

## **The Relationship between Food Preferences and Food Choice: A Theoretical Discussion**

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### **Abstract**

*This paper discusses the relationship between food preferences and food choice. First, we aim to identify and point out what factors affect our food preferences and thereby try to explain the many reasons for differing food preferences. The underlying reasons might come from different sources, and this paper focuses on trying to fully grasp this complexity. We illustrate the variation of factors affecting our food preferences; biological/physiological, psychological and societal factors. Second, we aim to give a general overview over factors affecting food choice and the actual decision making process used by consumers. Third, we provide a brief discussion regarding the connection between food preferences and food choice. Finally, we conclude by stating that further insight is needed in areas such as cultural, historical and demographic factors. One solution to this could be to allow methodological influence from other disciplines such as social psychology.*

### **Introduction**

Humans are faced with several food choices each day and make decisions on what food to eat based on several criteria. The need for food is a basic, physiological need with a clear and simple goal and a seemingly straight forward solution on how to be satisfied (Mela, 1999). As simple as it may seem, food choices are multifaceted and are not necessarily straight forward. It can be considered as common knowledge that people have different food preferences. Some people like bell peppers while others don't. Some people like a variety of foods while others might be picky eaters. On the one hand, preference in the context of food can indicate a consumers' choice of one food product over another. Liking, on the other hand, reflects the assessment of quality of a product (Franchi, 2012). What is interesting however, is what causes these differences and particularly why they occur. We already know that there are some biological differences in how we perceive the basic tastes (Tuorila, 2007) and that what foods we end up liking is to some degree caused by learning experiences we start forming already as infants (Capaldi, 1996) and continue to form throughout our lives (Nestle et al., 1998). We all have different learning experiences with food, and this causes different food preferences. These learning experiences are highly individual in nature and can be defined as psychological factors affecting food preferences.

Several different factors affect our food choices and preferences; one of these is our biological reactions towards the food we consume. Such reactions are related to the perception of sensory modalities and physiological post-digestive effects. How we perceive some of the basic tastes, such as our preference for sweet or rejection of bitter tastes, may be predetermined (Drewnowski, 1997).

Our chemosensory perception is more or less the same all over the world, and the psychophysical response to sensory qualities may not be much different in different cultures (Prescott & Bell, 1995). However, the preference for these qualities may depend on the context they are experienced in. Hence, different factors in our surroundings affect our preferences (King et al.2007; Rozin, 1996).

Using the Food Choice Questionnaire (FCQ) (Steptoe et al.,1995) researchers have revealed that several factors such as health, price, convenience, mood, sensory appeal, natural content, weight control, familiarity and ethical concerns affect our food choices (Steptoe et al.,1995). According to Grunert (2002), food choices are framed in terms of our quality expectations before and after our purchase of a food product. Research has shown that apart from price, sensory appeal is one of the most important factors influencing food choice (Costellet al.,2010; Drewnowski, 1997; Scheibehenne et al.,2007; Steptoe et al.,1995). In the FCQ sensory appeals covers whether the food smells nice, looks nice, has a pleasant texture and tastes good (Steptoe et al., 1995). What is interesting is that not only do our sensory or food preferences guide food choice, but a great variety of other factors also contribute to our final choice of food.

According to Costellet al. (2010), consumers' response to food products are determined by four different components. First, consumers perceive the sensory characteristics of a product. Second, the consumer has a general response to a product, which is an affective component. Third, the consumer applies a cognitive component which is related to the information the consumer has about the product and to the consumers' attitudes and beliefs. Fourth, the response is affected by a behavioral component which involves the persons' intentions or actions for future behavior (Costellet al.,2010). These components are of importance and will be discussed further throughout the paper. A central argument however, is that consumer's response to food products are further affected by the social milieu or culture we are surrounded by. Whether considered a fifth component in the reasoning above, or treated as a part of the cognitive component, the social milieu we live in is not only important in response to food products but also of importance when it comes to the development of our food preferences. One might claim that the consumption of food can only be fully understood in a social context (Rozin, 1996). Since people grow up in different societies all over the world we can see distinct differences in food traditions and cuisines (Montanari, 2006). In other words different demographic, sociocultural and economic factors modulate the connection between taste responsiveness to food and our choices of food (Drewnowski, 1997). This entails the assumption that people from the same culture or region of the world would have been affected in the same way culturally and therefore has similar food preferences compared to people from other parts of the world. Further, in the contemporary world it is common for people to eat the same food, or ingredients, all over the world. However, due to differences in weather and soil conditions, it does not necessarily mean that foods are prepared in the same way or that they taste the same across geographical regions (Risviken et al.,2006).

Following from the previous discussion, sensory preferences alone do not determine our food choice. As seen with the FCQ, several other factors determine what we choose to eat. The interesting thing is how the individual factors (biological and psychological) and the cultural or sociocultural factors interact to create people's unique sensory food preferences. This paper combines marketing and consumer research literature with sensory and food science literature to provide an interdisciplinary picture of the aforementioned mentioned issues. In this, some central questions are what biological or inheritable factors affect our food preferences, and what psychological factors contribute to the formation of food preferences? Moreover, what cultural or social factors affect food preferences and what factors affect our food choices are also important issues to address. Finally, how we make food choices and how our food preferences affect or interact with them are also of particular interest.

