman, 2013). Regarding the significance of positive food choices with images, Verma et al. (1999) conducted a field study at the O'Hare airport in Chicago. Different nationalities were asked to take part in the study by choosing one of five restaurant options whereas some of them had menus with pictures and others did not. The outcome of this showed mixed results. It is somehow dependent on the nationality of the respondent. Especially English speaking participants did not appreciate the incorporation of images on the menu, whereas Japanese speakers liked menus with displayed food (Verma et al., 1999). In another study by Gueguen et al. (2012), the effectiveness of watermarks was tested. Three identical menus were created with the exception of differently themed watermarks such as water and fish, countryside and animals and tables and chairs. The seaside-themed menu increased the sales of fish dishes and decreased meat dishes in comparison to the countryside-themed menu. However, there was no significant difference between the countryside-themed menu and the neutral tables and chair menu (Guéguen et al., 2012).

An increasing trend in the menu engineering sector is adding nutritional and health claims to the dishes which is mainly adopted in fast food restaurants. These labels include fat, salt, calories, and fibre content which can influence the food choice of individuals and the amount eaten if the label is noticeable. With all the information stated there is a tendency that the consumer gets overwhelmed. The general population seems to have surprising little idea about how many calories they're consuming through their daily food consumption (Spence & Piqueras-Fiszman, 2014). A recent statistic by Burton et al. (2006) showcased that the majority of consumers tend to underestimate the calorie and fat content of restaurant dishes by up to 50%. By adding the nutritional information about the restaurant food items, the guest has the chance to make a decision based on as much information as possible. However, the calorie content on the menu led the consumer to change their decision solely when the difference between the expected and actual calorie content was very high (Spence & Piqueras-Fiszman, 2014).

At the very end of deciding which dish to choose there is always the consideration of the price. On the one hand, the price might be the ultimate deciding factor between two dishes (Spence & Piqueras-Fiszman, 2014), however, on the other hand, if someone certainly chose a dish before, the price does not make a difference (Poundstone, 2010). Within menu engineering, there is a strategy called the "cheaper neighbour" effect. With this strategy, certain dishes get priced higher than their initially worth and are listed next to the most expensive item on the

menu. This creates the cheaper neighbour effect and makes the consumer think that this dish is actually up for a bargain price (Spence & Piqueras-Fiszman, 2014). Another pricing method used consults fixed-priced menus. By listing the single dishes in the a la carte menu with the price, the consumers tend to choose the most expensive one since the end price is fixed already and they want to get the most worth out of it. The strategic move here would be to price the dish the restaurant wants to sell the most as the most expensive one (Poundstone, 2010). On the contrary, other scholars suggest that if the personal preference is strong enough, this strategy will not make a difference in the decision-making process (Spence & Piqueras-Fiszman, 2014).

On restaurant menus the customers cannot see, smell, hear, touch and especially not taste the dish beforehand and can only rely on the description on the menu (Kpossa & Lick, 2020). In comparison to food products in the supermarket, consumers can use most of their senses to evaluate if they want to buy the product or not. A typical example of evaluating a fruit in the supermarket is to touch avocados in order to examine their ripeness. If the avocado passes the ripeness check, it will be instinctively expected to have a high sensory eating quality (Swahn et al., 2010a). Due to the lack of the usage of the five senses in the decision-making process in the restaurant, the description of the dishes on the menu is decisive. Adding sensory attributes to the name of the dish might be an opportunity to draw the attention of the customer and disrupt their habitual behaviour (Kahn & Wansink, 2004). The sensory description of the dish has to be in line with the actual dish after consuming it or the customer will not choose it over other dishes again (Caswell & Padberg, 1992). Ultimately, the taste is the decisive factor for a customer to repurchase a food product (Lee et al., 2006; Mai & Hoffmann, 2015).

Furthermore, Wansink and van Itersum (2001) give suggestions on how restaurant managers can revitalize their menus. Firstly, the restaurant owner can add geographic labels to the dishes on the menu. The key here is to choose regions which represent the products and spices and then decide on the matching adjectives. Typical examples would be Southwestern Tex-Mex Salad or Country Peach Tart (Wansink & van Itersum, 2001). Another possibility to label the dishes would be with affective labels. Affective labels prompt traditions, good memories of family and nationalism (Piqueras-Fiszman & Spence, 2015). Consumers often like to be reminded of these wholesome traditons since they think that they cannot recreate the dishes better than that. Some examples for affective labelling would be Legendary Chocolate Mousse Pie or Nana's Favourite Chicken Soup (Wansink & van Itersum, 2001). Cross-promotional brand labels can also be used to incrase the interest of the consumer. If the consumer loves a certain brand, it will also be more likely that the person will love the dish. However, working with other brand names can be expensive and there are many legal and licensing issues to be solved beforehand. Some examples of cross-promotional labels are Jack Daniels BBG Ribs or Black Angus Beef Burgers. As fourth improvement idea for menus, Wansink and van Itersum state sensory labels. Sensory lables relate to the accurate description of taste, smell and mouthfeel.

This can create a better expectation for the customer and they can better picture themselves purchasing this dish. In the wine industry (Swahn et al., 2010a) and ice cream industry (Wansink & van Itersum, 2001) this approach is commonly and successfully used. However, it can be still perfectionised on restaurant menus. Examples for sensory labels are Hearty Wholesome Steaks or Buttery Plump Pasta (Wansink & van Itersum, 2001).

Sensory descriptive labels as an addition to the menu have a powerful and positive influence on the attitude of a customer towards a successful restaurant visit and their intention to return (Wansink & van Itersum, 2001). Furthermore, the findings of Swahn et al. (2010) and Wansink et al. (2005) research shows that sensory description labels have a positive effect on the choice of the customer. This innovative way of marketing communication might be an opportunity in the future to positively affect consumer decision-making in the restaurant (Swahn et al., 2010a).

2.2 The Unhealthy-Tasty Intuition

In recent research, there has been increasing interest in the food advertisement industry. Especially, the factors that impact the food choice and decision-making process of individuals have attracted considerable research attention (Steenkamp, 1993). Within this research stream, specific attention was drawn to the combined focus of health and taste. Due to the increasing health problems and illnesses caused by an unhealthy diet, health has become an important factor in the food decision-making process (Haasova & Florack, 2019). On the one hand, researchers in the US have detected the unhealthy-tasty intuition which is a belief that unhealthy food generally tastes better (Raghunathan et al., 2006). However, on the other hand, there has been evidence that this is not the case. In a study conducted in France, there was a positive relationship found between taste and health. This positive relationship states that the healthier food is perceived, the tastier it is (Werle et al., 2013). Based on these contradicting studies, the claims of the researchers will be investigated and evaluated.

On the supportive side of the unhealthy-tasty intuition are Bialkova et al. (2015) and Radhunathan et al. (2006), who clearly state that healthy food is anticipated as less tasty compared to unhealthy food. Throughout its evolution, sugary, fatty and energy-dense products played a vital role as the main resource for survival. Therefore, individuals who tend to automatically perceive these food products as tastier, have an evolutionary advantage over the others (Mulier et al., 2021).

There is a negative correlation between health and the taste of food which can be observed in an experiment by the researchers Radhunantan et al. in 2006. One of their experiments showed that the personal beliefs and environment play no inherent role when deciding on and enjoying certain food products, however, there is an inverse relationship between the healthiness and the perceived taste of the dishes (Raghunathan et al., 2006). Moreover, the authors

describe this phenomenon with different reasonings which are based on *internal* and *external sources* (Raghunathan et al., 2006).

Internal sources are explained by rooted religious messages where individuals are morally obliged to put the priority on necessities rather than on luxury products. In Maslow's hierarchy of needs, the basic needs have to be fulfilled first before one can move up to more comfort and luxury (Maslow, 1982). Moreover, this study investigated this embedded theory that unwholesomeness equals fun. Activities and actions are categorized as either fun or serious, however, it is quite unlikely that they are both. Raghunathan et al. (2006, p. 171) describe this as "the basis of a belief in a compensatory relationship between the "wholesomeness" of stimuli and their "hedonic potential".An example, in that case, would be that cars perceived as attractive and fun are automatically considered less safe and vice versa. However, there is no proven evidence that there is a direct relationship between the attractiveness of the car and the safety (Raghunathan et al., 2006). Based on these notions, an inverse relationship between healthy goods and fun goods was discovered. In the context of food, this translated into the perception that unhealthy food is less tasty compared to healthy food (Raghunathan et al., 2006).

In addition to the internal sources, there are also *external sources* which serve as a theoretical explanation for the unhealthy-tasty intuition. Nowadays, the tremendous amount of exposure to the mass media and the speed of information travelling through social media platforms, have an immense impact on the way of thinking of individuals. The information shared aligns with the unhealthy-tasty intuition that unhealthy food tastes better in comparison to healthy food (Raghunathan et al., 2006). On social media platforms, celebrities and influencer are often used to promote food products regardless of whether it is considered as healthy or not. Besides the influencer promoting a brand, the brands often have their own social media channels presenting their food or beverages. In 2017 global social media advertising costs reached $35.98 billion with a highly positive trend for the future years (Bragg et al., 2020). According to Bragg et al. (2020), the food and beverage companies with the highest amount of followers are Coca-Cola, McDonalds, Starbucks, Red Bull and KFC which are not specifically known to sell healthy products but rather unhealthy ones. Therefore, social media usage can be dangerous in regards to health, due to the intensive time spent on these platforms and consequently the tremendous impact it could have on food consumption behaviour.

Adolescents are specifically vulnerable since over 90% of them have at least one social media account that they actively use (Kucharczuk et al., 2022). Based on the estimation of the WHO, 39% of adults in the population worldwide are overweight. Generally, overweight caused more deaths than underweight in the population (World Health Organization, 2021). Besides the exposure to the environment, one can state that most likely everyone has had a personal experience with the unhealthy-tasty intuition before. A mentionable example, in this case, would be that parents would suggest their children to consume more hedonically unpleasant food

like green vegetables and stay away from hedonically appealing food like sweets and fast food due to the proven healthiness or unhealthiness of these food products. Accordingly, the attractiveness and desire for unhealthy food are enhanced as people feel discouraged from consuming it (Raghunathan et al., 2006). This behaviour has been explained by several scholars as psychological reactance. The risk of losing freedom of choice can lead to resistance by individuals, which can alter the attractiveness of potential outcomes (Brehm & Brehm, 1981). This unhealthy-tasty intuition is then rooted in our behaviour and influences the decision-making process when choosing a food (Raghunathan et al., 2006).

The motivation of individuals to consume food can be either for hedonic pleasure or utilitarian reasons (Cramer & Antonides, 2011; Maehle et al., 2015). Hedonism in food consumption relates to the idea that one consumes food only for pleasure and enjoyment, whereas with the utilitarian approach food is consumed for the nutritional value and as a metabolic requirement to survive (Maehle et al., 2015; Mai & Hoffmann, 2015). In the utilitarian worldview, the food will be evaluated based on nutrition and health benefits. In past studies, scholars have agreed that the decision-making process of the consumer differs depending on whether it is a hedonic or utilitarian product (Burnett & Lunsford, 1994; Strahilevitz & Myers, 1998 as cited in Mahele et al., 2015). Looking at this behaviour from the hedonic point of view, the hedonic motivations support eating the food for pleasure instead of sustenance, whereas the unhealthy-tasty intuition states, that healthy food does not provide as much pleasure as unhealthy food. Therefore, hedonic food products are usually associated with unhealthy food. Unhealthy and hedonically delicious and enjoyable food products are perceived as better tasting which supports the theory of the unhealthy-tasty intuition (Huang & Wu, 2016; Maehle et al., 2015). The consumption of hedonic products might trigger a feeling of guilt (Okada, 2005) which might lead to a more reflective and altruistic behaviour. Altruism in food consumption behaviour might lead to a more sustainable and healthy food decision. Individuals who feel altruistic tend to reach out more to socially responsible and fair trade products, even for a slightly higher price or inferior taste (Maehle et al., 2015).

Whereas hedonic food is perceived to be delicious and enjoyable, utilitarian food is distinguished to be more functional and nutritious (Cramer & Antonides, 2011). Utilitarian food products are more goal-oriented, long-termed, practical and cognitively driven. In comparison to utilitarian food products, hedonic ones are characterized by more subjectivity. This subjectivity is caused by the personal multi-sensory emotional experience such as taste, sound, scent, tactile impressions and visuals (Hirschman & Holbrook, 1982). Hedonic food products are more considered as the “want” and utilitarian as the “should” (Cramer & Antonides, 2011). This supports the theory investigated by Maehle et al. (2015) and Mai and Hoffmann (2015), who state that individuals would like to consume more hedonic products rather than utilitarian due to the nutritional benefits of the latter one. Moreover, the preference for utilitarian food products can be explained by the guilt factor (Okada, 2005). Consequently, the consumer is

having a dilemma of either making a decision based on a short-term hedonic goal, and choosing taste over nutrition, or a utilitarian long-term goal where nutrition is more important than taste (Mai & Hoffmann, 2015).

Although the unhealthy-tasty intuition is often confirmed in the former research, there is evidence that contradicts this theory. Food pleasure orientation has been found as a highly influential counter factor in regard to the unhealthy-tasty intuition, which will be further elaborated on in the next paragraph.

2.2.1 Food Pleasure Orientation and the Unhealthy-Tasty Intuition

This subchapter will discuss the food pleasure orientation which has a tremendous impact on the unhealthy-tasty intuition since it is the foundation on how individuals make a food-related decision. Food pleasure orientation can be defined as the "general tendency of a person to associate eating with enjoyment and to generate pleasure from eating" (Mulier et al., 2021, p. 4). Cultures with a high food pleasure orientation are less keen to connect unhealthy food with tastiness but rather the other way around. Individuals high in food pleasure can be defined as those who prefer enjoying the food and the experience rather than the nutritious consequences of consuming the food (Huang & Wu, 2016; Rozin et al., 1999). These individuals evaluate food from a more hedonic perspective instead of a utilitarian approach. Huang and Wu (2016), even describe a high food pleasure orientation as the opposite of the utilitarian approach. The main difference between these two perspectives is that the hedonic approach is focused on "eating well" and the sensory pleasure. This perspective then leads to the perception that healthy food is less tasty. In comparison, the utilitarian approach treats food consumption more as a must rather than an act one can decide on. According to Mulier et al. (2021), there has been solely limited research on a direct relationship between food pleasure orientation and the healthy is less tasty intuition, however, the evidence in the past research supports the theory.

Moreover, individuals with a higher food pleasure orientation tend to choose healthier dishes as their main dish and afterwards have a tendency for a more unhealthy and higher caloric dessert. The individual treats themselves after a lower calorie intake with something unhealthier. Hence, the food consumption behaviour is based on balance and the compensation from the healthy food choice for the other item consumed (Huang & Wu, 2016).

The food pleasure orientation is highly influenced by the culture and geography of the individual's (Mulier et al., 2021). France and China are considered countries with a high food pleasure orientation (Rozin et al., 1999) whereas the Americans are known to have a low food pleasure orientation, similar to the United Kingdom (Huang & Wu, 2016). In a study conducted by Werle, Trendel and Ardito (2013), the French consumers do not follow the unhealthy-tasty intuition but rather the exact opposite. Their intuition is more based on the actual enjoyment

and pleasure of the food rather than seeing it as a necessity or health consequences (Mulier et al., 2021). Moreover, their perception of food is based on the perceived quality of the ingredients and the experience they get from it (Werle et al., 2013). Consequently, the French are viewing food as a hedonic product rather than a utilitarian (Huang & Wu, 2016) and contradict the unhealthy-tasty intuition (Werle et al., 2013). Due to the cultural differences, there will be alterations regarding the strength of the unhealth-tasty intuition. When the food pleasure orientation of an individual is high, it influences the perceived pleasure of the food product consumed positively which consequently diminishes the unhealthy-tasty intuition (Huang & Wu, 2016; Rozin et al., 1999). In comparison, if an individual has a low food pleasure orientation, food is consumed for sustenance instead of enjoyment. Therefore, individuals with low food pleasure orientation are keener to choose an unhealthy dish since they view healthy eating as the opposite of eating for pleasure. According to that, the consumer is more likely to assume the unhealthy-tasty intuition (Huang & Wu, 2016; Mulier et al., 2021). Based on the theoretical information found in the prior research, the first hypothesis is developed:

H1: Healthiness expectations are negatively correlated with taste expectations.

