Edible Experiences

The Science and Art of Food Perception

by

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Introduction: What is it about?

"Dining is wonderful because it elevates food from the realm of nutrition to that of culture".

Amol Rajan

In my more than two-and-a-half decades of work on topics in the field of culture and cultural tourism, I have always been interested in applying the richness of the results of my research work. I have researched cultural heritage, museums, libraries, visual arts, music, cultural and creative industries in general, cultural tourism, digital culture, experiences and innovations in culture, but only in very rare cases have I had the opportunity to research food as a cultural phenomenon. Within my primary interest in researching cultural tourism, the usual strategic-planning and managerial perspective no longer fully satisfied my research interests, because I was always interested in digging deeper and looking for answers to the questions 'how?' and 'why?'. How can we create a cultural tourist attraction that will be highly competitive? Why does the perception of a certain cultural tourist attraction differ from visitor to visitor? Why do the Chinese especially like colourful kitschy souvenirs? How can we ensure that a cultural tourist attraction is remembered, especially when we know that tourist experiences are relatively short (and we were taught that repetition is the mother of knowledge, which we often don't have time for in tourism)? Why does active participation in a cultural activity enable a more effective understanding of it, while passive absorption of information (such as is common on tourist tours) is forgotten within just half an hour? Which is more important: the content of the cultural tourist attraction itself, or its presentation? And many more questions...

As someone who knows very well that creating an atmosphere is a key element of a cultural product that differentiates it from competitive ones, I had a hunch that the answers lay precisely there. At the same time, more and more often I came across literature relating to the experience economy, which is not scarce, but there are few works that give concrete instructions on how to create an experience. Digging deeper into that research, new doors opened that, apart from culture and tourism, required an interdisciplinary approach and knowledge – at least from neuroscience, psychology, art and marketing. No matter how great the challenge was, the very idea of a broad and very concrete application of the possible results of such research only pushed me further. Research in this area is therefore an important knowledge base. In addition, my teaching engagement and interaction with students, with whom I jointly design various cultural and tourist experiences, find a concrete application of this knowledge. The opportunity that was presented to me, and that I could not miss in order to deepen this knowledge, may have determined the direction of the research that I have been doing in recent years. During 2019/2020, as a Fulbright scholarship awardee, I stayed in Athens, Georgia, in the United States of America, at the University of Georgia, where I conducted research titled 'Sensory stimuli and their influence on basic emotions in the experience economy'. The starting point of this research was the competitiveness of cultural goods in cultural tourism: the more powerful experiences cultural goods offer, the more tourists will be attracted, and the more memorable the experience will be. That is to say, in the sea of cultural attractions that are offered to tourists today, the goal is to provide something special (or, as we now professionally call it, 'an experience'), and if the tourist's experience really engages, the probability of remembering it increases. As a result, a repeat visit to the attraction is gained, which ensures loyalty to the attraction, and perhaps also to the tourist destination. From previous research, I learned that one of the principles of experience

design relates to the engagement of all senses. As culture engages the senses very effectively (e.g. music affects hearing; painting and film affect sight; design affects practically all the senses, etc.), it was logical to start from the tools that culture possesses. Thus, the research focused precisely on the study of the effective use of cultural products by engaging the senses (sight, hearing, smell, taste and touch) in what is offered to the tourist. The use of the senses creates experiences, and the senses serve as receptors with a significant impact on evoking emotions; furthermore, emotional responses lead to unforgettable experiences, simultaneously raising awareness of the value of cultural attractions, and creating personal attachment to a tourist destination. In order to be able to understand the process of creating experiences, research has primarily focused on the study of different types of visual and auditory stimuli (not excluding other types of stimuli, such as olfactory, gustatory and tactile), associating them with corresponding bodily reactions. With all the challenges that life in America brings, it was truly an unforgettable research experience that resulted in several published papers, and now, indirectly, in this book. The rare opportunity that was given to me there to 'hook up' research participants to devices that measure heart rate, palm sweating or facial muscle movements as a direct response to specially-designed visual and auditory (artistic) stimuli was hard to miss, even though the research itself gave only partial answers to the complexity of the functioning of the human body and brain and their reactions.

At the same time, my personal interest in food and its preparation is ideal 'terrain' for studying sensations, atmospheres and experiences. So what is it about?