In order to answer these questions, we will initially elaborate on factors that cause differences or similarities in food preferences, focusing on thematic areas such as biological, psychological, cultural and societal factors. Secondly, the underlying reasons for consumers' food choice will be discussed. Then, the review will provide a brief discussion of the connection between food preferences and food choice. Finally, any lack of research focus within the areas of food preferences and food choice are suggested.

### ***Different People – Different Food Preferences***

#### **Biological Factors Affecting Food Preferences**

When we consume food the brain receives signals from different sensory inputs, that is visual, olfactory, gustatory, tactile or trigeminal. This information is then integrated into the final sensory perception of the food (Prescott, 2004; Small & Prescott, 2005).

For most people the common definition of a foods' "taste" includes the chemical senses of taste and olfaction (Drewnowski, 1997). Sensory qualities and taste in particular is critical determinants of food choice and preferences (Garcia-Bailoet al.,2009). Understanding how consumers perceive senses such as taste and olfaction are thus useful in understanding food preferences (Lawless & Heymann, 2010). The interaction between taste and odor jointly constitutes the flavor, and this again reflects a central neural process which is based on associations between taste and smell (Costellet al.,2010). In addition, the oral perception of the foods texture is also included in what people perceive as the "taste" of a food product (Drewnowski, 1997). Thus, the sensory factors affecting our food preferences are particularly how we perceive the basic tastes: sweet, sour, bitter, salty and umami which, together with odor and texture, constitutes the vast array of flavors found in foods (Drewnowski, 1997; Garcia-Bailoet al.,2009).

How we perceive flavors is also biologically determined. For instance, it has been shown that genetic variations in an odorant receptor might alter peoples' food preferences (Lunde et al., 2012). Also, genetic taste markers cause a number of consumers to reject bitter tastes and this sensitivity is a heritable trait (Birch & Fisher, 1996; Drewnowski, 1997). In fact, bitter is the taste modality that has been most widely studied (Garcia-Bailoet al.,2009). Already as children we tend to reject bitter stimuli, a response evolved to protect us from the consumption of plant toxins (Garcia-Bailoet al.,2009). Specifically, some people genetically inherit the ability to taste the bitter compounds phenylthiourea (PTC) and 6-*n*-propylthioutacil (PROP), whereas others are non-tasters of the compound (Prescott & Bell, 1995; Tuorila, 2007). The minimum detectable concentrations of these compounds follow a bimodal distribution with about 1/3 of Caucasians unable to detect them (Lawless & Heymann, 2010). People can be classified as non-tasters, tasters or supertasters of PROP. Some researchers assume that our food consumption habits differ based on what type of "taster" we are (Garcia-Bailoet al.,2009; Tuorila, 2007), and this can be shown with coffee or the taste of caffeine. The same genetic variation in sensitivity to bitter tastes has been found to overlap with the variation for caffeine (Booth et al.,2011). PROP tasters are more likely than non-tasters to reject higher levels of caffeine in coffee (Booth et al.,2011). This ability to taste PTC and PROP also varies across cultures (Prescott & Bell, 1995). Even though PTC and PROP do not occur naturally in foods, the response to their taste correlates with bitter substances that are present in foods (Garcia-Bailoet al., 2009).

The other taste modalities also show some proof of being genetically determined, and as an example we are born with a preference for sweet tastes, and human infants show a positive hedonic response to sweet solutions (Drewnowski, 1997). The perception of sweet tastes as pleasant reflects evolutionary pressures to consume food that are energy dense, and there are individual differences in the detection of sweet taste thresholds (Garcia-Bailoet al., 2009). Sweet taste preferences and sugar consumption decline with age. One reason for this is that children's food preferences are primarily guided by taste alone whereas adults are often affected by other factors, such as nutritional beliefs (Drewnowski, 1997). However, it is important to note that consumers' sensitivity to chemosensory and other food-related stimuli varies a lot across different individuals (Tuorila, 2007).

In the literature we also find studies focusing on whether preferences for different food types are hereditary. In a twin study, Breen et al.(2006) examined the heritability of food preferences in young children. In contrast to other similar studies they investigated types of food rather than individual foods. Thus, they investigated the liking for vegetables, fruit, desserts, meat and fish instead of going into specific food products. Gathering data from 214 same-sex twin pairs (103 monozygotic pairs and 111 dizygotic pairs) they discovered that there is a modest heritability for desserts, moderate heritability for vegetables and fruit as well as substantial heritability for meat and fish. They suggest that variations in food preferences are heritable when aggregated across empirically-derived groupings of food. Even though these findings are not conclusive, it indicates that we also have to take heritability, or genetic predispositions, into account when discussing food preferences (Breen et al.,2006), and not only the chemosensory perception of tastes.