2.2.2 Factors Impacting Food Consumption Behaviour

Food plays a vital role in the life of every consumer since, on the one hand, it serves as a source of nutrition and enjoyment and on the other hand, it covers a considerably high allocation of the household budget (Bellisle, 2006). Nevertheless, there has not been much research done in the field of food consumption behaviour until the 21st century (Steenkamp, 1993), when this topic started to gain popularity. This can be attributed to the complexity and difficulty of this subject matter, due to the fact that many different factors influence food consumption behaviour. Moreover, food consumption behaviour is a topic which requires insights from many diverse sciences like psychology, medicine, nutrition, economy, marketing and anthropology (Steenkamp, 1993), which is not easy to combine into one research.

One of the earliest research projects done on food consumption or rather a food perception was by Pilgrim in 1957 (Pilgrim, 1957; Steenkamp, 1993). This researcher identified that the food function consists of three factors: “Physiological effects of the food, perception of sensory attributes and influences from the environment” (Steenkamp, 1993, p. 401).

In this early study, Pilgrim (1957) explored the effect of these factors on food perception, however, he did not investigate the correlations between these components. In further studies, many researchers based their conceptual model on Pilgrim’s model which is shown in Figure 1 (Steenkamp, 1993).

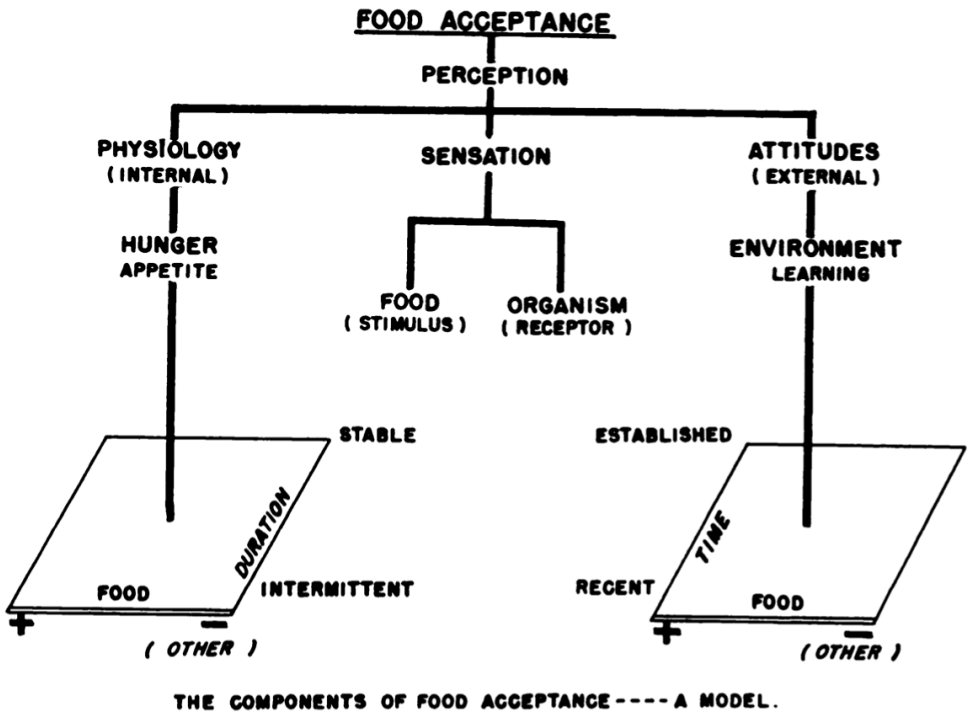

FIGURE 2. THE FOOD ACCEPTANCE MODEL. (PILGRIM, 1957).

Figure 2 describes how physiology, sensation and attitudes influence food perception. In regards to the internal and physiological factors, it is mentionable to look at the hunger attribute. Hunger will vary strongly in short periods of time which makes it difficult to investigate. Another intermittent factor would be the metabolic changes or the glucose level of the individual which is highly dependent on the consumption of food. Additionally, an example of a stable factor would be the hormone household (Pilgrim, 1957). On the right side, the external factors are being considered, where one can distinguish between recent or established influences of the environment. The recent or established experiences act together with the sensation to create a reaction and perception of different food products. In this context, it was discovered that there is a bias towards unknown products. If a product is unknown, individuals are more hesitant towards the product and more likely to choose the known one over the unknown one (Pilgrim, 1957). A basic understanding of factors that impact food consumption is also of high relevance for understanding how individuals make healthy and sustainable food decisions.

Another theoretical framework investigated by Lee, Lee and Schmidt in 2006 considers five main characteristics one can relate food to – taste, appearance, texture, aroma and irritation – whereas taste is considered the most influential one (Bellisle, 2006; Lee et al., 2006). They stated that the customer will neglect a food product with no exceptions if the taste of it is not satisfactory (Lee et al., 2006). Moreover, if the individuals' expectation of the taste of food is low, it is easier to surprise them with a greater taste. However, if the expectations are quite high before consuming the food product, it is easier to get disappointed. This is referred to as

the contrast effect which can be described as the result when high expectations are not met or when low expectations are exceeded, and it can be explained by the consequence of disconfirming high expectations or exceeding low expectations (Bialkova et al., 2016). Bialkova et al. (2015) state that this positive contrast effect may be one of the explanations why healthy food is perceived as better than expected or worse when the expectations were low. Consequently, it is vital to launch products with accurate health labels and advertisement claims in order to not disappoint the customer and to guarantee satisfaction (Bialkova et al., 2016)

The eating habits of different socioeconomic groups of the population are determined by their social class. Depending on the under- or overconsumption of food, different intervention methods are required. Underconsumption can lead to a lack of micronutrients, resulting in different illnesses. Overconsumption can lead to the opposite where excess energy results in overweight and obesity. Both extremes can lead to an extremely unhealthy lifestyle which should definitely be prevented (Bellisle, 2006). Healthy and sustainable food decisions are gaining more popularity now throughout the past couple of years (Wunsch, 2022). In 2020, Statista estimated that the global health and wellness food market were worth 733.13 billion U.S. dollars, and this number is expected to increase to one trillion by 2026 (Shahbandeh, 2021). In this context, analyzing the factors influencing a healthier food choice is of utmost importance. Besides hunger, appetite and taste, Bellisle (2006) discovered other key drivers for the consumption of food. The researcher distinguishes between six key drivers (Bellisle, 2006):

1. Biological factors
2. Economic factors
3. Physical factors
4. Social factors
5. Physiological factors
6. Food-related knowledge, attitudes and beliefs

Food choice is not only based on one single determinant, however, is more an interplay of these drivers. For this reason, it is quite complex to analyse and generalize food choices. Moreover, the relevance and perception of all these factors might vary among individuals, and individual characteristics impact food choice as well. Especially, food choice behaviour is strongly based on age, life stage and power which divides the population into different groups where slightly altered strategies are required (Bellisle, 2006). Individuals in different life stages have different needs and possibilities. Whether it is the financial budget, the health status or the general lack of time, it is nearly impossible to come up with an ideal solution to how to change to a healthier lifestyle (Jetter & Cassady, 2006). Despite this, there are certain determinants that are applicable to the majority of the population.

To begin with, biological determinants such as hunger, appetite and taste, are the most psychologically significant factors (Bellisle, 2006). The human body needs nutrients and energy as

fuel to survive. The nutrients are divided into three major ones: carbohydrates, fats and protein. A healthy diet suggests a balance of these macro-nutrients, whereas proteins have the highest effect on satiation and fats have the lowest (Stubbs et al., 1996). Consuming high-density food products, such as products with high fat and/or high sugar, will lead to overconsumption without actively knowing if the volume of the dish is not as immense. Nowadays, many people do not realize how much food one serving consists of, and as a result, consume more than is physiologically necessary (Spence & Piqueras-Fiszman, 2014).

Economic determinants are the most influential factor not based on the human body system. Costs play a key role in food choice due to the fact that a high share of the salary is dedicated to food products. Therefore, income and social status play an important role (Bellisle, 2006). A study by De Irala-Estévez et al. (2000) has shown that the lower-income group tend to have a more unbalanced diet and renounce the intake of fruit and vegetables more often. However, this does not mean that higher-income groups have a higher fruit and vegetable intake since these factors are not growing proportionally. Moreover, accessibility is economically seen as important since the food choice is highly based on the geographical location. Generally, healthy food is more expensive in urban areas compared to rural ones (Bellisle, 2006). In rural areas, the supermarkets only offer a limited assortment where healthy ingredients are often left out. In a survey conducted in Los Angelos and Sacramento, the smaller supermarkets lacked healthy items like whole-grain products, meat with lower fat content and low-fat cheese. Furthermore, if the low-income group had the access to the healthier items, it would have cost them about 40% of their monthly salary which is impossible to maintain next to other fixed costs needed for living (Jetter & Cassady, 2006). Therefore, for low-income groups, it is difficult to follow a healthy lifestyle based on the financial factor and on the availability factor in rural areas.

Besides the income aspect, the level of education has a certain influence on the food consumption behaviour of an adult. However, a study by Kearny et al. (2000) has also shown that there is no significant correlation between more knowledge and a healthier diet. This can be explained by the fact that although an individual has the knowledge, the person does not know how to directly apply it in daily life. Especially, with all the impressions an individual gets from the environment, it is quite difficult to distinguish the relevancy of the information. Moreover, through the different messages of the countless media and marketing strategies, the information tends to deviate and confuse the consumer (De Almeida et al., 1997). In the short time of the decision-making process, the individual will not directly recall the knowledge, but more listen to their intuition (Raghunathan et al., 2006). Besides the knowledge, the skills to cook and the time constraints play a vital role. If one cannot apply the knowledge or the time is not available, the theories acquired are not beneficial at all (Bellisle, 2006).

Moreover, cultural influences can lead to different eating behaviours and diets. Some cultures forbid certain food products and overconsume others. Meat and dairy are food groups which

are often forbidden in the diet plan due to religious beliefs. These cultural influences are often amended based on geographic location. For example, if someone with certain beliefs moves to another geographical location, It is quite likely that they will slightly adapt to the local eating behaviours (Bellisle, 2006).

Besides the above-mentioned influences, the social context and setting play an important role. Especially the subconsciousness, influenced by the surrounding people, plays an inherent part in the food decision-making process (Bellisle, 2006). Although an individual might be eating alone, the eating behaviour is still influenced by the attitudes and habits developed in a social context from previous experiences (Pilgrim, 1957). A supportive surrounding can have beneficial effects on the food choice itself and in the long run also on the dietary lifestyle (Sorensen et al., 1998). Support from family and friends has a specifically high influence when it comes to maintaining a healthy diet. Social support may facilitate a sense of belonging and increase confidence and self-efficacy (Berkman, 1995). Most of the food is eaten at home where individuals have full control over what to eat. However, when they are at work or in school, it might be difficult to fully decide what comes on the plate. Cafeterias often do not offer the healthiest choice or something which is to everyone's liking. Due to the limited offers, a fully working person has during work hours, it is important to investigate and improve the cafeteria menus to foster a healthier diet (Bellisle, 2006).

The general mood of a person can also have an influence on the food choice. Especially if someone experiences stress the food behaviour tends to change. Some people deal with stress by eating more and some less than usual. Individuals tend to eat more during stress since they forget about the concerns regarding weight control. A study has shown that during stress, many start to snack and thus, will increase their caloric intake. Moreover, less food might be consumed due to the loss of appetite based on the psychological changes caused by stress (Oliver & Wardle, 1999). In addition to these psychological factors, stress can cause practical changes such as time for meal preparation, the general availability of food and the opportunities to eat (Bellisle, 2006).

Former research has shown that consuming food has a tremendously strong influence on our mood and therefore also on the food choice. Often people feel guilty if they eat something which they were not meant to eat due to its unhealthiness. There is a struggle between the desire to enjoy the food and weight gain as a consequence (Oliver & Wardle, 1999). Forbidden oneself to consume a certain food type can create the opposite effect by increasing the desire to consume the food product even more which are known as food cravings. These food cravings are more common in the premenstrual ages when there is an increase in food intake next to the change in the metabolism. The mood and stress should be taken into consideration while creating an intervention for current and long-term lifestyle changes (Bellisle, 2006).

Besides the above-mentioned factors, personal knowledge, attitudes and beliefs about food impact the food consumption behaviours. Within the European Union, only around 70% of adults consider their eating behaviour as adequate where they see no need in adapting or improving it (Bellisle, 2006). According to the Pan-European Survey of Consumer Attitudes to Food, Nutrition and Health, the population of females, higher educated individuals and older ones are more considerate regarding the health aspects. On the other side, men base their decision more on the taste factor rather than the health aspect. Within the European Union the five most influential factors regarding food choice are ranked according to quality of the food, costs, taste, urge for a healthier lifestyle and the food requests of the other family members. These indicators are a summary of the survey conducted in the different European countries, however, there are high fluctuations between the countries. The biggest difference between European member states and the USA is that there most important influences are taste, price, nutrition values, convenience and weight concerns. The latter two factors did not make it into the five most important factors in the European countries. Regarding the similarities, taste and costs seem to align in the compared countries' (Smart Protein, 2021). Especially price is of high importance for retired or unemployed people due to the fact that they do not have a stable or high-income (De Irala-Estévez et al., 2000).

A certain extent on research has already been made by different researchers and they developed a few theories in regard to the healthy food decision-making process (Raghunathan et al., 2006). Especially, in the industrialised countries, the knowledge about nutritious food consumption is well-known in theory, however, the eating behaviour does not reflect the knowledge of the individuals' (Mai & Hoffmann, 2015). In the theory of constructive consumer choice processes by Bettman et al. (1998), the consumer does not recall a list of preferences while making a choice and rather base the decision on past experiences. Within prior research, there have been different opinions on the decision-making process. One of the earlier theories found was that within the decision-making process the consumer has abilities to consider the options which will maximize the value and choose accordingly (Bettman et al., 1998). However, in 1955 the scholar Simon added the notion of bounded rationality which implies that the individual in the decision-making process has restricted capacities like limited working memory and computational skills (Simon, 1955). Furthermore, scholars agreed that decision-making processes are considerations of different trade-offs of values to come to a decision (Bettman et al., 1998; Coupey, 1994; Simon, 1955). For instance, if the customer wants to buy a new car, they consider different attributes to make a decision. Depending on their personal and most important values, some other values have to be traded off such as safety for horsepower (Bettman et al., 1998). To make decisions, individuals do not have strong preferences, however, they rather create a construct on the spot to make a choice. This construct is based on the idea of constructive preferences which implies that they utilize different approaches and eventually restructure prior knowledge to make a decision in the moment. However, it is important to consider that preferences are strongly dependent on the context (Coupey, 1994). In regards

to restaurant menus, a customer might have a strong preference for chocolate cake, however, this does not necessarily mean the individual will always select this dish since the decision is dependent on the context of the situation (Bettman et al., 1998).

In the research of Bettman et al. (1998), five major points were raised to characterize the decision-making process of consumers. First of all, the choice between different options is highly dependent on the goal of the individual. The goal can be a combination of minimizing the cognitive efforts and past negative experiences or maximizing the accuracy and the ease of justifying the decision required for the decision-making process. Secondly, the decision-making process is dependent on the complexity of the task. As a task becomes more complex, decisions that are better in one of the most important attributes are favoured since the use of simple decision processes increases as a task becomes more challenging. Thirdly, the decision-making process is highly dependent on the context as reconfirmed by Coupey in 1994 (Bettman et al., 1998; Coupey, 1994). In order to make a decision the characteristics of all options in the choice set will be evaluated. Fourthly, the decision depends on how the question is formulated by the opposed individual. Different decisions can be systematically reached using various strategies for eliciting preferences. Lastly, the decision is dependent on the representation of the choice set. The main issue here is whether the outcomes are displayed as gain or loss whereas losses have a stronger impact on the decision-making process (Bettman et al., 1998).

2.3 Sensory Marketing

In the last two decades, the role of sensory experiences in the decision-making process has received a tremendous amount of interest from marketers and psychologist (Krishna & Schwarz, 2014). Marketers from various industries were building on strategies where they can reach consumers through the five senses (Havard Business Review, 2015) – sight, smell, hearing, touch, and taste – and establish a successful sensory marketing communication tool (Dissabandara & Dissanayake, 2019; Jain & Gupta, 2005). Krishna and Schwarz (2014) define sensory marketing as "marketing that engages the consumers' senses and affects their perception, judgement, and behaviour" (p. 159). Within the past research, it was found that these nonconscious stimuli can cause a powerful and positive response in the decision-making process (Havard Business Review, 2015). With the engagement of the senses, the purchase behaviour can be influenced by stimulating the interest and the emotional response. Consequently, this might affect the rational thinking of the consumers and change their purchasing behaviour (Kennedy, 2008). The main objective of sensory marketing is to send a message to the consumer and create interest and temptation to consume the product. Ideally, the consumer will repurchase it and create a bond with the product or brand (Dissabandara & Dissanayake, 2019).