The goal of *Edible Experiences: The Science and Art of Food Perception*, the book that you are holding in your hands, is to explain the principles of experience design involving all five senses. It is based on the

techniques of the experience economy as a modern approach to building an audience in gastronomy, culture and tourism and to achieving the psychological satisfaction of consumers. My work is based on scientific research, but its results provide applicable knowledge. Therefore, the principles of experience design are presented using the example of food, and the 'tools' that are used are often inherent to art and culture. Thus, for example, colour, shape, symmetry, melody, rhythm, tonality, scale, harmony etc., all of which are 'tools' used in experiential consumption of food, will have a strong influence on the experience. Scientific findings about the creation of experiences and the brain's reactions to these cultural and artistic 'tools' are therefore a guide for the application of some tricks in practice. This provides a clear understanding of the process of experience design, as well as the cause-and-effect relationship of individual visual, auditory, tactile, olfactory and gustatory stimuli to the reactions of consumers. The same principles are applicable not only in the experience of food, i.e. in gastronomy, but also more widely. Thus, they can be used not only in museums, performing arts, film, (cultural) tourism, communications, urbanism and art therapy, but also in everyday life. The same principles are then presented through practical advice, illustrated with 'tools' that relate primarily to sight, but also to other senses.

In particular, the book, in addition to this introductory chapter, contains **five main chapters with subchapters**. In the **introductory chapter**, entitled ***What is it about?***, the goal and purpose of the book, its potential users and its structure are presented. The **first chapter** is entitled ***Food in the experience economy*** and explains the basic principles of experience design, thus providing a scientific basis for further elaboration of the topic. In the **second chapter,** entitled ***The brain-food connection***, all five senses and their functioning through the connection with the brain are described. ***Creating a dining***

experience is the title of the **third chapter**, which provides concrete instructions for experience design through individual senses and through multisensory stimuli. The **fourth chapter,** entitled ***Food and identity*** emphasizes their strong connection, which is elaborated through the following sub-themes: food as a brand, gastrodiplomacy, and food and tourism. The fifth and **last chapter** is devoted to ***Food and art***, and presents the topic in a two-fold way: food in art, and food as a work of art. At the end of the book, reference literature is provided, and all the text in the book is accompanied by illustrative examples in order clearly to show the principles of experience design, thus enriching and clarifying the text.

The book is written primarily for art, tourism and hospitality researchers but also as an aid for those who work in the sector of catering and hospitality, culture and tourism. At the same time, it is also for artists, gourmets and foodies, and will also be of great use to students of cultural-artistic and tourism fields, marketing and, through some topics, to students of psychology, cultural anthropology, political science and various artistic disciplines. Finally, principles advocated in the book are also applicable in everyday life and suitable for anyone who wants a life more beautiful and pleasant.

1. Food in the experience economy

We can safely say that the last two decades have been marked by the experience economy, especially in the field of trade and tourism. The concept of the experience economy can most simply be linked to economic activities that focus on fulfilling people's need for experiences (Sundbo and Sørensen, 2013), which emphasizes the impact that products and services have on human life. Such an economy studies the successful and/or increased consumption of products and services by creating experiences associated with them. Or, better yet, it studies what experiences, or sensations, affect the success of the consumption of products and services, and puts the emphasis on the psychological satisfaction that the consumer feels when consuming the products thus created. Therefore, the material nature of products is no longer in focus, since we live in a time in which products are easily available, and their excessive accumulation is not only out of fashion, but is even considered inappropriate. Conversely, modern consumers long for the psychological satisfaction that a particular product or service can provide them in order to feel fulfilled.

But can a product or service in itself offer psychological satisfaction? And what influences whether the consumer will truly feel such satisfaction? The creation of a product or service usually involves four main elements: (1) basic product, (2) spin-off products arising from the basic product/service, (3) related services, and (4) atmosphere associated to the basic product. While the experience economy can be linked to all four elements, it is precisely this last one, the atmosphere, that creates the experience and will differentiate the product from competitive products with similar characteristics. Why would anyone purchase this particular product? Is it a more interesting packaging,

the feeling that arises when it is consumed, the related social status, humour, or even something invisible, but strongly present, that makes an impression? There is no clear-cut answer; rather, it is very complex, and it is clear even to the most untrained eye that experience design is not left to chance. What is more, the experience economy often implies the deliberate creation of experiences with the aim of making an unforgettable impression.