Another biological factor influencing food preferences and food choice is the human appetite control system that has evolved to ensure that we are protected against nutrient shortage and are able to exploit scarce food supplies (Yeomans, 2007). Different beliefs exist about what should be included in the physiological control of eating, but two key concepts are of central. The first is the concept of need-states, meaning a situation where the body needs a nutrient, for instance glucose, which has to be kept at a certain level for the body to be kept in homeostasis.

When the body detects perturbations from the necessary level, our appetite is driven by an intrinsic motivation to restore the level, or stated differently maintaining homeostasis (Yeomans, 2007). The second concept is the hedonically driven eating which bases itself on eating for pleasure or the sensory experience (Yeomans, 2007).

As can be seen from this description, several biological factors contribute to food preference, but with chemosensory perception and the sensory experience being the main factors. In addition, it is important to note that the choice of food is not only influenced by the chemosensory perception of our basic tastes, but also the huge variety of food odors and flavors which varies across the world (Prescott & Bell, 1995). Our chemosensory perception is more or less the same across cultures while our food preferences vary (Jaeger et al., 1998; Prescott & Bell, 1995). This might partly be due to the great varieties of odors and flavors. However, there is little evidence for physiological differences in the perception of tastes and therefore the differences observed between individuals and groups may be caused by other factors. These could be both biological factors such as individual taste preferences for fat in foods, and societal factors such as economics (Drewnowski, 1997).

### **Psychological Factors Affecting Food Preferences**

One of the reasons for different food preferences is that we have different experiences with food as we grow up. Apart from the previously mentioned biological factors, most of our food preferences are learned through experiences and there are several ways of learning about food (Nestle et al., 1998). Learned behavior might be conscious or unconscious. Food preferences are a typical example of learned behavior that occurs unconsciously. In contrast to intentional learning, this type of learning does not deteriorate with age (Köster, 2009). We learn about food throughout our lives, but most food related learning occurs during the first 5 years of life (Köster, 2009; Nestle et al., 1998). One of the basic ways of learning about food is through experiencing the negative or positive consequences of eating a particular food, called *flavor-consequence learning* (Yeomans, 2007). For example, associating a food's sensory cues with a positive post-ingestive signal can result in a learned preference for that food (Birch, 1999). If, however, the consequences are negative, such as nausea, the results can be learned aversions towards the food (Yeomans, 2007). Learned food aversions are formed quickly, maybe even after one pairing. Learned food preferences, on the other hand, are formed more slowly. Apart from the flavor-consequence learning, food preferences are formed through four different learning situations (Birch, 1999). First, perhaps the most basic learning situation is *mere exposure*; repeated consumption of a food increases preference for the food. This process starts from childhood and is believed to have a biological basis (Capaldi, 1996; Nicklaus et al., 2004). In fact, this has also been shown with initially disliked food; repeated exposure to novel foods might increase liking for that particular food (Hausner et al., 2012). However, it is important to note that exposure to food rarely is "mere" since it is frequently associated with cognitive food-choice decisions or linked with the context, post-ingestive consequences or other cues that may cause likes or dislikes. Such effects may be strong and can underlie or complement the mere exposure effect (Mela, 1999). Secondly, *the medicine effect* is the effect that occurs when food associated with recovery from illness becomes preferred. This is also the case the other way around, as mentioned above (Capaldi, 1996). Thirdly, there is *flavor-flavor learning* which occurs when a new flavor is paired with an already liked flavor (i.e. sweetness) (Birch, 1999, Capaldi, 1996; Yeomans, 2007). This type of learning is long lasting and the food continues to be liked unless another learning experience counteracts the initial experience (Capaldi, 1996). For example, sweetness is, as previously mentioned, innately liked and therefore the addition of sweetness to foods increases their immediate acceptability (Yeomans, 2007). Finally, there is *flavor-nutrient learning* which occurs when a food becomes associated with ingested nutrients or calories. Humans tend to prefer the food with the highest energy density, such as food high in sugars or fat (Capaldi, 1996; Cooke & Wardle, 2005; Drewnowski, 1997). However, it is challenging to separate flavor-flavor learning from flavor-nutrient learning since highly caloric food rarely tastes bad (Birch, 1999; Capaldi, 1996). Following from this, several different learning mechanisms cause differences in food preferences and these differences are highly individual.

Learning mechanisms can also be linked to habitual consumption, especially when it comes to mere exposure. Habitual consumption of a food might increase consumers' liking or preference for that particular food (Costellet et al., 2010). Habits develop through repeated behaviors and can be seen as automatic acts since individuals rarely think consciously about them (Franchi, 2012). Habitually consumed food products might also become preferred over equivalent products (Mela, 1999).

While adults are affected by a great variety of factors when choosing what to eat, children's food preferences are often predicted by liking (Cooke & Wardle, 2005). Children do not eat what they do not like and what they like is in great part influenced by the energy density in the food (Birch & Fisher, 1996). Studies on children from different countries show that children have similar food preferences across countries, and this also applies to food aversions (Cooke & Wardle, 2005). This indicates that personal experiences and the environment around us continue to form our food preferences throughout the life span.