Nowadays sensory marketing mainly addresses the two higher senses, seeing and hearing, and rather neglects the other senses like taste and touch (Krishna, 2010; Swahn et al., 2010a). This may be caused by the fact that our senses are geared towards detecting danger rather than delighting in sensory experiences. However, this might be a great opportunity for marketers to include these other senses to heighten the appeal and sensation of a food product in order to increase the interest of the consumer's (Swahn et al., 2010a). Although all the senses are separated anatomically, environmental stimuli affect and stimulate multiple senses at once. Correspondingly, sensory marketing should not focus on a single sense (Yeomans et al., 2008).

In sensory marketing, the environmental psychology study by Mehrabian and Russell (1974) is used as the predictor of consumer behaviour. This stimulus-organism response paradigm explains that environmental stimuli can cause an emotional reaction which consequently creates a behavioural response in the consumer. Moreover, the model suggests that the consumer can react with three emotional responses namely pleasure, arousal and dominance which lead to either the approach or avoidance behaviour. The approach behaviour thrives for exploring, staying and accepting the environment, whereas, avoidance leads to escape from the environment (Mehrabian & Russell, 1974). This model is often used as a foundation in consumer behaviour studies to investigate the additional time spent in a store, behavioural intention, purchase decision and actual spending (Erenkol, 2015).

2.3.1 Sensory Attributes in the Food Industry

The sensory department of the Institute of Food Technologies defines sensory evaluations as "a scientific discipline used to evoke, measure, analyze, and interpret reactions to those characteristics of foods and materials as they are perceived by the senses of sight, smell, taste, touch, and hearing" (Penfield & Campbell, 1990, p.52). Sensory evaluations are used to create a perception of anything with the five senses. However, within the food industry, the descriptive sensory attributes are defined even more precisely to evaluate food quality. Using humans' senses to detect and evaluate these sensory qualities of foods, beverages or other materials is known as sensory evaluation (Sinesio, 2005). The most common attributes assessed with the sensory evaluation are appearance, texture, taste and smell (Bellisle, 2006), whereas some researchers like Chumngoen and Tan (2015) added odour as the fifth attribute. Sensory evaluation supports defining the technical specifications of the food products and determining the hedonic perception of the consumer (Sinesio, 2005).

Unlike sensory marketing in general, the sensory food design industry mainly focuses on taste and smell instead of sight and sound (Swahn et al., 2010a). Bellisle (2006) even argues that the taste attribute solely is the deciding one since "taste is the sum of all sensory stimulation that is produced by the ingestion of a food" (p.1). The personal taste is strongly dependent on the influence of the family and the general experiences with food (Clark, 1998). This already starts to develop at an early age as an infant but will change over the years (Forestell & Mennella, 2017). Darwin suggested over a century ago that "we can learn much about humans from the microstructure of their behavioural affective reactions" (Forestell & Mennella, 2017, p.1). In the research over the past 50 years, scholars discovered that spontaneous facial expressions can have a tremendous impact on emotional experience (Saad, 2013). This unequivocal language influence created a universal expectation of what the facial expressions of the basic emotions of happiness, sadness, anger, fear, surprise and disgust should look like. In comparison to other sensory capacities, taste already emerges quite early in the human fetus (Forestell & Mennella, 2017). After the 8th week of conception, taste buds start to develop and around the 14th week it begins to resemble the ones of an adult (Maone et al., 1990). From the evolutionary theory point of view, infants convey information from the hedonic facial expression toward the flavour and taste of their caretakers which consequently forms their perception of the sensory characteristics of the food (Forestell & Mennella, 2017). The food industry mainly builds its new product based on taste and smell and adjusts the flavours for future products accordingly (Swahn et al., 2010a). Therefore, the development of taste and flavour has to be understood, in order to create food items liked by the wide population.

In marketing strategies, the sensory characteristics of a food product may play a significant role in capturing consumers' attention and consequently affect their behaviour in a habitual way (Kahn & Wansink, 2004). Due to the recognition of sensory experiences, marketers have put more effort into applying multiple sensory inputs to influence the decision-making of their

consumers (Yeomans et al., 2008). Since the consumer only needs two seconds to make a decision, it is of major importance to break through these habits and routines (Lindstrom, 2005). However, in this short time span of the decision-making process, it is quite complex to change the consumer's behavioural patterns.

Swahn et al. (2010a) conducted an experiment where they tried to break the routines by altering the description of the product with different labels. The experiment was conducted with apples where the labels were altered in every round by adding information such as origin, sensory descriptions and semantic descriptions. Within four rounds, over 1,623 consumers were observed during their apple purchasing process. The outcome of this experiment was that one could see that the habits can be changed based on the extent of additions in the description of the apples. However, when only the sort name of the apple is presented, the consumers are more likely to choose the usual apple instead of trying something else. This shows that the precise descriptions and labels have an impact on the consumer choice and the habits can be changed (Swahn et al., 2010a).

2.3.2 Cue Utilization Theory

Within sensory marketing, the consumer is influenced by different cues of sensory descriptive attributes. Based on the information provided about the product, the consumer creates a belief and opinion about these new products. Depending on the prior experiences and knowledge about the certain product, the consumer combines the newly presented cues with the already known information (Piqueras-Fiszman & Spence, 2015; Wansink et al., 2005). The cue utilization theory plays an important role as it is the foundation of a decision-making process.

As food is consumed based on either hedonic or utilitarian benefits, one should distinguish between two different decision-making processes. Accordingly, research is required to better understand the determinants of consumption of hedonic products in order to better understand how to evaluate products and make decisions based on their hedonic qualities. To explain this behaviour the cue utilization theory is widely used (Pezoldt et al., 2014). Cox was one of the first scholars to describe this product evaluation process and called it an “array of cues” (Cox, 1967, p. 324). The consumer is given different cues in order to evaluate a product and make a judgement (Cox, 1967). The cue utilization theory is acknowledged as “a rationale for explaining consumers’ evaluation of products and product attributes (Pezoldt et al., 2014, p. 1283).

Within the cue utilization theory, one can distinguish between intrinsic and extrinsic cues (Kpossa & Lick, 2020). The intrinsic cues are associated with the product itself and cannot be altered when modifying certain features such as an ingredient. In comparison, extrinsic cues are everything which relates to the product itself but are not a physical aspect of the product.

Examples of extrinsic cues are the brand, price, packaging or warranty (Richardson et al., 1994). In regards to the effectiveness of intrinsic and extrinsic cues, research provides rather conflicting evidence (Pezoldt et al., 2014; Szybillo & Jacoby, 1974). On the one hand, intrinsic cues seem to be more effective regarding product quality. On the other hand, extrinsic cues are more relevant when it comes to the decision-making process for hedonic products (Pezoldt et al., 2014). Depending on the product type and prior experience, consumers switch between using intrinsic and extrinsic cues (Jacoby et al., 1971). Moreover, this evaluation of the presented cues is subjective to every individual due to the fact that these new cues are evaluated in combination with the existing ones (Piqueras-Fiszman & Spence, 2015).

A number of these cues are filtered based on their availability and selection is impacted by a variety of consumers' awareness, preferences, beliefs, abilities, characteristics and contextual factors (Fejes & Wilson, 2013; Kpossa & Lick, 2020). These product-extrinsic and product-intrinsic cues prompt flavour expectations and perceptions which are based on sensory and hedonic components (Kpossa & Lick, 2020).

Due to the rapid growth of this industry, solely focusing on intrinsic elements is not good enough to meet the expectations of the consumer. More importantly, industry specialists should put more emphasis on extrinsic product attributes like innovative ideas regarding the label, description, price and brand of the product in order to make an impact on the consumers' choice (Enneking et al., 2007). An intrinsic attribute of a food product would be taste, whereas extrinsic factors can also be a label or description. Sensory descriptive food attributes are considered extrinsic cues since they can be adapted and changed throughout the branding process (Richardson et al., 1994). As already stated in previous chapters, extrinsic cues like descriptive attributes can prompt positive expectations of the customers. Therefore, it is vital to make use of this cost-efficient marketing strategy to increase sales and positive feedback (Wansink & van Itersum, 2001).

Enneking et al. (2007) came to the conclusion that at the point of the decision, the individual does not simultaneously evaluate the intrinsic and extrinsic product attributes. Therefore, the decision either lies with the overvalued taste attribute or the extrinsic attributes. However, the food product usually cannot be tasted before the decision-making process which makes the extrinsic factors more important in attracting the consumer (Enneking et al., 2007).

2.3.3 Food Expectations and Perceptions

The way the human brain works is often explained by the match or mismatch with the input of sensory attributes to the stored information. In prior research the scholars explained the brain process by the predictive processing paradigm (Piqueras-Fiszman & Spence, 2015). Neuroscientists propose that "perception involves the use of a unified body of acquired knowledge (a multi-level "generative model") to predict the incoming sensory barrage" (Clark, 2015, p. 5). In

the predictive processing model, perception and cognition is seen as one single unit and in order to perceive the world representatively, sensory prediction errors has to be avoided. During the process, the brain uses prior beliefs to create a percediction for the current sensory signal. Therefore, the key property of the predictive processing model is that the brain is always actively influences the predictions and creates predictions instead of solely listening to the external stimuli (Piqueras-Fiszman & Spence, 2015).

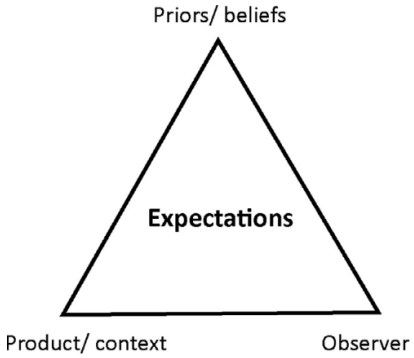

FIGURE 3. EXPECTATION CONSTRUCT. (PIQUERAS-FISZMAN & SPENCE, 2015).

As shown in figure 3, expectations are an interplay of the factors relate to the product and context the observer is in currently, the observer's priors and beliefs and the observer itself (Piqueras-Fiszman & Spence, 2015).

Expectations are often mentioned in the context to food consumption. Due to the lack of opportunity to taste food products prior to the purchase, the individual has certain expectations toward the product. These expectations are based on a combination of the extrinsic and intrinsic cues of the food product (Kpossa & Lick, 2020). Within the food expectation, one can distinguish between sensory expectations and hedonic expectations. The concept of sensory expectations refers to expectations regarding certain sensory characteristics for instance the texture, sweetness, saltiness, creaminess, and crunchiness to a certain extent. In comparison, consumers' hedonic expectations refer to the magnitude of their satisfaction or dissatisfaction with the food product (Cardello & Sawyer, 1992).

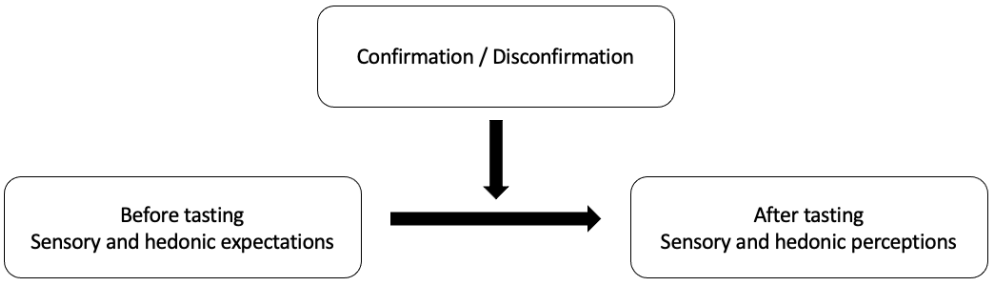

FIGURE 4. SENSORY AND HEDONIC EXPECTATIONS AND PERCEPTIONS. (ADAPTED FROM KPOSSA & LICK, 2020).

After the consumption of the food product, the consumer creates a sensory and hedonic perception of the product. The perception of the value of the product either matches the prior expectation or diverges. Therefore, the sensory or hedonic expectations are either confirmed or disconfirmed as seen in figure 4 (Kpossa & Lick, 2020; Piqueras-Fiszman & Spence, 2015). However, there are three possible outcomes while comparing the expectations and perceptions. The first outcome is a neutral feeling where the perception of the food product equals the expectations. The second scenario is that the perception exceeds the pre-tasting expectations which can be referred to as positive disconfirmation of the expectations (Kpossa & Lick, 2020). This overperformance leads to higher satisfaction and might lead to a repurchase of a product. However, the actual purchase behaviour depends on the level of attachment the customer has towards the product. If the customer puts more thought into the purchase rather than just spontaneously buying it, the more the customer is attached and involved with the product (Solomon, 2006). The third and last situation is when the perception underperforms and is perceived as lower than the expectation. In this context, the situation is defined as a negative disconfirmation of the expectations which leads to dissatisfaction (Kpossa & Lick, 2020).

Another theory used to explain the effect of descriptive food attributes on food expectations and experiences is the assimilation theory. The assimilation theory describes the congruency of the expectation and the actual experience, whereas small discrepancies are allowed. This congruency would confirm that the actual flavours reached the expected ones. This assimilation process is particularly strong when put into relation to affective or sensory evaluations. Therefore, positive sensory expectations can increase the likelihood of the food whereas negative sensory expectations reduce it (Yeomans et al., 2008). In the situation with a restaurant menu, a descriptive addition which increases the expectation of the quality will lead to a higher hedonic evaluation of the food in comparison to only a nutritional description. This shows that the actual evaluation of the dish is closer to the expected quality although that differed from the actual quality based on the different stimuli (Yeomans et al., 2001). Correspondingly, adding evocative descriptive attributes lead to a more positive evaluation of the food compared to more nutritious and non-evocative attributes (Wansink et al., 2005).

Researchers have discovered an important method to positively stimulate food expectation and perception. The flavour expectations and perceptions consist of hedonic and sensory factors which are generated by extrinsic and intrinsic cues (Kpossa & Lick, 2020). Especially product-extrinsic cues have a strong influence on the food choice particularly when there are no prior experiences (Kpossa & Lick, 2020). These external pieces of information like descriptions (Chen et al., 2020), labels (Higgs, 2016) or packaging (Papies et al., 2017) are important guidelines for the individuals to form a perception. Moreover, for instance, the choice of background colour can influence the expectations and perceptions of the consumer. With this insight, the “crossmodal correspondence” construct was invented to describe this correlation

between extrinsic cues and flavour expectations (Kpossa & Lick, 2020). Spence (2011) describes the crossmodal correspondence theory as "nonarbitrary associations that appear to exist between different basic physical stimulus attributes, or features, in different sensory modalities" (p.972). Every human being associates certain basic stimuli with a different sensory attribute such as small and big circles versus low and high pitched sounds. These patterns were discovered and can be observed within the majority of the population (Spence & Parise, 2012). Most of the prior research emphasizes the relationship between the sensory modalities of vision and audition, however, the crossmodal correspondence is very likely to exist between all sensory modalities. In regard to taste, there were significant results found in combination with sounds, shapes, odours and colours (Spence, 2011). Wang and Spence (2019) conducted an experiment where the participants had to describe a white wine, rosé wine and white wine which was artificially coloured with a tasteless food dye to look like rosé without the participants knowing. The results of the experiment showed that the participants rated the artificially coloured wine closer to the rosé rather than the white wine although the coloured one was originally a white wine. This showed that the colour of the product can affect the perception of the flavour which is an example of the crossmodal correspondence (Wang & Spence, 2019). Another study conducted by Lick et al. (2017) confirmed that the colour of wine labels has an impact on the flavour perception. The researchers compared the colours red, orange, black, white, beige and blue to fruity, flowery, herbal, tangy, caramelized, smokey, peaty and microbiological flavours. The outcome of the study was mostly significant showing that red and black are strongly associated with tangy flavour, red and orange with fruity and flowery flavour, orange with sweet flavour, black with earthy and dry flavour and white with milky flavour (Lick et al., 2017).

Certainly, these correlations and associations made are not explicitly learned or studied, however, there are similar behavioural intentions for most individuals (Yeomans et al., 2008). Studies showed that people on the spectrum of autism do not necessarily fall into this scheme, indicating that the crossmodal correspondence does not apply to every human being (Oberman & Ramachandran, 2008). Since the subconscious learns from these schemes to make food-based decisions, it is even more essential to highlight the importance to understand the food-based expectancies in order to stimulate a healthier eating habits. Based on the crossmodal correspondence theory, the consumer is highly influenced by the product-extrinsic cues. Therefore, it is vital to investigate these correlations between these sensory modalities in order to understand and stimulate the expectations of the consumer in one's favour (Spence, 2011).