James Gilmore and B. Joseph Pine II, considered to be the fathers of the modern experience economy, have stated that the areas in which experiences are staged have an aesthetic, entertaining, educational or escapist aspect (1998). Therefore, consumers will likely experience psychological satisfaction if the product they consume has aesthetic appeal, if they are entertained and learn something new, or if the product offers them the possibility of transformation, either spatial (from this place to another) or temporal (from this moment to another). This last aspect, escape, can also be understood symbolically, as an opportunity for personal transformation. Participation in such an experience can be active or passive, and thus, for example, the aesthetic aspect (e.g. visiting an art exhibition), although important, is very likely to offer only passive enjoyment, while the educational aspect (e.g. participating in a pottery workshop) will provide active pleasure. Furthermore, not every type of product provides the same intensity of experience, and thus the entertainment aspect (e.g. watching a film) will affect the consumer's immersion in the story, while the escapist aspect (e.g. acting in a play) will affect their complete immersion in the role.

In order to influence the consumer positively, it is necessary to create various, diverse, innovative, spectacular products and services that will affect their satisfaction. In doing so, we should be guided by the

principles of experience design; and, according to Pine and Gilmore, there are five of them:

1. assigning a theme to each experience,
2. harmonizing impressions with positive cues,
3. eliminating negative impressions,
4. offering memorabilia as additional experience-enhancers, and
5. engaging all five senses in the experience design (1998).

This implies that you will have more success if you assign a specific theme to your product; for example, inviting guests to a 'kitsch party' will invoke more excitement than an invitation to get together. Furthermore, no product is perfect. Perhaps your restaurant lies off the beaten path, and getting to it requires special effort and therefore discourages guests. For this reason, it is necessary to come up with ways to attract guests despite this negative element and turn it, for example, into an interesting quest, so that guests have fun, rather than complain. The experience itself is certainly the central component of your product, but it has a limited duration. To increase the durability of the experience, making use of additional products may be helpful, such as souvenirs that will awaken the memory of the experience, thus prolonging it and turning it into a memorable experience. And finally, and perhaps most importantly, use of all the senses in experience design potentially affects the consumers' emotions. When consumers are emotionally engaged, they create direct neural connections with the product, and consequently become loyal to your product.

When using senses, most companies use vision as the primary sense for presenting and branding their products. According to the BRAND sense research, 37 percent of respondents identified sight as the most important sense for assessing their surroundings (Lindstrom 2009). This, however, does not diminish the importance of other senses in

experience design. The famous Confucian saying, "What I hear, I forget. What I see, I remember. What I do, I understand", points to different intensities of the effects of various senses on the human brain, and his preference is touch and direct involvement in activities, so that the experience can be understood, which will then strongly impact memory and attachment to it. Research (e.g. Baumgartner, Esslen and Jäncke 2006; Lindstrom 2009) has shown that coordinated multisensory stimuli have the greatest impact on consumers. Stimulating a number of senses leads to emotional arousal and allows easier interpretation of the stimuli (Jelinčić and Šveb 2021).

This subject matter is addressed particularly by neuromarketing, a field of commercial marketing communication which applies neuropsychology to marketing research, focusing on investigating consumers' sensorimotor, cognitive and affective responses to marketing stimuli. Neuropsychology is not necessarily applicable only to marketing research. Its application is much broader, and includes areas such as medical treatment, culture, tourism, urban planning etc. It is especially interesting in the context of the hospitality industry.

So what is the importance of food and taste in creating an experience? We have all found ourselves at an interesting book launch, followed by refreshments. No matter how interesting the presentation was, it reaches its climax only at that final moment. It is a moment of engagement in which the audience also participates, talks with the author, socializes: a moment in which other senses are also activated. While we used sight and hearing during the book presentation, when food is served, in addition to sight and hearing, our smell, taste and touch are also activated. In a conversation with the author and other participants, we may find out new details relating to the topic of the presentation, which will make us even more engaged and ultimately

provide us with an emotional impression of the event, which we will subsequently characterize as good or not so good. Such multisensory stimuli enable stronger emotional engagement, even though we are probably not even aware of many of them. The focus of the entire event is on the book and its author, and they should serve as an indicator of whether the event is good or bad, but the impression is also made by sensory stimulation with abstract elements that we sometimes may not even be aware of. If there were technical problems during the book presentation and the microphone was not working properly, it is very likely that this will spoil our impression, because our hearing was deprived of parts of the presentation. If the author gestured vigorously with his hands during the presentation, often risking spilling a glass of water that was on the table, this could have visually distracted us from focusing on the presentation. If the chairs we were sitting on were extremely uncomfortable, the sense of touch made us squirm in an attempt to find a better position. Or, if the refreshments are served in the same room in which the book launch takes place, the smells of the food preparation could shift our focus from the launch to the refreshments, instead of concentrating on the content of the presentation. Experience design, therefore, requires careful planning, because a multitude of details can influence its success or failure.