Personality characteristics also affect consumer perception and preferences for food (Jaeger et al.,1998). Private Body Consciousness (PBC) (Miller et al.,1981) is one such characteristic and previous studies have related PBC to food preference (Jaeger et al.,1998; Solheim & Lawless, 1996). PBC is an individual measure of inner body awareness and subjects might be classified as either high or low in PBC. The subjects are classified based on several factors such as sensitivity to changes in body temperature, internal tensions, heart rate, dryness of mouth and throat, and hunger sensations (Jaeger et al.,1998). PBC theory predicts that some people are more sensitive to changes in their body than others, and this has been successfully linked to different aspects of human behavior including preference for sensory characteristics (Jaeger et al.,1998). Specifically, Jaeger et al.1998 showed that people who were high in PBC were more likely to evaluate apple samples on the basis of sensory characteristics than people who were low in PBC. How consumers' react to information given about a food product (in this case cheddar cheese) has also been found to depend on whether they are high or low in PBC. High PBC increased the purchase probability when tasting was accompanied by correct information about fat content and price (Solheim & Lawless, 1996).

Other personality characteristics have also been investigated. In one study Goldberg & Strycker (2002) found that individuals who substitute low-fat food for high-fat food tend to describe themselves in terms that reflect dutifulness, orderliness and conscientiousness. They also found that people who avoid foods flavored with fat tended to describe themselves in terms of quickness, alertness and other aspects of intellect. Further, people who try to avoid non-meat types of fat describe themselves in terms of morality, cooperativeness, dutifulness and purposefulness. People who avoid meat fats describe themselves in terms of imagination and reflection as opposed to talkativeness and sociability. Finally, those who reported high consumption of fiber rich foods tended to describe themselves in terms of openness to experience which includes imagination, reflection, quickness and poise (Goldberg & Strycker, 2002). Even though these results, in combination with the PBC-results mentioned above, should not be taken out of context (historical and geographical), it is an interesting finding showing that differences in personality characteristics influence what types of food we prefer and how we perceive food.

Allen et al. (2008) argues that the effect of evaluating sensory attributes depends on human value priorities. Hence, they suggest that subjective processes influence our perception of how a food tastes. According to them the consumer compares the cultural value the food symbolizes to his/hers values and self-concept. When the consumers' value and the symbol coincide, implying a value-symbol congruency, the consumer experiences a more favorable taste and aroma, causing him/her to like the product. Another likely result is a higher behavioral intention and an increased probability for choosing the product for a second time. On the other hand, the consumer tends to dislike a product when he/she experiences lack of congruency between the above mentioned factors. The product will then be perceived as having a poor taste, and the likelihood of repeated trial will be smaller (Allen et al., 2008).

Consumers' perception of a food product is also colored by previous experiences as well as how the product is marketed and how the social surroundings react to the product (Jansson-Boyd, 2010; Hoegg& Alba, 2007; Siegrist& Cousin, 2009; Tuorila et al.,1998). The sensory likes and dislikes that consumers express are often a result of experience as we tend to associate sensory stimuli with other food properties or with consumption situations (Mela, 1999). Stated differently, the quality of an experience with food is determined both by a bottom-up process and a top-down process. The bottom-up process reflects the characteristics of the taste stimulus impinging on the consumers' sensory organs, whereas the top-down process is the preexisting beliefs, desires and expectations affecting our experience with a food product (Lee et al.,2006). In other words, expectation towards sensory or hedonic characteristics might influence food selection and can be generated from a variety of factors (Costellet al.,2010). One issue that generates expectations is the information given about the product. This has been found in several experiments, with one example being consumers who are given information about wine (negative or positive wine critique).

While the subjects who were given the information after tasting the wine (or not given the information at all) were not affected by the critique, those who received the information before tasting the wine were affected by the information. This suggests that information received before tasting a food product influences hedonic ratings more than information received after tasting (Siegrist & Cousin, 2009). In other words, consumers tend to search for the taste experience they initially received information on (Lee et al., 2006; Siegrist & Cousin, 2009). Brand knowledge is another example of a factor that affects our expectations or experiences of food products. Consumers might have expectations or experiences related to a certain brand and this can affect their food preferences (Lawless & Heymann, 2010). Further, consumers are often brand loyal and have a preferred brand that they continue to choose repeatedly. The brands they are loyal to produce positive associations for the consumers, and these associations determine whether the consumer will repeatedly buy the product (Jansson-Boyd, 2010).