The assimilation process solely works if the discrepancy between the actual and expected value is not too high. If that is not the case, the contrast theory may substitute the assimilation theory. The contrast theory states that the actual evaluation of the product is far away from the expected quality which decreases the perception of quality. However, when the expecta-

tion is strong enough with a large discrepancy, assimilation might still occur (Piqueras-Fiszman & Spence, 2015). Within the current research, there are split opinions on the occurrence of assimilation and contrast theory. The majority states that assimilation theory is more common, however, a study by Zellner et al. (2004) proves exactly the opposite. Additionally, an experiment by Yeomans et al. (2008) with salmon-flavoured ice cream showed that if the expected flavour is very different to the actual flavour, the contrast effect applies. However, if the product is described as ”frozen savoury mousse”, the product was rated better on average. This effect can be explained by the crossmodal correspondence since ice cream is associated with sweet and fruity and when trying the savoury version the participants were caught by surprise (Yeomans et al., 2008). These linguistic labels affect the expectation of the individual and therefore the behaviour toward the food or drink (Papies et al., 2017). In regards to general hedonic evaluations, assimilation and contrast effects can both be outcomes, however, the actual outcome depends on the type, plausibility and strength of the expectation (Yeomans et al., 2008).

Individual and subjective experiences play an important role regarding food expectations. Individuals combine certain situations and stimuli with different outcomes. Especially the activation of specific memories can result in additional inferences through the pattern completion process. Depending on the situation, the best fitting memory gets activated to guide the individual to the desired goal based on the expertise of a prior experience. This also goes along the line with the grounded theory of desire and motivational behaviour where the best-matching conceptualization of the situation becomes the basis of the current situation (Papies et al., 2017). An example of the pattern completion theory would be that the specific memory of the taste of, for example, a sweet chocolate cake will result in an additional inference where the cake is perceived as less nutritious (Garaus & Lalicic, 2021). These inferences are subjective to individuals since there is a different kinds of food consumption in different situations which shape the experiences. These different experiences lead to different pattern completion inferences for future food cues (Papies, 2013). This individuality goes alongside genetics, cognitive, affective, motivational and behavioural traits. These factors reflect the situated conceptualization of an individual’s memory (Papies et al., 2017).

2.3.4 Sensory Descriptive Food Attributes

Prior research has shown that linguistic information about food-related products has a positive impact on the consumer. Up to this point, research has centred primarily on aspects related to origin product ingredients, health and nutritional claims and safety of the products instead of a description with sensory attributes (Borra, 2006; Kahn & Wansink, 2004). The description of food and food-related items is of tremendous importance especially when the consumers have priors and a certain expectation for the item. Sensory descriptive attributes can be found on any packaging of food items in the supermarket, on restaurant menus and also in the general advertisement industry (Borra, 2006). In an early study in 1966 by Wolfson and Oshinsky with a

chocolate-flavoured liquid space diet drink. The participants received the chocolaty drink either labelled as space food or unknown. The unknown labelled drink scored two points lower on a 9-point scale compared to the space food labelled one (Wolfson & Oshinsky, 1966). The conclusion Wolfson and Oshinsky (1966) made is that altering the name either related to the food product or an exotic term can enhance the preference of the consumer.

The scholars Piqueras-Fiszman and Spence (2015) identified different kinds of labels a food item can have. One of them is about the production and growing process. A study conducted in the US showed that individuals who show interest in sustainability tend to rate organic and natural food as tastier compared to the indifferent group after trying it. The group that does not particularly care about the environment experienced the food as less tasty. This can be explained by the unhealthy-tasty intuition since organic food is perceived as healthier than commercially grown food (Schuldt & Hannahan, 2013). On the contrary, other scholars found evidence that labelling food products as organic increases the hedonic scores while blind tasting compared to any other type of label (Ekelund et al., 2007). Evaluating these results from prior studies, it seems that the labels about production and the growing process can influence the perception in both directions. An assimilation effect might appear depending on the consumer's interest in sustainability (Piqueras-Fiszman & Spence, 2015). Another identified label is the industrial treatment of food products. Informing the consumers about the industrial processes of the items can backfire due to the prejudiced negative attitude these attributes have. However, being informative of the processes, enlightening the benefits and highlighting the taste attributes can change customers's opinions and increase the ratings. Nevertheless, it is highly dependent on the customer, the kind of product and the type of information shared (Cardello, 2003).

Health or ingredient labels give the consumers insight into the nutritional content of a certain food item. This nutritional information includes in most cases the number of calories, and the fat and salt content (Kähkönen & Tuorila, 1998). In the literature to date, there have been slightly contradicting explanations regarding the effectiveness of health labels. However, there is an agreement that the effect is based on the type of product and that it does not directly correlate with the hedonic liking (Fernqvist & Ekelund, 2014; Piqueras-Fiszman & Spence, 2015; Turnwald et al., 2017). In a study with Bologna sausage, the participants received it either labelled as "Light Bologna (10%) fat" or "Regular type of Bologna (20%) fat". The experimenters expected the dish with the healthier label to be evaluated as less fatty, juicy, salty and generally less pleasant. However, after the consumption, there were no significant differences between the evaluations of these two differently labelled dishes (Kähkönen & Tuorila, 1998). Regarding health labels, Garaus and Lalicic (2021), conducted an experiment where consumers' responses to the same online recipe were compared with different labels. The outcome of the experiment was that a taste label only does not have a significant impact on the decision-making in comparison to a no label condition. However, a combination of taste and health

labels had the most significant impact on the food choice (Garaus & Lalicic, 2021). Turnwald et al. (2019) confirms in their study that taste-focused labelling elevates the taste expectation of healthy food items. Moreover, taste-focused labelling has a better success rate to promote healthy dishes compared to health labels or basic and non-descriptive labels (Turnwald & Crum, 2019) Another study conducted by Norton, Fryer and Parkinson (2013), compared chocolates with either no label or the label "reduced-fat". The outcome of this experiment showed that the health label had a significant negative effect on the expected liking of the participants. Conversely, it did not affect the actual liking, rating or the tested sensory attributes after the consumption (Norton et al., 2013). The conclusion one can draw from these experiments is that health labels negatively affect the expectation of the food item which confirms the unhealthy-tasty intuition. Moreover, the product with the healthy label is rated with lower salt and fat content, whereas the actual liking of the food item tends to stay the same after consuming it. As with organic products, the expectations are highly affected by the labels, however, there is no significant difference between the organic and commercially grown food. Therefore, the description of a product is vital since it creates the foundation for the expectation which consequently can lead to the assimilation or contrast effect (Piqueras-Fiszman & Spence, 2015).

Furthermore, short and meaningful health claims have a stronger impact on consumers with less involvement and interest whereas a more aware consumer rather has more detailed information (Bettman et al., 1998). However, an overflow of information like long descriptions might lead the consumer to make a poorer decision, while a lack of information may be misinforming (Jacoby et al. 1974 as cited in Swahn et al., 2010a). Consumers who do not understand the descriptions or simply ignore them, tend to evaluate the food product as either solely good or bad. Involved customers who read and understand the description are more likely to give a more comprehensive evaluation of the product. Therefore, labels or descriptions should be designed clearly and understandably to achieve the best effect in the decision-making process (Dimara & Skuras, 2005; Swahn et al., 2010a). Moreover, researchers have found another relevant factor regarding the quality of the product. If the producers do not label their product with the quality status, the product is more likely to be perceived worse compared to the labelled ones (Caswell & Padberg, 1992). The time constraints of the consumer play an inherent role in the decision-making process as well due to the fact that through time pressure the consumer might not be able to process the claims made on the product and rather decides spontaneously and intuitive. Therefore, the claims made have to "catch" the consumer's attention and get at least acknowledged subconsciously (Bettman et al., 1998).

The wine industry is one of the few which applies sensory methods and languages successfully. Sensory language is used to communicate and advertise through the labels on the bottles, as a description on the wine menu and in stores. The information provided relates to the origin, certifications, vintage, style of the vineyard and sensory descriptives of the wine and grapes

(Dimara & Skuras, 2005). In the wine industry, it is inconceivable anymore to not have these labels since the purchasing behaviour is strongly based on the information provided as the wine usually cannot be tasted beforehand. From the manufacturer's point of view, this communication strategy is cost-effective and assists the brand to stand out in comparison to their competitors (Swahn et al., 2010a).

Wansink et al. (2005) report that the results of adding a descriptive attribute to a dish on the restaurant's menu leads to a change in the consumer's perception. According to Chen et al. (2020) and Wansink and van Itersum (2001), the addition of descriptive sensory attributes has a positive impact on food choice and can generate an additional sales of 27 per cent. Wansink et al. (2005) conducted a study where the items on the menu in a restaurant were described with a more evocative label. Therefore, the items of "Seafood Filet", "Chicken Parmesan" and "Chocolate Pudding" were adapted to "Succulent Italian Seafood Filet", "Homestyle Chicken Parmesan" and "Satin Chocolate Pudding". The additional descriptive labels showed many positive effects such as doubling the number of positive feedback and higher ratings on tastiness and attractiveness of the dishes (Wansink, 2015). However, the descriptives used in the study were not conducted from research with a sensory analysis or a flavour profile but rather from brainstorming food-related terms which could be associated with the meal (Wansink et al., 2005).

The decision-making process about food purchases is complex and affected by numerous psychological, marketing and sensory factors. However, food descriptions and labels can highly influence the food buying decision and support the consumers with their food choices (Swahn et al., 2010a). This shows the importance of sensory attributes which can help the consumer to evaluate new food products or alternatives to the usual buying behaviour. Moreover, these attributes can trigger the retrieval cue which will recall information from the long-term memory (Lindstrom, 2005). Wansink et al. (2005) set up a theory that descriptive labels can support consumers by using their feelings and emotions on the anticipated taste which influences the opinion and decision on a food product. There are a number of complexities involved in communicating the sensory characteristics of a food product. The appropriate use of sensory descriptions and the choice of words is vital to positively influence the consumers' choice (Swahn et al., 2010b). According to the research up-to-date, the following hypotheses were formulated:

H2: Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes.

H3. Health attributes negatively impact taste expectations (a) and positively impact healthiness expectations (b) as compared to the absence of any attribute.

H4. Taste expectations (a) and healthiness expectations (b) positively impact food choice.

2.3.4.1 Taste and Flavour

During the consumption of food and drinks, individuals experience flavour. Flavour is a multisensory experience and stimulates all five senses such as visual, olfactory, gustatory, auditory and tactile senses (Kpossa & Lick, 2020). Spence (2017) states that it is commonly acknowledged that "flavour perception results from the multisensory integration of multiple sensory signals in the human brain" (p. 235). Scientists do not fully agree yet on how flavours are processed by the human brain (Sheperd, 2013; Spence, 2017). On the one hand, Sheperd (2013) describes flavour as the result of the brain processing the flavour molecules in food and beverages which is in the sector of neurogastronomy. On the other hand, Spence (2017) claims that this explanation is not satisfactory and developed the science of gastrophysics where he justifies the experiences made with food and beverage with the multisensory factors. Gastrophysics is a combination of the words "gastronomy" and "psychophysics", whereas gastronomy relates to the culinary experiences and psychophysics refers to the study of perception and its effects on consumer behaviour (Spence, 2017).

Taste and flavour are often used as synonyms in daily life. However, taste is only one part of the flavour experience. The five basic tastes are sweet, salty, bitter, sour and umami whereas umami can be described as the taste of glutamate or a strong broth (Piqueras-Fiszman & Spence, 2016). The overall flavour experience is categorized into either exteroceptive or interoceptive senses. Exteroceptive or anticipatory senses create expectations before the consumption of food and beverages, whereas interoceptive or consummatory senses are prompted after taking the first sip or bite (Piqueras-Fiszman & Spence, 2016).

Exteroceptive Senses	Interoceptive Senses
Vision	Gustation
Orthonasal Olfaction	Retronasal Olfaction
Somatosensation	Oral Somatosensation
Audition	Audition

TABLE 1. EXTEROCEPTIVE & INTEROCEPTIVE SENSES. (ADAPTED FROM PIQUERAS-FIZMAN & SPENCE, 2016).

Before the consumption of food or beverages, the four exteroceptive senses presented in Table 1 are particularly important. At first, the food will be evaluated visually where the individual already forms an opinion about the product. The colour and shape play an inherent role in

the evaluation. Orhtonasal olfaction describes the smelling of the food product before trying it such as sniffling a hot soup or a wine. Somatosensation relates to the tactile senses of touching a product before consuming it. An example of that is touching fruits to determine their stage of ripeness. The fourth anticipatory sense is the sound the food product produces while preparing it. This audition could be the sizzle of a steak touching the pan or the sound of chopping fruits and vegetables (Kpossa & Lick, 2020; Piqueras-Fiszman & Spence, 2016).

In contrast, after the first try of the food or beverage, the interoceptive senses evaluate the experience of the product. The right column of Table 1 describes the four most important consummatory senses (Piqueras-Fiszman & Spence, 2016). The most observable sense activated after trying the product is gustation. Gustation relates to the taste of the product which is composed of five different ones as discussed above (Yeomans et al., 2008). Furthermore, retronasal smell, the odours emanating from the product, have a strong influence on the perception of flavour. The retronasal olfaction can be further described as a mixture of taste modes and conventional smell (Kpossa & Lick, 2020). The combination of retronasal and orthonasal olfaction from the anticipatory senses has the strongest influence on the whole flavour experience (Lawless, 2001). Besides these before-mentioned senses, the temperature and texture experienced in the mouth have a strong influence which is defined as the oral somatosensation (Yeomans et al., 2008). As within the exteroceptive senses, the interoceptive senses include audition as well. In this sense, the sounds of for instance crunchy, crispy or chewy food products affect the perception of the product itself (Kpossa & Lick, 2020; Piqueras-Fiszman & Spence, 2016).

Exteroceptive senses prompt expectations and create a perception of the item in front of the individual while interoceptive senses solely appear after the consumption. Therefore, only exteroceptive senses are important in regard to sensory descriptive attributes since the customer has to make a decision before having the first bite of the food or drink.

2.3.4.2 Texture, Viscosity and Mouthfeel

Many researchers agree that taste is one of the major determinants of food choice. However, taste and flavour are not the only determinants (Bellisle, 2006). Texture and mouthfeel have a tremendous impact on the whole experience and have been challenging sensory properties for manufacturers in the food and beverage industry (Guinard & Mazzucchelli, 1996). Guinard and Mazzucchelli (1996) refer to texture as the “forgotten attribute” due to the fact that it has not gotten much attention in comparison to flavour in prior research. The definition of texture has been revised several times throughout the research. The first definition of texture in the context of food was defined by Matz in 1962 as “the mingled experience deriving from the sensations of the skin in the mouth after ingestion of a food or beverage, as it relates to density, viscosity, surface tension and other physical properties of the material being sampled” (Guinard & Mazzucchelli, 1996, p. 213). In more recent research this definition has been

adapted more to “the sensory manifestation of the structure of the food and the manner in which this structure reacts to the applied forces, the specific senses involved being vision kinesthesia, and hearing” whereas kinesthesia relates to the “sensation of presence, position or movement” which are generated by “muscles, tendons and joints” (Szczesniak, 1990 cited in Guinard & Mazzucchelli, 1996, p. 213). While texture relates to solely solid and semi-solid foods (Hogenkamp et al., 2011), mouthfeel includes all the tactical properties which include liquids as well. Food or beverage can be considered as mouthfeel only while the product has been placed in the mouth until it gets swallowed. Afterwards one relates to residual mouthfeel effects or after-feel which is the equivalent to the aftertaste, the sensation of residual taste (Guinard & Mazzucchelli, 1996). The perception of texture is extremely dynamic since the physical properties change meanwhile processing it in the mouth (Guinard & Mazzucchelli, 1996). A study conducted by Hogenkamp et al. (2011), showed that texture is superior to taste. Part of the experiment was to rate chocolate milk and chocolate custard. The result of the experiment was that the custard was consistently rated as tastier compared to the milk, although it had the same chocolate taste. Therefore, the thicker the food is, the higher the expected satiation (Hogenkamp et al., 2011).