So what about the taste itself? Whether it is an event in which food is the central experience, such as dinner in a restaurant, or one in which food is an accessory or enhancer of the central event, such as a book launch, taste can be a powerful element in creating an impression. For example, if you knew that fattiness and sweetness could be the most important characteristics of food, because the brain responds positively to them, would you consider including, for instance, chocolate in the experience you want to design? Chocolate is considered a superfood, because it is the only fatty fruit with

approximately 50 percent fat, and we consume it in combination with sugar. Such a composition directly affects the brain, because it combines both fatty and sweet. Specifically, two tiny parts of the brain respond to chocolate consumption: the amygdala and the hypothalamus. In layman's terms, the amygdala is the centre for emotions and serves as a repository for emotional memory. When chocolate is consumed, it releases dopamine, a neurotransmitter also known as the feel-good hormone. The hypothalamus also plays an important role in emotions, and it also controls important vital functions, including eating and drinking. Thus, for example, when chocolate is consumed, the brain simultaneously perceives taste and also pleasure, due to its sweetness. When we add to this the research findings indicating that eating sweet foods increases the formation of a memory of a meal (Henderson, Nalloor, Vazdarjanova and Parent, 2015), we will probably make chocolate a must-have ingredient in creating a taste-based experience!

Furthermore, in the brain, there is also the so-called *nucleus accumbens*, whose function relates to rewarding, so when we do something that is considered a reward, it is activated and increases dopamine levels. So, if you knew (again!) that chocolate and coffee are foods that particularly strengthen the reward system, you would probably (again) consider them when designing an experience. Caffeine has long been known to enhance memory, which is why students often consume copious amounts of coffee when studying for exams. It is less well known, however, that caffeine enhances other tastes, specifically sweet and salty, and potentially also increases the ability to smell and taste (Allison and Chambers, 2007). Isn't that why you would put less sugar in your coffee cake?

Why do some people enjoy eating spicy food, and how can we use this fact when designing an experience? How much alcohol is allowed for

an experience to be optimally rated? Do we all feel the same when consuming certain foods? And is it possible to design an experience that would be the same for everyone? There is no doubt that taste plays a significant role in creating or enhancing an experience. In order to be able to answer these questions, let us first look at how the brain functions in relation to food and drink.

2. The brain-food connection

In order to understand better how the brain reacts to food and drink, it is necessary to explain what actually happens in the brain when it is triggered by a stimulus. Stimuli to which the brain reacts can be external or internal. Thus, for example, the temperature in the restaurant can be too high, which will certainly affect our dining experience. Therefore, temperature is an external stimulus, and every restaurant owner will know that it is one of the elements that should be taken care of if they want to create a pleasant experience for their guests. In the same way, they will pay attention to the choice and volume of the music, and decide on the lighting and interior decoration, because these are all external stimuli that can play a significant role in the very experience of the dining (premises). The same external stimuli can also affect internal stimuli, which are related to the consumers' affective response, feelings and mood. In general, we don't have a magic wand that can change the fact that the consumer arrived at the restaurant in a bad mood because he had just had a car accident, or he's feeling bad because the girl he was supposed to meet has just told him that she won't be joining him for dinner. Internal stimuli most often relate to thoughts that we produce ourselves, which are difficult to influence directly when designing experiences. However, by proper selection of external stimuli, using tools that influence the stimulation of the senses, it is possible to change a lot, with the aim of evoking positive thoughts and feelings among the consumers.

So what happens in the brain after it is stimulated by an external or internal stimulus? We know that the brain enables the human ability to think, and that it is the centre of the nervous system. It consists of nerve cells: neurons that are connected in an information network and

that communicate with each other, and are also connected to the rest of the body by nerves (see Figure 1). Each neuron consists of a cell body and branches (dendrites). There are two types of branch: dendrites and axons, where dendrites have the role of receiving information, and axons send the received information on to other cells and thus cause a certain reaction.