### **How Society and Culture Affects Food Preferences**

Dietary patterns evolve and change over time (Saba, 2001) and are a part of societal development. People's diets are multidimensional and shaped by several factors, society being one of them (Drewnowski, 1997; Naska et al., 2006), and differences in food preferences across cultures can be observed (Risvik et al., 2006). Food preferences have been closely linked to cultural development throughout history (Wright et al., 2001; Montanari, 2006). The cultural group we belong to is of great importance when it comes to food preferences. The choice of food is more complex than just liking or disliking a food product. Several circumstantial factors such as habits, beliefs, attitudes and values influence our choices (Mela, 1999; Palojoki & Tuomi-Gröhn, 2001). Culture can be seen as a sort of collective memory that influences individual behaviors (Franchi, 2012), and the influence of culture is rooted in a combination of several factors. One factor is the environment; that is geography, climate and availability of different plant and animal species. Another is ritual and belief systems, both religious and otherwise. Community and family structure is also a factor as well as the degree of innovation, mechanization and experimentation in the society. The degree of mobility in a society is also important since the trading with, and import from, other populations or consumer groups may impact the food culture. Finally, the historical, economic and political context within a culture also affects consumers' food choices and preferences (Mela, 1999; Wright et al., 2000).

Since there is little evidence supporting physiological differences between nations in terms of food preferences, a reasonable assumption is that the difference is caused by cultural or societal factors (Mela, 1999; Risvik et al., 2006). Risvik et al. (2006) argues that the differences in food preferences between rural and urban parts of a country might be bigger than the difference between cities in different countries, for example Paris and Reykjavik. This is due to an increasingly more open food market (Risvik et al., 2006). Nevertheless, this can still be termed as cross-cultural differences as such differences do not necessarily have to be national differences but could be variations between subgroups within a nation or region as well (Risvik et al., 2006).

The difference between rural and urban areas is probably caused by availability, which is a major moderator related to food preferences and food choice. This again relates to familiarity which is of importance in terms of how we perceive food. Jaeger et al. (1998) suggests that cross-cultural differences in preference might be linked to level of familiarity with products used in tests. If there is a huge difference between the familiarity with a food product in different cultures, then the difference in preference for that product will be bigger than if there is a similar familiarity for the product. Which foods are familiar to us is closely linked to which foods are available to us, and this might vary throughout the world and therefore cause differing preferences (Jaeger et al., 1998). Food availability also includes both physical and economic access. The food supply varies across the world and seasonal changes cause fluctuations in food supply in a variety of geographical places (Mela, 1999). These factors illustrate that the society or culture we grow up in is of great importance when studying consumer food preferences.

Our closest social environment and family also plays a great role in food liking (Tuorila, 2007). Most eating occurs in the presence of others, and cultural forces serve as a guide to how much we eat, when we eat and what we eat. Food is a form of social exchange that is of great importance in several cultures (Askegaard & Madsen, 1998; Nestle et al., 1998; Rozin, 1996). Stated differently, consumers use the categories and rules of their cultures, subcultures or ethnic groups to decide what is acceptable and preferable to eat (Nestle et al., 1998).

Learning these rules starts early in life and exerts a powerful force when it comes to food choice and preferences throughout our lives. The closest reference groups such as family and peers provide several opportunities for modeling and reinforcing the common food choices as well as sensory likes and dislikes (Mela, 1999).

In fact, the previously mentioned food learning mechanisms often occurs in the closest environment or family situation (Birch & Fisher, 1996). Also, to some degree culture determines what kind of foods we are exposed to as children, thereby influencing our preferences later in life (Ludy & Mattes, 2012). This is linked to the matter of availability discussed above. From this, we can assume that people from the same parts of the world would have somewhat similar food preferences compared to people from other parts of the world.

We are also affected by how other people in our environment act while we are eating. The mere observation of other peoples' behavior affects our liking of a food product. This can be considered as a social facilitation effect (Zajonc, 1965), which simply stated is the effect the presence of other people has on our behavior or level of arousal. In fact, Barthomeuf et al. (2009) showed that the presentation of a photo of an eater might modify the desire to eat a product, but this depends on whether the product is in a liked or disliked category and what type of facial expression the eater has. They discovered that when the foods were liked, the desire to eat the product was lower when a photo of an eater expressing disgust or neutrality was shown. When foods were disliked, and the photo showed an eater showing an expression of pleasure, the desire to eat that product increased more than when the photo was not shown to the consumer. An interesting fact here is that whether the photograph influenced the consumers depended on the degree of liking the consumer had towards the product in advance. For example, if the consumer already disliked a product, the desire to eat the product did not change when seeing a photograph of a face expressing disgust (Barthomeuf et al., 2009). This work suggests that the presence of other people affects the desire to eat food, and thus it also affects our food preferences to some degree.