2.3.4.3 Multiple Sensory Attributes

Although taste and texture are the most commonly used sensory attributes to make a dish more attractive, many studies have discovered that combining multiple sensory attributes can possibly achieve a higher success rate (Auvray & Spence, 2008; Ernst & Bülthoff, 2004; Piqueras-Fiszman & Spence, 2015; Spence, 2015). Flavour is considered a multisensory experience including not only taste and smell, however, also texture, somesthetic sensations and visual and auditory perceptions (Auvray & Spence, 2008). The multisensory integration comes from neuroscience and is defined as the study of the effects of sensory modalities on the nervous system. Individuals usually process many different sensory cues for instance vision, noise, and temperature at the same time which indicates that multisensory integration is the creation of a coherent multisensory perception (Ernst & Bülthoff, 2004).

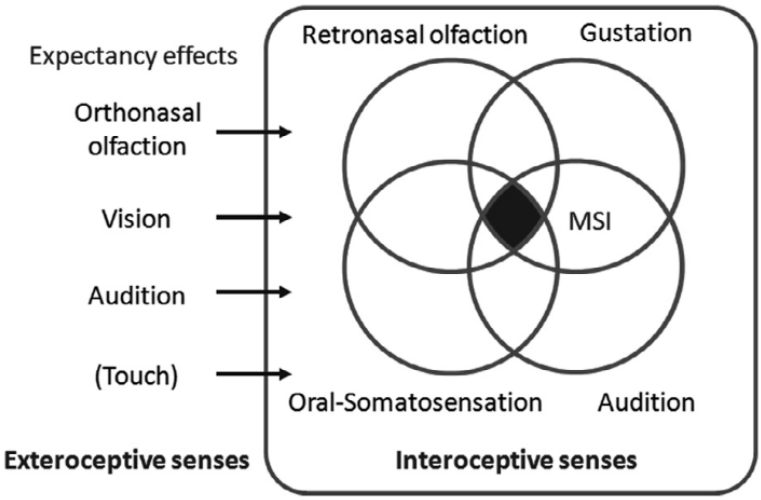

FIGURE 5. MULTISENSORY INTEGRATION. (PIQUERAS-FISZMAN & SPENCE, 2015).

Piqueras-Fiszmann and Spence (2015) visualized the multisensory integration which can be seen in figure 5. The multisensory integration in the context of food is the interplay between retronasal olfaction, gustation, oral somatosensation and audition which is only activated when tasting the food or drink. Since the flavour is an interplay of different exteroceptive and interoceptive senses, it is vital to approach more than one sense in order to prompt the full flavour experience. Spence (2015) states that smell is the main contributor to taste and accounts for 80% - 90% of the flavour.

With descriptive sensory attributes, only the exteroceptive senses can be stimulated due to the fact that interoceptive senses belong to the food item itself and can only be changed by altering the whole product. Therefore, only exteroceptive senses can stimulate the taste expectation (Piqueras-Fiszman & Spence, 2015). Due to the multisensory nature of flavour expectation, multiple sensory cues should be addressed. In prior studies, the interplay of taste and texture has been investigated already.

Multisensory integration influences the expectation and perception of the consumer and plays a key role in determining the flavour and quality of a food item. Moreover, existing researchers propose that there is no necessity in stimulating all the elements of flavour to achieve multisensory integration, however, it has to be more than one (Velasco et al., 2018). Based on this information, the sensory descriptive food attributes of taste and texture will be used to create a multisensory integration and therefore prompt the tastiness expectation and positive behavioural intention.

2.4 Hypotheses Development and Conceptual Model

In the previous subchapters, the most important theories were highlighted in order to explore the effects of descriptive sensory attributes in the decision-making process of food. The main

theory is the unhealthy-tasty intuition, where unhealthy food is perceived as tastier compared to healthy food. Moreover, descriptions in combination with sensory attributes have shown significant results in the prior research. Based on the information in the extensive literature review the following conceptual model and hypotheses were created:

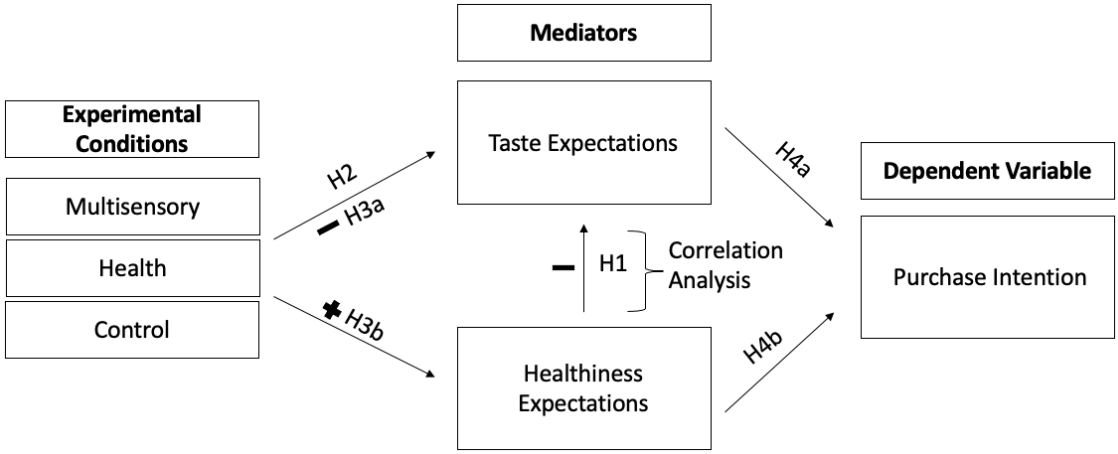

FIGURE 6. CONCEPTUAL MODEL.

The hypotheses are summarized below.

H1: Healthiness expectations are negatively correlated with taste expectations.

H2: Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes.

H3: Health attributes negatively impact taste expectations (a) and positively impact healthiness expectations (b) as compared to the absence of any attribute.

H4. Taste expectations (a) and healthiness expectations (b) positively impact food choice.

3 METHODOLOGY

After an extensive literature review on the main theories the unhealthy-tasty intuition and sensory marketing in the restaurant industry, the following chapter is going to give some practical insight into this topic. In this chapter of the thesis, the chosen methodology and research design will be closely evaluated. Additionally, the sample used in the research as well as the methods for collecting data will be described. In the final stage, the methods for analyzing the collected data will be discussed.

3.1 Selection of Methodology

The research strategy for this thesis is based on a linear research design. An overview of the research strategy is shown in figure 7. First of all, a comprehensive literature review was conducted. Based on the secondary research, the conceptual model and hypotheses were formulated. These hypotheses were tested using a quantitative research method in form of an experimental research design. Afterwards, the data will be analysed with the help of SPSS a statistics software. Lastly, there will be a conclusion and discussion of the results of the experiment and a comparison to the secondary data.

FIGURE 7. RESEARCH STRATEGY.

In quantitative research, research problems are identified based on trends in a certain area and the urge to understand the relationships between variables (Creswell, 2012). Mertler (2019) even states that “quantitative research relies on the collection and analysis of numerical data to describe, explain, predict, or control variables and phenomena of interest” (p. 108). In this research, there was a trend in the rising numbers of obesity and therefore the author investigated the food consumption behaviour. To be even more precise, individuals tend to have an intuition that healthy food tastes worse. In order to counteract this unhealthy eating behaviour, the author investigated if sensory descriptive attributes can change the taste perception of dishes in restaurants. Moreover, the main aim of quantitative research is to explain certain situations or events as stated by Mertler (2019), “researchers seek to describe current situations, establish relationships between variables, and sometimes attempt to explain causal relationships between variables” (p. 108). The advantage of a quantitative survey is that it rather focuses on generalizing the findings instead of going into depth which is more likely covered in qualitative research designs (Creswell, 2012).

3.2 Research Design & Instrument

The chosen quantitative research design for this thesis is an explanatory study with an experimental fixed design. The experiment was created in a survey design with the help of SoSci survey. A survey design is a quantitative research method where one can study a sample of the population in regard to attitudes, trends and opinions. The experimental design takes this a step further and tests the impact of an intervention on an outcome while controlling all the other factors of the environment. The survey is given out randomly and the respondents get assigned to a certain group or set of questions. While some receive the treatment group and the others the control group, the researcher can investigate if the individual variable is the influencing factor and not the others (Creswell, 2014). Experiments are the greatest way to test a cause-and-effect relationship since the risk of other variables can be taken out of the results. Bhattacherjee (2012) even states that experiments are "the 'gold standard' in research designs, is one of the most rigorous of all research designs" (p.83) where the main strength is the internal validity since it can connect causes and effects through the treatment manipulation while controlling all other factors. However, the controlled setting does not always reflect the situation in the real world environment (Creswell, 2014). The treatment can be determined as successful if the treatment group receives a more favourable rating at the end of the study compared to the control group. This experiment used in this study can be considered a true experiment since the participants get randomly assigned to either the control group or one of the two treatment groups. The instrument used to distribute the experiment was through a survey. The survey included single-choice questions and short open-ended questions. Most of the statements were measured on a 1 to 7 Likert scale. This research design was chosen based on the successful prior research made on this topic. For example Kpossa and Lick (2020, Lick et al. (2017), Swahn et al. (2010b), Wansink et al. (2005) and Wansink and van Itersum (2001) all conducted different experiments on the effects descriptive attributes had on the actual liking and purchase intention. Furthermore, an experiment through a questionnaire is the most suitable research design since this study measures the expectation and not the actual liking of the dish which would have been conducted in a laboratory setting or a field experiment (Bhattacherjee, 2012).

3.3 Procedure of the Experiment

In this following subchapter, the whole development of the experiment will be explained. This includes the structure of the experiment, the item measurements, the sampling procedure and data collection process.

3.3.1 Experiment Structure

The thesis employed a one-factor, between-subjects design with sensory food attributes been manipulated at three levels: health attributes (experimental group 1), sensory attributes (ex-

perimental group 2), no attributes (control group). Since this experiment is aiming to detect causal relationships, the participants were randomly allocated either into the control group or one of the two experimental groups. The difference between the three groups, where the participants had other stimuli, will be explained in the experiment structure.

The online experiment can be divided into three different main sections. In the first part of the experiment, the participant was exposed to a one-pager of a restaurant menu. The menu shown was the page of the desserts which included four different ones whereas one of them was classified as a healthier dessert compared to the more traditional ones. While choosing the desserts for this experiment, the author made sure to include traditional ones which were popular and well-known among the population. The manipulated item in this study was the *Berry Yoghurt Créme with Chocolate Flakes* which is always listed as the second item on the menu in order to avoid the primacy or recency effect which relates to the advantages the first and last item have on a list. The menu was shown for 20 seconds before the "next" button appeared which should encourage participants to look at the menu and avoid skipping the stimulus.

FIGURE 8. STIMULI OF THE EXPERIMENT – CONTROL, HEALTH AND MULTISENSORY.

As seen in figure 8, the descriptive attributes for the four chosen desserts stayed the same except for the healthy dessert (item 2 on the menus). For the control group, the originally chosen name was kept. In the middle one with the healthy manipulation, the attribute *low-sugar* was added. The sugar content is strongly associated with the perception of healthiness since it directly influences the calorie and nutrition aspects (Bellisle, 2006). The menu on the right side represents the stimuli for the multisensory group. The two most commonly used sensory attributes – taste and texture – taste and texture – were used for the multisensory group. Therefore, the sensory descriptive attribute *sweet* was used for taste and *crunchy* for texture.

After the exposure to the stimuli, the manipulation check was conducted within two steps: First, three questions regarding the inclusion of taste, texture and health attributes were asked. The participants were able to answer these questions based on a Likert scale from 1-7 where they could agree or disagree. As an additional manipulation check, another question followed which specifically asks which attribute was used to describe the manipulated item. The participants could choose between one of the three possible answers: no attribute, low-sugar or sweet and crunchy. The second manipulation check should ensure that the manipulation of the item worked successfully.

In the next section, the questions relate to the manipulated item, the Berry Yoghurt Créme with Chocolate Flakes. The first three questions were asked to measure the healthiness perception of this dessert. In this section, participants could answer this on a Likert scale from 1 to 7 where they could strongly agree and disagree. Furthermore, the experiment measured the taste expectation of this dessert using two questions with a Likert scale from 1 to 7 where the participants could share their preferences from “not at all” to “very”. At the end of this section, the participant has to answer three questions about the purchase intention of this healthy dish measured on a 1-7 Likert scale. The Likert scale is used for most of the questions due to the fact that this type of scale allows more specific answers to whether the respondents are neutral to the presented statement (Bhattacherjee, 2012).

The following section of this survey is based on the participants´ current eating habits. In order to avoid any biases, the participant has to state their present diet in a single choice question. Moreover, the participants have to indicate how often they visit a restaurant per month due to the fact that frequent restaurant visitors might have a different perception of what to order. Furthermore, non-regular guests might have other behavioural patterns. In addition, six statements regarding the interest in a healthy diet were stated for the participant to answer. With this question, the general interest in healthy eating habits was investigated.

The second last page of the survey consisted of demographic questions. The participant was able to insert gender, age and current country of residence. On the very last page of the questionnaire, there is a short thank you note for the participant.

3.3.2 Item Measurement

As mentioned in the experiment structure, several constructs were measured during the primary research. The four main constructs were healthiness perception, taste expectation, purchase intention and eating habits. All items for the healthiness perception were based on the healthiness perception construct by Huang and Lu (2015) measured on a 1 (strongly disagree) to 7 (strongly agree) Likert scale. Furthermore, the taste expectation item measurement is adapted from the construct by Raghunathan et al. (2006). This measure was also based on a 1 (strongly disagree) to 9 (strongly agree) Likert scale. For the purchase intention construct, the

items were based on the buying intention construct used in the study from (Bialkova et al., 2016). This measurement was based on a 1 (Not at all) to 7 (Very likely) Likert scale. In addition, the eating habits items were adapted from the health motivation construct by Roininen et al. (1999) which is also often used in newer studies on the topic of healthy eating habits. The measurement for this is a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

3.3.3 Sampling Procedures & Data Collection Process

For this study, nonprobability sampling methods were used due to the time and financial limitations. The population of the study were individuals who had dined in a restaurant before and the sampling frame was social media platforms. In order to achieve as many respondents as possible convenient and snowball sampling was used in combination. Convenient sampling, also called opportunity sampling, is a data collection procedure where the author uses the most convenient participants which is in most cases family, friends or colleagues. On the one hand, convenient sampling is the least expensive and least time-consuming technique, but on the other hand, the selection bias and the fact that the sample might not be representative could be an issue (Malhotra et al., 2017). With snowball sampling, the author shares the questionnaire with a group of people who are continuously sharing access to their own social circles (Bhattacherjee, 2012). The questionnaire was shared through a link which was posted on the author's social media platforms. The participants were encouraged to send it to their family and friends, which relates to snowball sampling. The data was collected from Wednesday the 25th of May until Sunday the 29th of May. Within these four days, 269 valid responses were collected. Since everyone has to eat and has a food consumption behaviour, there were no restrictions on the sample group.

3.4 Analysis & Results

In this section of the thesis, the data preparation process will be described. Furthermore, the tools used later on in the hypotheses testing will be presented.

3.4.1 Data Preparation

The results of the questionnaire showed 269 complete responses. Everyone who started the questionnaire also finished it. In the data preparation process, the control group was assigned to '0', the health group to '1' and the multisensory group to '2'. Moreover, three items (I eat what I like and I do not worry about healthfulness of food; The healthfulness of food has little impact on my food choices; The healthfulness of snacks makes no difference to me) of the *Eating Habits* construct had to be recoded, since the they were negatively formulated whereas the other items were formulated positively. All the items in a construct have to be formulated in the same direction in order to compare the means of the results.

3.4.2 Data Analysis

The collected data was analysed with the help of the statistical software SPSS. SPSS allows a wide range of different statistical tests which were required for a successful analysis. Before the actual analysis of the data, the scale reliabilities have to be conducted in order to assess the reliability and validity of the items in the construct. Moreover, since the data is from an experiment, a manipulation check has to be performed in form of a MANOVA test.

In the first step of the actual analysis, different frequency and descriptive tests were conducted to create a table of sample characteristics. This table includes information about the sample which will we be studied and there attitude towards healthy eating behaviours. In order to analyse the first hypothesis, which is based on the unhealthy-tasty intuition a correlation analysis executed. For the second and third hypotheses, the comparison of sensory attributes, health attributes and the absence of attributes and its effect on taste and healthiness expectaiton, a MANCOVA test is required. The MANCOVA test is a multivariate analysis of covariance which is an extension of the ANOVA test. The dependent variables for the test are healthiness and taste expectations and the group variables, control and experimental groups, are considered as the independent variable. As covariates the eating habits, gender and age are used whereas the latter two could be included in the control variable. For the fourth and last hypothesis, a regression analysis was conducted with the independent variables being taste or healthiness perception and dependent variables being purchase intention. This hypothesis aims to answer the question if taste expectations and healthiness expectations have a positively impact on food choice.