However, our immediate environment is not the only factor affecting food preferences. Demographic factors such as age, gender, income or level of education also interacts with our food preferences and choices. This is also closely linked to the previously mentioned cultural factors. For example, level of education will arguably affect what type of social milieu you inhabit, and then again affect what type of food you are exposed to (Bourdieu, 1995). If we consider gender as a variable, studies have shown that females tend to prefer more vegetables and less energy-dense food than males (Cooke & Wardle, 2005; Wądołowska et al., 2008). Also, females have a lower rate of animal product consumption than males (Kubberød et al., 2002), a stronger tendency to avoid fats from meats (Goldberg & Strycker, 2002) or fats in general (Johansen et al., 2011). Ares and Gámbaro (2007) found that gender and age groups have different preference patterns for functional food concepts as well as different healthy food habits in general (Carillo et al., 2011; Wądołowska et al., 2008). Similarly, in an interdisciplinary study from the UK, Beardsworth et al. (2002) found that women tend to be more concerned about moral or ethical concepts related to food than men (i.e. the use of animals for food). This corresponded with the finding that women were more likely to be vegetarians than men (Beardsworth et al., 2002). In the area of preference for different food categories Beardsworth et al. (2002) found little gender difference for several food categories, but similar to the findings reported by Kubberød et al. (2002) they found that female respondents tended to avoid eating red meat. Females, however, ate more fresh fruit than males, who ate more crisps, fried foods and processed meat. Finally, women were more likely to make dietary changes in order to lose weight, and feel guilt related to eating. Thus, Beardsworth et al. (2002) concluded that women exhibit a more "virtuous" eating and food choice pattern than men. Put differently, they refer to the awareness of certain ethical and nutritional principles valued in western culture. Based on their findings they conclude that women more easily act in accordance with these principles than men do (Beardsworth et al., 2002).

Reasons for these gender differences can be biologically grounded as males' energy requirements are greater than those of females, or it could be socially grounded as females tend to attach more importance to social desirability (Cooke and Wardle, 2005). This is linked to the culturally generated construct of body image (Beardsworth, 2002). Also, it could simply be that men are less motivated by, or enthusiastic about, health related to food than females (Wardle et al., 2004). The gender differences mentioned above has been found in samples of both children (Cooke & Wardle, 2005) and adults (Beardsworth et al., 2002). Moreover, from Wardle et al.'s (2004) cross-cultural study it seems as though the difference between genders is consistent across a large variety of countries. Age also affects food preference, and in their sample Goldberg & Strycker (2002) found that older consumers ate more fiber-rich foods than the younger ones.

All the different factors mentioned in the preceding paragraphs contribute to creating different and unique food preferences. The move from food preferences towards actual food choice is not a straight forward process as it is affected by several other factors. This will be discussed in the succeeding parts of this paper.

## ***Making Food Choices***

### **Factors Affecting Food Choice**

Food choice is a very complicated process and we make several food choices every day based on more or less conscious decisions. In fact, it might seem that most food choices are based on intuitive thinking, resulting in effortless and fast decisions often based on habits that are not consciously monitored (Köster, 2009). Our food choices cannot be seen only as a result of individual preferences but as complex social constructions. These choices are cumulative in the sense that they develop throughout people's lives and integrate people's experiences with food (Franchi, 2012). Food choices might be based on a great variety of factors, food preferences being one of them. There are several other factors influencing food choice however, such as health, price, convenience, mood, sensory appeal, natural content, weight control, familiarity and ethical concerns (Steptoe et al.,1995). Cultural values, perceptions, beliefs, attitudes and social influences are also of importance to food choices (Nestle et al.,1998). In addition to this, consumers' attitude or perception of extrinsic product cues are also of importance (Chrea et al.,2011). Food choices are dynamic, complex and situational, and change over a person's life course (Franchi, 2012). Research using the FCQ has shown that sensory appeal is one of the most important factors affecting food choice along with health, convenience and price (Ares and Gámbaro, 2007; Fotopoulos et al.,2009; Franchi, 2012; Scheibehenne et al.,2007; Steptoe et al.,1995). Studies using other data collection procedures have also shown that sensory appeal is one of the most important factors (i.e. Wądołowska et al.,2008). In fact, sensory factors, that is taste, smell, sight and texture of food, is a significant driver of both food preferences and dietary habits, or food choice (Nestle et al.,1998). However, there are different ways to categorize the different factors affecting food choice, and different disciplines may concentrate on various areas.

Shepherd (2001) divides food choice factors into three main groups; first, it is the product or food related factors which rely on the physical or chemical properties of the food, sensory attributes, functional factors and nutrient content. Second, there are the consumer related factors including personality, social psychological factors, and physiological factors. Third, there are environmentally related factors including economic, cultural and social issues (Shepherd, 2001; Wądołowska et al.,2008). Many of the aforementioned factors are mediated by beliefs and attitudes held by the individual. For instance, the beliefs about the nutritional quality of a food product may be more important than the actual nutritional value of the food when consumers determine their food choice. Marketing, economic, social, cultural, religious or demographic factors might also act through attitudes or beliefs held by the person (Shepherd, 2001). Franchi (2012) argues that the division of food choice factors outlined by Shepherd (2001) does not prioritize culture as an important factor. According to her we must not overlook the importance of the "feeling" consumers have that makes some foods seem "better" than other foods (Franchi, 2012).

Another important factor to consider in food choice is availability. As previously mentioned this is an important moderator when it comes to food choice. According to Mela (1999) there are some basic global rules relating to understanding food choice. Availability is included in the rules as follows: *"If it is not available, it will not be eaten. If it is available, it is likely to be eaten. If there is no alternative, it will be eaten."* (Mela, 1999, p. 514). However, for people in the western world the food desired is usually available to them. Availability might mean different things to different groups of people and we may distinguish between overall availability and immediate availability (Nestle et al.,1998). Overall availability refers to the range of food options accessible that are accepted and affordable by the consumer. Immediate availability, on the other hand, refers to the readiness and convenience of the food product, for instance if it can be stored for a long time, preparation time and whether it can be eaten anywhere (Nestle et al.,1998).

Other factors included in Mela's (1999) rules are first, related to familiarity, the fact that peoples' behavior tend to be stable. Second, the rules state that food choice is related to learning and that learning will take place if it is possible. Third, the rules relate to context by saying that context is just as important as content. Finally, the rules state that perceived quality and intake of a food product reflect the matching of the consumers' expectations towards the experience of eating the food product (Mela, 1999).

There is a widespread agreement about which factors influence food choice (Shepherd, 2001; Wądołowska et al., 2008), what remains important to investigate is the relationship or connection between the different factors, food preferences and actual food choice.

### **Understanding the Food Choice Process**

When consumers select a food product they go through a decision process considering different factors. This process may be more or less conscious and includes both cognitive and emotional dimensions; all of which involve past experiences, present needs, sentiments and values (Franchi, 2012). According to Franchi (2012), food choice cannot be translated into a rational or cognitive exercise as it involves several emotional dimensions. Several different models or assumptions exist that discuss the food choice process. The focus varies in the different subject areas such as sensory science, sociology or marketing (Franchi, 2012). Since several models of food choice have been developed throughout the years, it is not possible to cover all of them in this review, but a brief discussion of some of these will give a good overview of the complexity within food choice processes.

As previously mentioned, the FCQ developed by Steptoe et al. (1995) can be used to measure consumer's food choices. It consists of 32 items measuring nine factors: Health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concerns. The FCQ measures self-reported attitudes and it has been shown that the food related attitudes people have often correlate with their dietary intake or actual food choices (Scheibehenne et al., 2007). However, they do not reflect actual dietary behavior (Steptoe et al., 1995). The FCQ, or adapted versions of it, has been used in several studies and adapted towards different related areas such as food motivation (Fotopoulou et al., 2009), attitudes towards healthy eating (Carrillo et al., 2011), consumption of traditional food (Pienak et al., 2009), and consumption of functional food (Ares & Gámboro, 2007).

Furst et al. (1996) developed a conceptual model of the food choice process based on a qualitative study using a constructionist approach. The model takes a wholistic approach towards the food choice process. The factors involved in food choice can be divided into three components called life course, influences and personal system. According to Furst et al. (1996) the life course must be explicitly considered when conceptualizing food choice. The life course consists of the personal roles a consumer has, as well as the social, cultural and physical context or environment where s/he spends his/her life. It also includes past influences like personal experiences and historical eras, as well as current trends. The influences are divided into five major categories, namely ideals, personal factors, resources, social framework and food context. These influences in turn contribute to people's personal systems which include conscious value negotiations and unconscious operationalized strategies. The value negotiation system within this model is very dynamic, while the strategies are based more on routine.

Since people repeatedly make food choices they develop personal systems for food choice. These systems have two main components: Conscious value negotiations and strategies involving choice patterns based on habits. Values that are negotiated are sensory perceptions, monetary considerations, convenience, health/nutrition, managing relationships and quality. Among these, sensory perception emerged as the most dominant one in the study conducted by Furst et al. (1996). The strategies people develop become heuristics that guide food choices. While these strategies may be unique for every food choice, they can have a similar pattern and tend to be stable but flexible. Food choice is also a highly complex process with variation both within and between individuals, and choices are often very reflective or habitual and automatic in nature (Furst et al., 1996). Sobal & Bisogni (2009) have stated that food choices are frequent, multifaceted, situational, dynamic and complex.

The Total Food Quality Model (Grunert et al., 1996) gives an overview over what type of considerations are made while choosing foods to consume. When making a decision about which foods to buy we perform a judgment of quality both before and after purchase (Grunert, 2002). The information consumers base their quality expectations on before purchase is called cues and there might be intrinsic or extrinsic quality cues (Grunert, 2002). The cues consumers use, such as color of meat to infer tenderness, are not highly predictive but more predictive cues might be unavailable or not understandable to the consumers. Intrinsic quality cues are physical characteristics of the food product whereas extrinsic quality cues are other aspects such as price (Grunert, 2002) or the design of a wine bottle (Chrea et al. 2011). After purchase the consumer has a quality experience, and the relationship between quality expectations and quality experience often determines whether or not the consumer will be satisfied with the product. Both the expected and the experienced quality is only partially under the control of the producer since several factors affect them.

For instance, in the formation of quality expectations consumers' might use cues to infer quality that might not be predictive of quality. When it comes to quality experience on the other hand, the consumers' cooking process (as is often the case with food) might mediate the quality experience (Grunert, 2002).