4 RESULTS

In this section, the results of the experiment will be presented through statistical tests with the help of SPSS. Subsequently, the outcome will be interpreted and later on compared with the information gathered in the literature review. In the following figure (9), the structure of the hypothesis testing process will be presented.

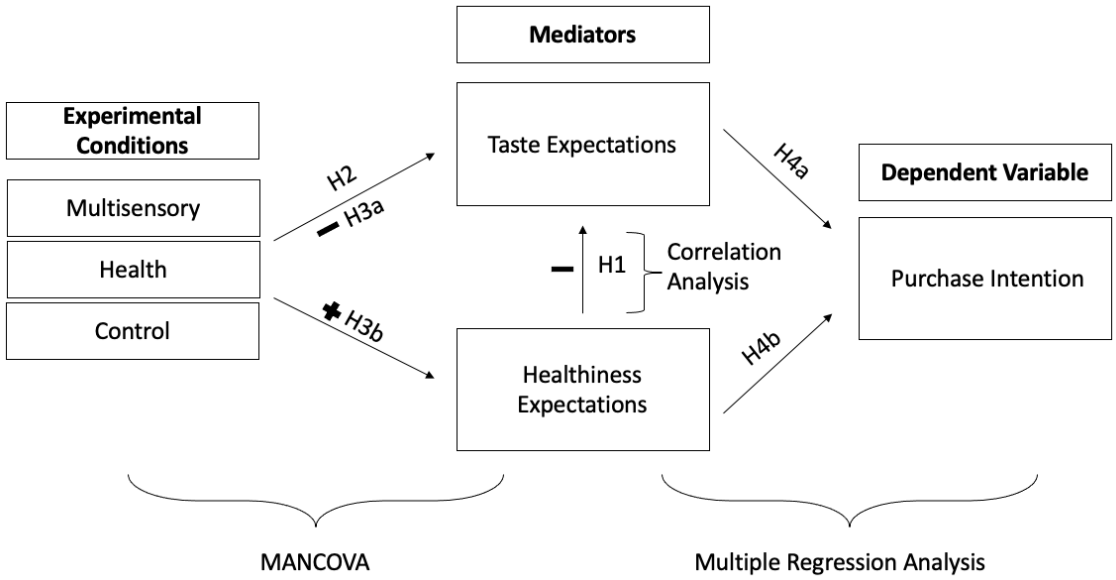

FIGURE 9. STRUCTURE OF HYPOTHESIS TESTING.

At the very beginning, there will be a correlation analysis conducted for H1 between taste expectations and healthiness expectations. Afterwards, a MANCOVA analysis will be conducted for all three groups: health, multisensory and control. The covariates used are eating habits, age and gender to explore the effects of the claims on taste expectation and healthiness expectation. In order to investigate the effects of taste expectations and healthiness expectations on purchase intention, a multiple regression analysis will be conducted.

4.1 Scale Reliabilities & Manipulation Check

First of all, the scale reliability has to be determined in order to assure the consistency of the items measured in the constructs. Hence, a reliability analysis was conducted for each of the constructs. The following table (2) will present all the constructs with their items measuring the construct, Cronbach Alpha's and Cronbach's Alpha if item deleted. The four constructs of this experiment are eating habits, purchase intention, healthiness perception and taste expectation.

Construct & Items measuring the construct	Cronbach's Alpha if item deleted	Cronbach's Alpha
Eating Habits		**0.762**
I try to eat nutritiously.	0.723	
I carefully watch what I eat.	0.714	
I always follow a healthful and balanced diet.	0.724	
I eat what I like and I do not worry about healthfulness of food.	0.694	
The healthfulness of food has little impact on my food choices.	0.773	
The healthfulness of snacks makes no difference to me.	0.730	
Purchase Intention		**0.916**
The probability that I would consider ordering this dish is high.	0.859	
I would like to recommend the dish to my friends.	0.908	
The likelihoof of ordering this dish is high.	0.867	
Healthiness Perception		**0.817**
This dessert is healthy for me.	0.670	
This dessert is a part of a healthy diet.	0.755	
This dessert is nutritious.	0.807	
Taste Expectation		**0.876**
How tasty do you think these dessert would be?	-	
How much do you think you would enjoy eating them?	-	

TABLE 2. RELIABILITY ANALYSIS.

All the Cronbach's Alpha values were significant due to the fact that it was higher than the threshold 0.7. In the table, the *Cronbach's Alpha if item deleted* was also included. However, it was not the case except in the construct *Eating Habits*. In this construct, the item *The healthfulness of food has little impact on my food choices* could have been deleted to achieve a higher Cronbach's Alpha. Nevertheless, that was not necessary since the Cronbach's Alpha would have not increased by much and the value was significant regardless.

After the stimulus was presented in the survey, a two-step manipulation check was conducted to test whether the participants could distinguish between the different descriptive attributes

or no label at all. For the first manipulation check a MANOVA test has been conducted. The question examined in the questionnaire was if the participant could recognize some information about either healthiness, consistency or taste on the menu presented on the page before. Depending on which group they got assigned to they had to insert different numbers on the 1 (strongly disagree) to 7 (strongly agree) Likert scale. The participants either got a healthy attribute (low-sugar), multisensory attribute (sweet and crunchy) or no attribute at all. The analysis revealed a significant main effect for treatment (Pillai's trace: 0.557 $F(2, 266) = 34.12$, $p < 0.001$). The main effect of the manipulation check regarding healthiness was significant as $F(2, 266) = 84.37$, $p < 0.001$, as was the main effect regarding consistency ($F(2, 266) = 22.86$, $p < 0.001$) and taste ($F(2, 266) = 12.76$, $p < 0.001$).

	Experimental condition	**Mean (Std. Deviation)**
Some of the dishes of this menu included information about **healthiness**	Control	1.76 (1.38)
	Health	4.73 (2.26)
	Multisensory	1.88 (1.38)
Some of the dishes of this menu included information about **consistency**	Control	3.58 (2.30)
	Health	4.56 (1.89)
	Multisensory	5.60 (1.82)
Some of the dishes of this menu included information about **taste**	Control	3.33 (2.19)
	Health	4.63 (2.13)
	Multisensory	4.22 (2.14)

TABLE 3. MANIPULATION CHECK.

As presented in table 3, the healthy attribute showed the most significant result in the health group ($M_{HE} = 4.73$) compared to the multisensory ($M_{MS} = 1.88$) and control ($M_{CO} = 1.76$) group which means that most of the respondents who received the health group passed the first stage of the manipulation check. The question about consistency was rated with $M_{MS} = 5.60$ which is the highest score in the manipulation check. However, the health attribute also got a comparable high result ($M_{HE} = 4.56$), although the consistency was not meant to be considered as a health attribute. The multisensory group scored the highest in consistency ($M_{MS} = 5.6$), however, not in taste ($M_{MS} = 4.22$) although both, taste and consistency attributes, were only used in combination. The question, if some dishes on the menu included information about taste, did not have a significant result. In this case, the participants from the health group rated taste the highest ($M_{HE} = 4.63$), although it was meant to be the multisensory one ($M_{MS} =$

4.22). The reasoning for this outcome might be derived from the unhealthy tasty intuition which claims that there is a direct correlation between health and taste inferences. Individuals might connect healthiness with taste which would indicate a high food pleasure orientation. The control group had none of the asked information included on the menu. Although the control group scored the lowest on all three questions, the consistency and taste scoring could have been lower. The participants might get distracted from the other dessert options on the menu, which can lead to a misunderstanding. Moreover, participants are unlikely to think that none of the questions apply and rather believe that at least one of them applies. To conclude the analysis of this manipulation check, health and consistency attributes are rated quite high, which can be associated with the unhealthy-tasty intuition. This indicates that health inferences directly correlate with taste inferences. Overall, it can be concluded that the manipulation worked in terms of healthiness and consistency but not with taste. Therefore, the theory from the current literature is confirmed that for flavour expectations texture is considered more important than the taste (Hogenkamp et al., 2011).

In the second step of the manipulation check, the participants were directly asked which attributes the manipulated dessert had. The participants had the choice between no attribute, low-sugar or sweet and crunchy. In order to ensure that the manipulation check was successful, a Chi-Square test was conducted. The cross-tab analysis revealed that 73.91% of the experimental group with health attributes answered this question correctly. For the multisensory experimental group, 63.77% chose the right answer and in the control group, only 61.11% of the participants chose no attribute as an answer. According to the Pearson Chi-Square, X^2 = 157.486 and $p < 0.001$ and thus the results are statistically significant.

4.2 Sample Characteristics

In the following table (4) the most important characteristics of the sample are presented. In the study 269 participants completed the questionnaire which will also be considered in this statistic. The mean age of the participants was 28.5 years, whereas the age ranged from 12 to 74 years old. The highest share of the participants was female (70.7%), followed by male (28.1%) and 0.4% of them were transgender and another 0.4% preferred not to say. In regards to education, over half (52.4%) of the participants had obtained a University degree, 37.5% completed high school, 4.8% are doing an apprenticeship, 3.7% are visiting a vocational school and 1.5% completed compulsory school. A main characteristic of the sample is also the current diet of the participants, due to the fact that the diet influences the consumption behaviour. The highest share in the category diet was ‘no diet’ (40.5%). The participants who selected no diet, do not see themselves following any specific eating habits. The second largest proportion was omnivore (24.5%) which specifically means that the participant consciously eats everything. Around a fifth of the participants shared that they follow a flexitarian diet which can be defined as following a reduced meat consumption (20.4%). Only 8.2% stated that they are vegetarian and 2.2% were vegan. Vegetarianism describes a diet in abstaining from the con-

sumption of meat and the by-products of animal slaughter, whereas vegan is a solely plant-based diet. Within the 4.1% of 'other', the participants included gluten free, clean, high protein, high carb, low carb and pescetarian. The eating habit construct measures the general interest in healthy eating behaviour. The means of the items showed that the participants have a tendency to try to eat more nutritiously (M = 5.08), however, they do not always follow a healthy diet (M = 3.75). For the frequency of dining out per month, the participants inserted quite different values which are reflected in the standard deviation of 6.84. The mean value was 5.16 with a minimum of 0 and a maximum of 90. This indicates that on average the sample population visits restaurants around 5 times a month.

Sample Characteristics	**Study (n = 269)**
Mean Age	28.5
Gender	**%**
Male	28.1
Female	70.7
Transgender	0.4
Prefer not to say	0.4
Education	**%**
University	52.4
High School	37.5
Vocational School	3.7
Apprenticeship	4.8
Compulsory School	1.5
Diet	**%**
Omnivore	24.5
Flexitarian	20.4
Vegetarian	8.2
Vegan	2.2
No diet	40.5
Other	4.1
Eating Habits	**Mean (SD)**
I try to eat nutritiously.	5.08 (1.44)
I carefully watch what I eat.	4.24 (1.67)
I always follow a healthful and balanced diet.	3.75 (1.69)
I eat what I like and I do not worry about healthfulness of food.	3.61 (1.83)
The healthfulness of food has little impact on my food choices.	3.71 (1.75)
The healthfulness of snacks make no difference to me.	3.36 (1.80)
Frequency of Dining Out	**Mean (SD)**
How often do you visit a restaurant in a month?	5.16 (6.84)

TABLE 4. SAMPLE CHARACTERISTICS.

The platform used for the survey (SoSci Survey) allocated the participants randomly to the control or to one of the two treatment groups. The table below presents an overview on the share of the participants in each group.

Chacteristics		**Condition**		
		Health	**Multisensory**	**Control**
Age	<18	2.2%	0%	2.3%
	18-29	79.1%	66.0%	66.3%
	30-39	10.5%	14.9%	21.3%
	40-49	2.3%	12.8%	6.7%
	50-59	2.3%	4.3%	2.2%
	>59	3.5%	2.1%	1.1%
Gender	Men	32.6%	26.6%	25.8%
	Women	66.3%	72.3%	74.2%
	Transgender	1.1%	n/a	n/a
	Prefer not to say	n/a	1.1%	n/a

TABLE 5. SAMPLE OF THE EXPERIMENT.

As shown in Table 5, the multisensory group had no respondents within the age group <18. The age group with the highest concentration was 18-29 with 79.1% in the health group, 66.0% in the multisensory group and 66.3% in the control group. The second highest concentration was the age group 30-39. 10.5% of the sample size received the questionnaire with the healthy attribute, 14.9% with the multisensory one and 21.3% had the no treatment group. In regards to gender, it can be seen that 70.7% of women took part in the experiment and only 28.1% of the sample were men. The other 0.8% either indicated that they were transgender or preferred not to say. The health group had the highes share of men (32.6%), whereas the control group had the most women (74.2%).

4.3 Hypothesis Testing

For the first hypothesis, *healthiness expectations are negatively correlated with taste expectations* a correlation analysis was conducted. The Pearson Correlation showed a value of 0.28, which indicates a medium effect. However, the correlation is not significant ($p = 0.642$). Based on the one-tailed formulation of the hypothesis, the p-value can be divided by 2. Regardless, the correlation is still not significant ($p = 0.321$). Therefore, H1 is rejected and the null hypoth-

esis retained which states that there is no significant negative correlation between healthinesss expectations and taste expectations. Table 6 showcases a overview of the correlation analysis.

		Healthiness Expectation
Taste Expectation	Pearson Correlation	0.028
	Significance (2-tailed)	0.642

TABLE 6. CORRELATION ANALYSIS TASTE AND HEALTH EXPECTATION.

In the next step, a MANCOVA, a multivariate analysis of covariances, was conducted for hypotheses 2 and 3. A MANCOVA test was chosen to test these hypotheses, as this test has the opportunity to test the correlations of more than one dependent variable. Moreover, the MANCOVA analysis considers the inclusion of several covariances in the analysis. Therefore, a MANCOVA can examine the relationship between the dependent variables while taking the covariates into account (Field, 2009). For this MANCOVA analysis the independent variable were the different groups (control, health and multisensory), the dependent taste and healthiness expectations and the covariates age, gender and eating habits.

Before the actual testing, the linearity, normality and multicollinearity assumptions have to be investigated. For the linearity assumption, a linear regression analysis was conducted with the groups as the dependent variable and the taste and health expectation as the independent variable. The maximum value of the Mahalanobis distance is 10.556 which is an acceptable value for two dependent variables since the acceptable value cannot exceed 13.82. Afterwards, the normality of the data was tested. The Shapiro-Wilk significance was $p < 0.001$ for both, taste and health expectation, which indicates that the normality assumption cannot be assumed. For the multicollinearity assumption, a bivariate correlation was conducted. The Pearson correlation was 0.028 for taste and health expectation which indicates a very weak relationship between the two variables. Thus, the multicollinearity assumption cannot be confirmed. Furthermore, Box's test of assumption in the equality of covariance matrices has to be assessed. The result of Box's test is not significant ($p = 0.140$) and therefore the homogeneity of the covariances can be assumed.

The overall result of the MANCOVA indicates that there is a statistical significance across the levels of the independent variables (control, health and multisensory group) on a linear combination of the dependent variables (taste and health expectation) when all of the covariates are controlled. Since not all the assumption tests for the MANCOVA were significant, the Pillai's trace significance has to be considered. The analysis has revealed a significant model (Pillai's trace: 0.11 $F(2, 263) = 7.45$, $p < 0.001$). The Partial Eta Squared value was $\eta^2 = 0.54$ which indicates a large effect.

Taking a closer look at the multivariate test results of the MANCOVA, there is evidence that the covariate *age* adjusts the value of the outcome (Pillai's trace 0.044, F = 5.980, p = 0.003). The other two tested covariates, gender (Pillai's trace 0.004, F = 0.571, p = 0.565) and eating habits (Pillai's trace 0.006, F = 0.849, p = 0.429), were not significant and therefore do not have a significant influence on the outcome. Furthermore, the Levene's of equality of error variances shows that taste (p = 0.455) and health (p = 0.152) expectation are both not significant which strengthens the case that the assumption of the multivariate statistics are robust. Therefore, the analysis can be continued since the assumption of homogeneity of variances is met.

Evaluating the tests of between-subjects effects on healthiness expectation shows a significant result with $F(2, 263) = 12.73$,$p < 0.001$, $\eta^2 = 0.088$. The Partial Eta Squared shows a medium effect, as it is around $\eta^2 = 0.06$ which indicates a medum effect. In regard to taste expectation, the significance value was $F(2, 263) = 2.51$, $p = 0.08$, $\eta^2 = 0.019$. However, since the hypothesis is formulated one-tailed, the p-value has to be divided by 2, which results in p = 0.04 which is significant. Therefore, it can be concluded that the treatment groups have a significant effect on healthiness expectations and on taste expectations. However, solely based on this result, it is still unclear which treatment group influences the healthiness expectation or the taste expectation. In order to evaluate which group had which effect on taste and healthiness expectations, the contrast results have to be investigated. Additionally, the pairwise comparison of the analysis highlights that there is a significant difference in the health expectation between the control and the health group (p = 0.001) and the health and multisensory group (p = 0.001). Therefore, there is a significant difference in the adjusted means between these groups on the level of outcome.

In table 7 the control group is compared with one of the two treatment groups: either the health or multisensory one. The comparison of the groups is then put into relation with the dependent variables, health and taste expectation, to investigate if there is a statistical significance or not. Looking at the significance levels in the K matrix, there is a statistical significance in taste expectation (p = 0.029) but not in health expectation (p = 0.452) between the control and multisensory group. Considering the 95% confidence interval, there are only differences between the groups detected regarding taste expectations.

			Dependent Variable	
			Health Expectation	**Taste Expectation**
Health vs. Control	Significance		< 0.001	0.475
	95% Confidence	Lower Bound	0.491	- 0.447

	Interval for Difference	Upper Bound	1.315	0.419
Multisensory vs. Control	Significance		0.452	0.029
	95% Confidence Interval for Difference	Lower Bound	- 0.428	- 0.012
		Upper Bound	0.379	0.837

TABLE 7. CONTRAST RESULTS – K MATRIX.

In the following table 8, the mean values of the groups toward taste and health expectations are presented. As expected the health group prompted healthiness expectation (M_{HE_health} = 4.05, SD = 1.48) compared to the multisensory group ($M_{HE\_multisensory}$ = 3.05, SD = 1.31) and the control group ($M_{HE\_control}$ = 3.10, SD = 1.34). The difference between the mean of the health group and the control group was 1.05 whereas for the multisensory group it was only 1.00. The multisensory group was aiming to prompt taste expectation and had the highest among the groups ($M_{TE\_multisensory}$ = 5.74, SD = 1.29). However, that is not much higher compared to the health group (M_{TE_health} = 5.38, SD = 1.48) and the control group ($M_{TE\_control}$ = 5.33, SD = 1.61). The standard deviation was the highest in the control group with SD = 1.61, whereas for the multisensory group it was only SD = 1.29 which intends that within the multisensory the ratings were more similar.

	Control	**Health**	**Multisensory**			
	Mean (SD)	Mean (SD)	Mean (SD)	F	p	η^2
Taste Expectation	5.33 (1.61)	5.38 (1.48)	5.74 (1.29)	12.73	0.01	0.088
Health Expectation	3.10 (1.34)	4.05 (1.50)	3.05 (1.31)	2.51	0.04	0.019

TABLE 8. MEAN VALUES.

Based on this analysis, H2 *Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes* can be supported and therefore, H2 can be accepted.

In the comparison between the control and the health group, there is no statistical significance on taste expectations (p = 0.475). However, there is a statistical significance between these two groups in healthiness expectation (p < 0.001). The 95% confidence interval indicates the true value of the difference between groups 95% of the time. If both, the lower and upper bound of this value, are either positive or negative, an assumption can be made that the true

value is different from zero. Therefore, the comparison of the control group to the health group shows that there is a group difference regarding healthiness expectations, however, there is no significant difference regarding taste expectations. In the case of the health vs. control group combined with health expectations, the lower bound is 0.491 and the upper bound 1.315 which indicates that there is a positive relationship. Therefore, H3a *Health attributes negatively impact taste expectations as compared to the absence of any attribute* has to be rejected since there is no significant difference. However, H3b *Health attributes positively impact healthiness expectations as compared to the absence of any attribute* has to be accepted.

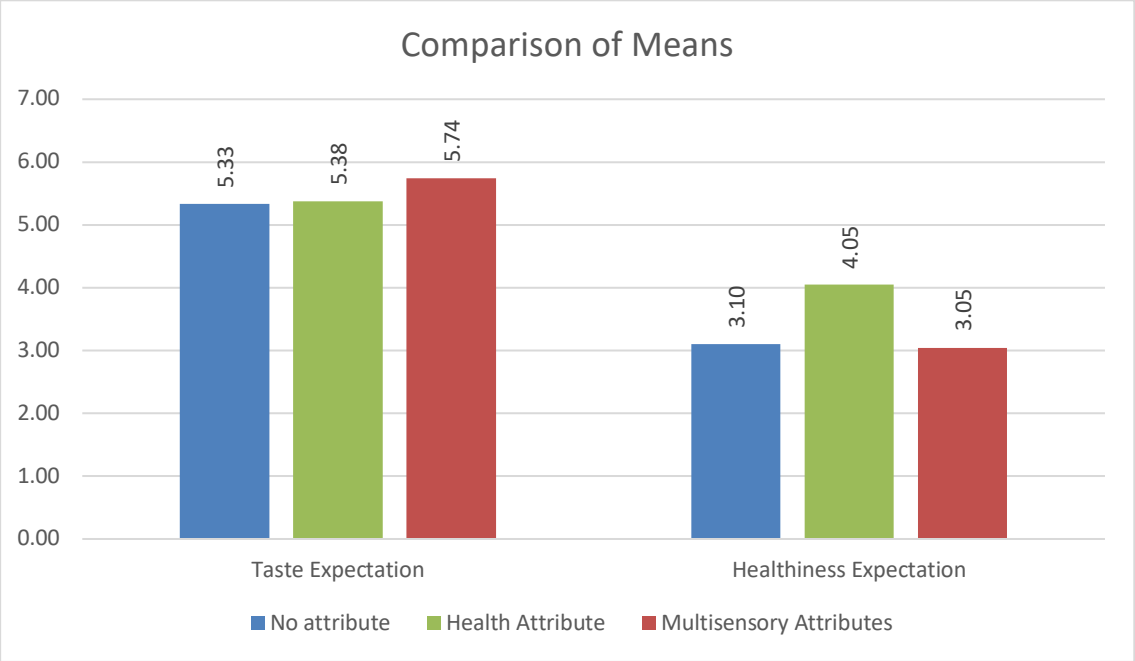

FIGURE 10. COMPARISON OF MEANS.

Figure 10 highlights the comparison of the means which can present trends which are not statistically significant. Taste expectation was rated the highest by the multisensory group, followed by the health and the control group. Therefore, a trend confirming H2 *Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes* can be seen. However, the difference between the health and control group are too minimal to be identified as statistical significant.

H3a projected that health attributes will negatively impact taste expectations compared to no attribute which has to be rejected. As seen in figure 10, health attributes achieved a higher mean in comparison to the control group regarding taste expectations. In regards to healthiness expectations, the health attribute stimulated the highest healthiness expectation followed by the control group and then the multisensory group. H3b anticipated that health attributes will have a positive impact on healthiness expectations compared to no attribute

which is accepted based on the data presented. The bar chart in figure 10 confirms that as the mean of the health group toward health expectation is higher than the one from the control group.

In order to test H4 *Taste expectations (a) and healthiness expectations (b) positively impact food choice*, a multiple regression analysis has been conducted. The overall significance is $p < 0.001$ which means that both variables, taste expectation and healthiness expectations, have an effect on purchase intention. The strength of the effect can be seen in the model summary. The adjusted R^2 is 0.555 which shows a moderate effect. Consequently, the regression model has a moderate fit. The R^2 indicates that taste and healthiness expectations can account for 55.5% of the purchase intention. Furthermore, in the coefficients table, one can determine which variable influences the purchase intention more. Both independent variables show a statistical significance due to the fact that $p < 0.001$. The unstandardized coefficient B represents "the change in the outcome associated with a unit change in the predictor" (Field, 2009, p. 208). In this study this means in the figurative sense that tastiness expectation is increased by one, the purchase intention is increased by 0.854 and 0.191 for the healthiness expectation. Due to the B coefficients being positive values, H4a and H4b can be retained.

Independent variables	**Unstandardized Coefficients**		**Standardized coefficients**	**Significance**
	B	**Std. Error**	**Beta**	
Tastiness expectation	0.854	0.048	0.725	0.001
Healthiness expectation	0.191	0.048	0.160	0.001

TABLE 9. COEFFICIENT TABLE OF THE MULTIPLE REGRESSION ANALYSIS.

Table 9 shows a summary of the coefficient table of the regression analysis. The standard coefficients beta result shows that tastiness expectations ($\beta_{TE} = 0.725$) have a higher effect on purchase intention compared to healthiness expectations ($\beta_{HE} = 0.160$). This concludes that tastiness expectations have a much higher influence on purchase intention than healthiness expectations.

4.4 Additional Insights

To additionally investigate the role of sensory attributes in stimulating food choices in comparison to health and no attribute conditions, further analyses were conducted. As already mentioned in previous chapters, the questionnaire did not only contain the experiment itself and questions regarding that but also questions about demographics, age, gender, country of resi-

dence, eating habits and frequency of dining out. In this section, these additional variables will be taken into consideration to eventually find other effects in the data.

Based on the MANCOVA test conducted for the hypothesis testing, the variables, age, gender, eating habits and frequency of dining out will be taken into consideration. Having a closer look at the tests of between-subjects effects, one can see that the covariate age had a statistical significance on taste expectation ($p = 0.04$) but not on healthiness expectation ($p = 0.186$). Therefore, age has an influence on taste expectations.

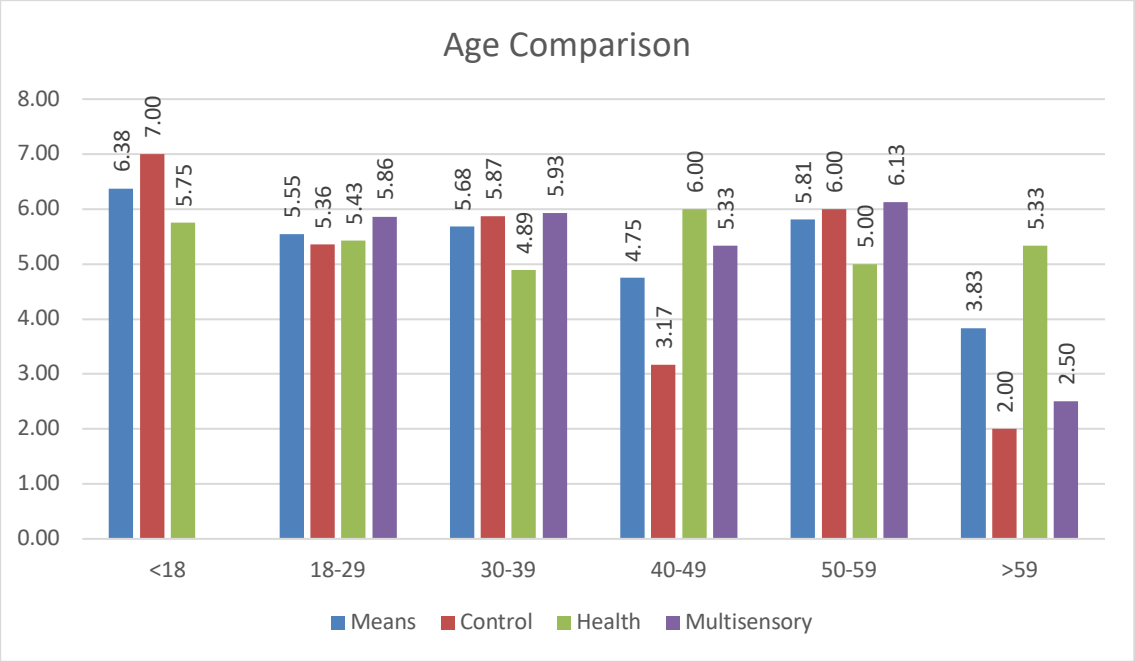

FIGURE 11. AGE COMPARISON.

In order to compare the means of the different age groups, the descriptive statistics of the MANCOVA analysis were used. As shown in figure 11, one can see a trend that the younger the individual is, the tastier the dessert was rated. However, within the <18 age group there were no representatives in the multisensory group. Nevertheless, the <18 scored the highest regarding taste expectation with a mean of 6.38, whereas the >59 age group only had a mean of 3.83.

In order to investigate which age group significantly differs from another, a Bonferroni post hoc test was conducted. Based on this post hoc test, the age group >59 significantly differs from the age group 18-29 ($p = 0.049$) and 30-39 ($p = 0.040$). Therefore, the age group >59 has the most significant difference from the other age groups in regard to taste and healthiness expectations.

Moreover, considering the covariate gender in the MANCOVA analysis, it did not have any significance impact on taste expectation ($p = 0.345$) or on healthiness expectation ($p = 0.388$). Therefore, there is no significant difference when it comes to the influence of gender on taste

and health expectations. In addition, this does not confirm the information found in other studies, where women are more health-conscious than men generally and especially in their diet behaviours (Bärebring et al., 2020). In the MANCOVA analysis the eating habits of the respondents were considered as a covariate. The significant level of the eating habits towards taste expectation was (p = 0.727) and healthiness expectation (p = 0.142). Hence, the specific eating habits did not have a significant influence on the taste or healthiness expectation. This indicates that regardless what eating habits the individuals had, the evaluation of the manipulated dessert would not be affected. Furthermore, the frequency of eating out did not have statistical significance regarding taste expectations (p = 0.344) and health expectations (p = 0.152). Therefore, the frequency of dining in a restaurant did not impact the decision-making process toward taste and healthiness expectations. An overview of the significance levels of the covariates from the multivariate tests in the MANCOVA is shown in the following table (9). This table shows which covariate had an significant influence on the dependent variables.

Covariate	Dependent Variables	Significance	
Age	Taste Expectation	0.004	Significant
	Health Expectation	0.186	Not significant
Gender	Taste Expectation	0.345	Not significant
	Health Expectation	0.388	Not significant
Eating Habits	Taste Expectation	0.727	Not significant
	Health Expectation	0.142	Not significant
Frequency of dining out	Taste Expectation	0.344	Not significant
	Health Expectation	0.152	Not significant

TABLE 10. SIGNIFICANCE LEVEL OF COVARIATES.

4.5 Conclusion

To conclude the analysis part of the thesis, it can be said that half of the hypotheses could be retained. However, the main H1 that healthiness expectations are negatively correlated with taste expectations, was not significant and therefore had to be rejected. As stated by Huang and Wu (2016), the unhealthy-tasty intuition is strongly based on the food pleasure orientation. Moreover, there was no statistical significance that sensory attributes have a greater impact on taste expectations compared to health attributes or absence of any attributes.

However, in the mean comparison one could see a trend that the dish with sensory attributes was evaluated higher compared to one with health attributes or no attributes at all.

Table 11 summarizes the results of the hypotheses testing and the methods used.

Hypothesis	**Testing Method**	**Result**
H1: Healthiness expectations are negatively correlated with taste expectations.	Correlation analysis	Not significant → H1 rejected
H2: Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes.	MANCOVA	Significant → H2 accepted
H3(a) Health attributes negatively impact taste expectations as compared to the absence of any attribute.	MANCOVA	Not significant → H3(a) rejected
H3(b) Health attributes positively impact healthiness expectations as compared to the absence of any attribute.	MANCOVA	Significant → H3(b) accepted
H4(a): Taste expectations positively impact food choice.	Multiple Regression analyis	Significant → H4(a) accepted
H4(b): Healthiness expectations positively impact food choice.	Multiple Regression analysis	Significant → H4(b) accepted

TABLE 11. RESULTS OF THE HYPOTHESIS TESTING.

5 CONCLUSION

5.1 Summary

As the obesity rate is continuously increasing, food policymakers should put more effort into marketing healthier food more attractive to the population. The unhealthy-tasty intuition has to be counteracted and healthy food has to become more desirable in order to relieve the health care system and prevent health diseases. Besides the rising health concerns, nudging the consumers' eating behaviours can be from major advantage for the stakeholders like restaurant owners or marketing-related jobs. In restaurants, the menu engineers can use these descriptive attributes to create a more efficient menu which eventually can increase revenue. With the rising attractiveness of the menu, the restaurant gains an advantage over the competitors which is vital to surviving in the fierce market.

Restaurant owners do not emphasize the healthy dishes enough on the restaurant menu and therefore, this thesis was aiming to connect the rising marketing strategy of using sensory attributes in combination with menu engineering. Consequently, the research question "How do sensory attributes stimulate healthy food choices" was formulated. In order to answer this research question, an experimental fixed design was chosen.