Jaeger et al.(2011) propose what they have named the food choice kaleidoscope which can be seen as "*a tool for structured description and observation or variability in food choice events*" (Jaeger et al.,2011, p. 413).

The center of attention in the kaleidoscope is food choice events or eating occasions and three groups of food choice factors; place, person and product. Each of these may consist of several sub-factors; for instance, fruit being a sub-factor of product and at home being a sub-factor of place. The kaleidoscope tool allows the researcher to scrutinize either one factor, for example place, or focus on the interaction between several factors. The kaleidoscope is not a framework for explaining food choice, but a descriptive framework for structured description of food choice which provides both qualitative and quantitative aspects of research methodology (Jaeger et al.,2011). However, such a description of food choice might provide further insights into the complexity of food choice as well as understanding the food choice process in itself.

### **The Connection between Food Preferences and Food Choice**

As can be seen from the preceding discussion, several factors affect our food choices. Therefore, the process connection food preferences and food choice is not straight forward and explicable. According to Wądołowska et al.(2008) food preferences interact with different food choice factors (such as advertising, functional, health, price, sensory and socio-cultural) and sociodemographic features of the consumer (such as age, economic condition, education, gender, region of residence and size of the place of residence), which again interacts with the frequency of food intake (Wądołowska et al.,2008).

It has been shown that people who have different food choice motives differs in preferences for selected food products (Wądołowska et al.,2008). Food choice remains a complicated area of study and consumers' choices are affected by a great variety of factors as previously mentioned. The actual decision making process remains somewhat unclear, partly because of its complexity but also due to the food choice process multifaceted nature. In addition, the fact that it is of interest to several disciplines contributes to its complexity since all disciplines may approach the matter from different point of views, thus illuminating different processes.

### **Discussion and Conclusion**

This paper has portrayed how the development of food preferences is a complicated process involving several factors and considerations. The fundamental sensory perception is more or less the same for all of us, but both underlying biological and psychological factors as well as the surrounding social and cultural context affects us differently. This contributes to creating unique food preferences between individuals. On the other hand, factors such as culture and the immediate environment may also create similar food preferences for groups of people who live in the same social milieu. Our food preferences in turn contribute to what food choices we make, although this is also mediated by a significant number of other factors. The great number of mediators on choice contributes to complicating the understanding of consumers' food choices process.

The aforementioned arguments show that a lot of research has been undertaken to identify and point out which factors affect the formation and maintenance of food preferences, as well as the impact those factors have on our food choices. However, what remains difficult but important to investigate is the connection, or relationship, between food preferences and food choice. There are two main reasons for its importance; first, food preferences differ and food producers have no control over the consumers' preferences. What they are able to control is the sensory quality of the product as well as how it looks and feels to the consumer. Being able to understand the actual importance of the products' sensory quality and liking among consumers is therefore of upmost importance for food producers. Apart from the sensory quality other factors previously mentioned should also be taken into consideration by producers of food products, such as package design, how the product is marketed and whether it should be targeted towards a specific segment of consumers. Second, there is an increasing importance for understanding both the development of food preferences and the connection between food preferences and food choice. Also, the different factors mediating our food choices are of importance. One of the main reasons for this is the evolving problem with obesity all over the western world. If researchers are able to better understand the underlying reasons for peoples food choices, we may better provide advice for policy makers when they are implementing measures towards stopping the obesity epidemic.

To understand the development of food preferences and food choices from an early age could also help prevent children and teenagers from developing obesity.

Nestle et al. (1998) points out that in research on food choice the main focus has been on physiological and psychological determinants, and that less attention has been given to cultural, historical and demographic factors. This still holds today, and a further insight into this part of the food choice process, as well as how it interacts with food preferences, would be fruitful as a means to understanding the complex food choice process better.

It would enhance our chances of meeting the challenges addressed in the previous paragraphs. In addition to this, such a focus is also important for investigating the social and social psychological factors that arguably should receive more attention. Therefore, research in sensory and consumer science could benefit from insights from social psychology. As suggested by Köster (2009), sensory and consumer science could have benefited greatly from adapting to changes and developments in psychological theory. Also, in terms of methods, turning towards experimental designs where the subjects actually make a products choice rather than asking about product liking might lead to further insight on both the formation of food preferences and how these relate to actual food choice (Köster, 2009).

The great variability in approaches to food preferences and food choices shows us that a great number of disciplines are interested in the subject. This also contributes to the complexity illustrated in our discussion. Further research should aim at using an interdisciplinary approach for two main interdependent reasons. The first reason is simple yet complex; we need to make use of an interdisciplinary approach in order to fully grasp the complexity of food preferences and food choice. Secondly, it is needed to implement cultural, historical and demographic factors to a greater extent to understand all aspects, or details, of the food choice situation. The interdisciplinary research could then be complemented by more detailed mono-disciplinary approaches on specific areas such as sensory responses. If such a method is used, it may very well advance our understanding of the complex connection between food preferences and food choice and the actual choice situation.

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