In the experiment the unhealthy-tasty intuition was tested with H1 *Healthiness expectations are negatively correlated with taste expectations.* The food consumption behaviour is strongly dependent on the unhealthy-tasty intuition. Although, scholars agree that this intuition is strongly supported, Huang and Wu (2016) distinguished between cultures with high and low food pleasure orientations. The result of this hypothesis testing showed that there is no correlation between healthiness and taste expectations. Since 79.6% of the participants were Austrians in the study which is the majority, it can be derived that Austrians might have a tendency to high food pleasure orientation and therefore, do not support the unhealty-tasty intuition. However, this is a clearly not well tested in this experiment and suggests more in-depth research to confirm this claim. The definition of high food pleasure orientation is the tendency of individuals to connect enjoyment and pleasure with food consumption and do not see eating as solely a necessity (Mulier et al., 2021). Moreover, the general interest in a healthier lifestyle might be another reason there was no correlation detected between health and taste (Duarte et al., 2021; Wunsch, 2022). Future research needs to test these possible explanations.

The literature review points to a consensus among researchers that a combination of sensory attributes tends to have a higher impact on positive behavioural intentions. Especially taste and texture, the two most commonly used attributes, proved to be successful as descriptive attributes. In the experiment, the impact of the multisensory attributes was investigated with

H2 *Sensory attributes (i.e., taste and texture attributes) on restaurant menus have a greater impact on taste expectations as compared to health attributes and the absence of any attributes.* Due to the significant testing outcome, sensory attributes do have a statistically significant impact on taste expectation compared to health or no attribute. The addition of multisensory attributes to a dish positively impacts the taste expectation, as it had the highest mean value compared to the other two groups. In prior research, the addition of a taste-related label did not necessarily increase behavioural intention. However, a taste label can counteract the negative annotations of a health label and a combined label can lead to positive behavioural intentions (Garaus & Lalicic, 2021). Furthermore, Hogenkamp et al. (2011), claim that texture creates even more positive behavioural intention. Therefore, this experiment can conclude that the combination of a taste and texture label can prompt taste expectations and consequently purchase intention. However, due to the non-random sampling method chosen, the reliability of the results are minor.

Based on the unhealthy-tasty intuition evaluated in the secondary research, health attributes decrease the taste expectation of the food item. However, hypothesis H3(a) *Health attributes negatively impact taste expectations as compared to the absence of any attribute* was rejected. The respondents did not assume the unhealthy-tasty intuition as already confirmed by H1. The second part of H3(b) *Health attributes positively impact healthiness expectations as compared to the absence of any attribute* was statistically significant in the analysis. On the one hand, there are contradicting claims about the effectiveness of health claims in the literature investigated. However, on the other hand, this experiment confirms that health attributes increase the positive impact of healthiness expectations compared to no label at all.

The fourth hypothesis H4(a) *Taste expectations positively impact food choice* and H4(b) *healthiness expectations positively impact food choice* showed statistical significance in the multiple regression analysis. According to the prior literature, taste inferences always lead to a positive purchase intention. Moreover, as confirmed with H1 health inferences do not negatively impact health inferences, claiming that healthy food can also be perceived as tastier. Therefore, healthiness expectation does positively impact food choice. This outcome of the experiment contradicts the prior research evaluated in the literature review as stated that health labels were associated as less tasty (Bialkova et al., 2016)

Additionally, the covariate age showed a statistical significance toward taste expectations. The mean comparison shows that younger respondents generally rated the dessert higher compared to older respondents. A possible explanation for that might be that older individuals have more evolved taste buds and interests compared to the younger generation. Moreover, older individuals should be more health-conscious and since desserts are usually perceived as quite unhealthy, the older generations tend to renounce unhealthy food items. Although the literature distinguished between male and female eating habits, the experiment conducted did not show any differences among gender groups. Females tend to show a higher interest in a

healthy lifestyle in comparison to men (Bärebring et al., 2020). The share of the groups was not equally distributed between both genders and therefore, results need to be interpreted with caution.

The literature reveals that the food consumption behaviour is based on the eating behaviours of the individuals. Depending on the existing interest of the individuals in healthy eating habits, the food consumption behaviour varies. However, the experiment did not confirm that eating habits have an influence on food choice. The reason for the insignificant outcome might be that desserts are not considered as a full meal itself but more like an additional food item to the main dish. In regards to that, Huang and Wu (2016) stated that individuals who follow a healthy diet and choose a nutritious main dish, tend to treat themselves with a calorie-dense dessert. Thus, the eating behaviour might not be as affected as the usual eating habits. The last aspect tested in the experiment is if the frequency of dining in the restaurant affects the decision-making process while choosing food. Considering the effect of the covariate, the outcome was not significant, implying that the frequency of dining out does not have an influence on food choice. This could either be derived from the fact that internal sources overpower external ones. The internal sources relate to beliefs, experiences and values whereas external ones relate to environmental cues and the opinions of the surroundings (Pilgrim, 1957; Raghunathan et al., 2006).

To answer to the research question, it can be concluded that sensory attributes do stimulate healthy food choices. The analysis conducted showed that sensory attributes can positively stimulate taste expectations. The multisensory group (combination of taste and texture attribute) was rated the highest regarding taste expectations compared to the health or no attribute. This answers the research question that the addition of sensory attributes can stimulate food choice. However, the sensory attributes have to be implemented in the healthy dishes in order to prompt healthy food choices. The most surprising outcome of the experiment was that there is, on the one hand, no unhealthy-tasty intuition detected within the respondents. The majority perceived health attributes as not negatively correlated with taste expectations which can be possibly explained by the general interest in a healthier eating behaviour or a high pleasure orientation. Moreover, both, health and taste expectations have a positive impact on purchase behaviour which partly confirms the diminished unhealthy-tasty intuition. On the other hand, the health attribute was often associated with tastiness and therefore, as often discussed in the prior literature, taste inferences correlate with health inferences which would confirm the unhealthy-tasty intuition again. The unhealthy-tasty intuition is still a well-discussed topic and requires more research to make a unified statement. The food consumption behaviour is clearly difficult to generalize and the results of this experiment have no clear direction to either confirm or decline the unhealthy-tasty intuition.

5.2 Contribution to Knowledge

The findings of the experiment contributes to the existent literature about the unhealthy-tasty intuition. Although there have been numerous studies about the unhealthy-tasty intuition, this experiment still highlights some new angles to look at the construct. The unhealthy-tasty intuition was insignificant which implies that there is no direct relationship between these two factors. Since the experiment was based on a dessert menu, the unhealthy-tasty intuition can imply that respondents do not follow this intuition regarding desserts. A possible explanation might be that desserts are generally seen as rather unhealthy and therefore there is no instinct towards one of them. Moreover, if the unhealthy-tasty intuition does not apply to main dishes, individuals tend to make the same behavioural decisions for other categories like desserts. As desserts are generally perceived as rather unhealthy, the experiment successfully showed that with sensory attributes the purchase intention can be influenced. With this insight, individuals can be stimulated to choose healthier versions on the dessert menu, if the descriptors are used correctly.

Alongside the unhealthy-tasty intuition, there was no negative relationship between health attributes and taste attributes found. This result suggests that health attributes do not directly lower taste expectations. A possible implication is that there is an increasing interest in healthy eating behaviour due to numerous reasons. Individuals might not always be fully healthy, however, they try to avoid being unhealthy as seen in the results of the experiment. Therefore, eating habits and interest in health should be considered since the purchase intention is based on these beliefs.

Within sensory marketing, the texture is clearly more recognized compared to taste attributes. Therefore, the traditional strategy of solely putting emphasis on taste should be revised and texture should be highlighted more. This insight is already claimed in prior research (e.g. Hogenkamp et al., 2011) and is also supported by this study. Furthermore, the result of the study claimed that taste and health expectations have a positive effect on purchase intention. However, taste expectations showed a stronger impact on purchase intention. This implies that in the promotion of health-related food items, taste attributes should also be taken into consideration. The relevance of taste should not be underestimated. Therefore, a combination of taste and health related attributes could have a strong effect in stimulating healthy food choice.

Based on the knowledge acquired from this thesis, the addition of sensory or health attributes can change the food consumption behaviour of individuals. Therefore, it is crucial to use this knowledge and support individuals in reaching a healthier food consumption behaviour.

5.3 Implications for Relevant Stakeholders

The main goal of this experimental study was to find a possible way to make healthy food more attractive to the wider population. Food policymakers are interested in the effectiveness of sensory attributes in stimulating healthy food choices due to the fact that they want to stop the increase in obesity and prevent the overflow of unhealthy patients. By the correct implementation of policies regarding the description of food items, the consumer can be led to a healthier food consumption behaviour. The usage of sensory attributes in combination with health attributes can increase the attractiveness of the food item and consequently the purchase intention.

Moreover, the restaurant owners and menu engineers can influence customers' food choices. Therefore, using sensory attributes in the description of the dish can be used to push certain dishes such as cash cows on the menu to increase the revenue. However, this strategy should rather be used to promote healthier dishes to counteract the rising obesity rates instead of focusing on the profit. In addition, with the right menu engineering, restaurant owners can eventually shift the usual food consumption behaviour of their customers. Implementing sensory attributes should not solely be used by restaurant owners or managers but supermarkets can also implement more descriptive labels. The results of this thesis can be of high relevance while implementing additional labels in the different sectors.

The implication of rules regarding the promotion of healthier dishes would have an immense impact on the wider population. Without actively knowing, consumers have a tendency to choose healthier dishes. On the one hand, this would not only contribute to the decrease of obesity rates in general and consequently the illnesses related to being overweight. However, on the other hand, it will contribute to a better environment due to the reduction of high greenhouse gas emissions. Therefore, the implementation of using sensory attributes for a healthier eating behaviour is beneficial for all of the related stakeholders.

5.4 Limitations of the Study and Suggestions for Further Research

Although the study of the thesis gave new insights and contributed to the current knowledge, the study provides some limitations. Participants of the experiment were asked to rate the tastiness and healthiness expectation of the manipulated item on the dessert menu without actually tasting the dish itself. The evaluation of the dish is solely based on the perception while reading the description. The rating of the actual taste could have been tested in a field experiment to test the variable taste instead of only taste expectation. Moreover, in a field experiment, the environment would have been more realistic and the natural decision-making process could have been observed better.

Furthermore, this study only contained desserts on the menu to overcome the issue of the different diets of the participants. Since desserts are usually only a small part of a restaurant menu, sensory descriptive attributes should also be used to stimulate healthy food choices in the other categories such as starters or even the main dishes. By testing other menu categories, a deeper insight can be given regarding food items in general.

Another limitation of the study is that the sampling method used was convenient sampling. The disadvantages of convenient sampling are that the sample is difficult to generalize since the participants were in the circle of acquaintances of the author. Therefore, a random sampling method would have been more credible to make generalizations as well as give the study more objective results. Although the sample size of the study contained already 269, an even bigger one can offer more insights which can be possibly generalized. In this sample specifically, there was a very high share of women. Although there are more women worldwide, the female participants of the study do not represent the proportions in the real world. Moreover, most of the respondents were based in Austria, but not all of them. Since most of the respondents were Austrians, creating the questionnaire in English might have a bias due to their different native language. In addition, the unhealthy taste intuition is strongly influenced by the culture. Therefore, focusing on one country or two to compare would give a deeper insight into this matter. The age group 18-29 were strongly represented in this study and therefore, a future study should aim to have more evenly distributed age groups proportional to the real world.

Although the participant had to wait 20 seconds before clicking to the next page after the stimulus, the respondents might have not actively read through the menu. Without carefully reading the menu, the related questions could not be answered accurately. This might have influenced the outcome of the experiment itself since the participants could not go back to memorize the menu again.

Furthermore, it also should be highlighted that considering a qualitative research approach could have offered more detailed and in-depth responses to why individuals prefer certain dishes over others. Since most individuals have specific preferences regarding food, investigating their reasons and argumentation will shed more light on this matter.

Based on the limitations, there are suggestions for further research. Therefore, there are still certain areas within this topic which can be further analysed. Other menu sections can still be tested and compared to investigate if there are differences depending on the dishes. In the existing literature, there is no distinction between the type of food items.

Moreover, as the food pleasure orientation differs from country to country, further research can explore the differences between them. Since age was a significant covariate regarding food choice, considering age groups in future research might give insights into the differences

between ages. Furthermore, this current study evaluated multiple sensory attributes as a treatment group but making a distinction between the sensory attributes and testing the effects of these might give new insights regarding which sensory attributes have the best effect on certain food items.

This current study is conducted in the year of 2022 and with the increasing interest in healthier eating habits, repeating this study in a couple of years may show other significant results due to the fact that the food consumption behaviour changes throughout time. Finally, there are still several parts of this topic, like different menu categories, comparison of single sensory attributes or other needs in different life stages, not investigated well enough and therefore the main recommendation is to take a closer look into this topic due to the increasing issue of the individuals' unhealthy lifestyles.

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APPENDIX

Online Experiment

Dear visitor,

This study aims to investigate the perceptions of restaurant menus and is part of my Master thesis. I would highly appreciate it if you could spare a few minutes to answer the following questionnaire (3-4 minutes).

We guarantee that your answers will remain confidential and will be used for academic purposes only. Please note that your answers should reflect your personal judgement.

Thank you for your input and participation.

Clicking on the “Next” button below would indicate that you have read the information above and that you voluntarily agree to participate.

Please have a look at the following menu. The "next" button will appear after 20 seconds.

1. In this section, I have some questions related to the previously presented menu. Please indicate your agreement with the following statements (1-strongly disagree, 7-strongly agree):

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
Some dishes of this menu included information about the consistency (e.g., crispy, crunchy, fried).	○	○	○	○	○	○	○
Some dishes of this menu included information about the taste (e.g., sour, sweet, salty).	○	○	○	○	○	○	○
Some dishes of this menu included information about the healthiness (e.g., fat content, sugar content, nutritional value).	○	○	○	○	○	○	○

2. The menu included a yoghurt crème. Please indicate which attributes were used to describe this particular dessert:

- ○ No attribute
- ○ Low-sugar
- ○ Sweet and crunchy

Berry Yoghurt Crème with Chocolate Flakes

3. In this section now we are interested in your personal preferences.

Please let us know how you evaluate the above mentioned dessert" (1-strongly disagree – 7-strongly agree):

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
This dessert is healthy for me.	○	○	○	○	○	○	○
This dessert is a part of a healthy diet.	○	○	○	○	○	○	○
This dessert is nutritious.	○	○	○	○	○	○	○

4. In this section now we are interested in your personal preferences.

Please let us know how you evaluate the above mentioned dessert" (1-Not at all – 7-Very):

	Not at all 1	2	3	4	5	6	Very 7
How much do you think you would enjoy eating them?	○	○	○	○	○	○	○
How tasty do you think these dessert would be?	○	○	○	○	○	○	○

Berry Yoghurt Crème with Chocolate Flakes

5. Please let us know if you would consider ordering the above mentioned dish (1-strongly disagree – 7-strongly agree).

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
I would like to recommend this dish to my friends.	○	○	○	○	○	○	○
The probability that I would consider ordering this dish is high.	○	○	○	○	○	○	○
The likelihood of ordering this dish is high.	○	○	○	○	○	○	○

6. How would you describe your diet?

- ○ Omnivore
- ○ Flexitarian
- ○ Vegetarian
- ○ Vegan
- ○ No diet
- ○ Other

How often do you visit a restaurant in a month?

7. We are interested in your eating habits.

Please indicate the extent you agree/not agree with the following statements. (1-strongly disagree – 7-strongly agree)

7. We are interested in your eating habits.

Please indicate the extent you agree/not agree with the following statements. (1-strongly disagree – 7-strongly agree)

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
I carefully watch what I eat.	○	○	○	○	○	○	○
The healthfulness of snacks makes no difference to me.	○	○	○	○	○	○	○
I always follow a healthful and balanced diet.	○	○	○	○	○	○	○
I try to eat nutritiously.	○	○	○	○	○	○	○
I eat what I like and I do not worry about healthfulness of food.	○	○	○	○	○	○	○
The healthfulness of food has little impact on my food choices.	○	○	○	○	○	○	○

8. Gender

[Please choose]

Age

9. Highest completed education

[Please choose]

10. Which is the country, you're currently living?

Country: No answer

Thank you for completing this questionnaire!

We would like to thank you very much for helping us.

Your answers were transmitted, you may close the browser window or tab now.