Figure 1. Neural network

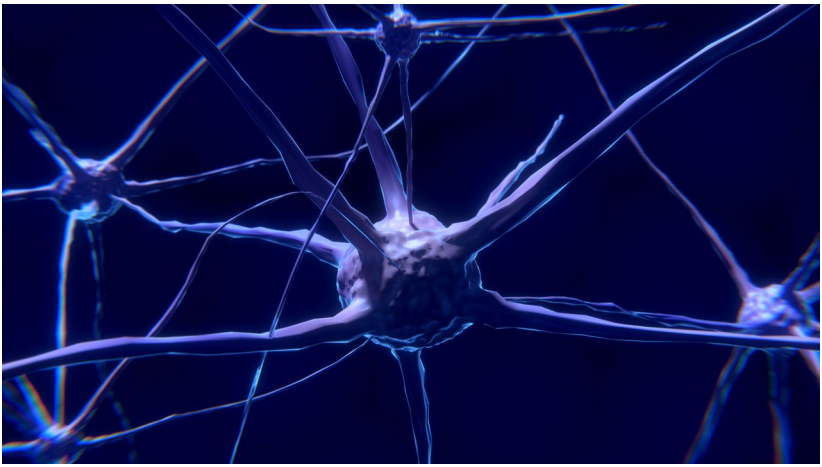

Photo by Colin Behrens, Pixabay, https://pixabay.com//?utm_source=link-attribution&utm_medium=referral&utm_campaign=image&utm_content=2213009

So the basic unit of triggering an action is a thought (e.g. "I'm hot!" as an external stimulus or "I never really liked that girl anyway!" as an internal stimulus). It manifests itself as a nerve impulse and sends a message to the next neuron using a neurotransmitter. Neurotransmitters are substances that mediate the transmission of electrical signals between nerve cells – or, in simple terms, 'chemical messengers'. These processes in the brain are related to the transport of proteins and the pumping of hydrogen ions, so it is no coincidence

that we say of two people in love that there is some 'chemistry' between them. Neurotransmitters also produce moods that affect our experience, and among the most famous ones are serotonin, adrenalin, dopamine and noradrenalin. Therefore, the brain chemistry that we create on a daily basis with the help of our thoughts determines how we feel; so, in order to create pleasant experiences for our clients, it will be essential to provoke positive thoughts in them. We have already mentioned above that, when designing an experience, if we want it to be a memorable one, it is necessary to evoke an emotional response to the stimulus, and in doing so we use sensory stimulation. The senses, such as sight, hearing, smell, touch and taste, therefore, can be freely considered as points of evoking emotions, and the tools with which we do this are extremely diverse, from colours, shapes, symmetry, melody, rhythm, harmony, smoothness and weight, to certain combinations of smells or tastes.

So is there a connection between taste and emotions that we could use to create an experience? This connection is extremely strong and can be classified into three categories: (1) desire for food, (2) preferences for certain foods, and (3) craving for food. We would not survive without food, so the desire for food is, in fact, a primary need of ours. In critical times, it can happen that a person refuses food because (s)he does not feel the desire to eat; but also, on the contrary, (s)he can use food to silence some other emotions. On the other hand, we can have preferences for certain foods: something is tasty or not, and we associate certain emotions with it, which can range from delight to disgust. And, finally, we can express a craving for food that is significantly deeper than the desire for food itself. We see this most often in pregnant women who, due to hormonal changes, express a strong desire for a particular, and often unusual, type of food. However, craving can occur in anyone, and it is interesting that, within the brain's structure, craving occupies the same regions

occupied by various addictions, such as for tobacco, alcohol and drugs, and it is very difficult to get rid of it. The more we seek food, the more the brain will crave for more, which potentially leads to obesity and various health problems. In this regard, therefore, it is optimal to offer a moderate portion when serving food.

Also, we have often heard the advice that it is not good to go shopping when hungry, because then we are more susceptible to heavy spending. And there you can see the direct connection between the brain, taste and emotions. Namely, the hungrier a person is, the bigger the emotional image of taste (s)he perceives, and therefore the more (s)he buys. In the same way, in situations of hunger or other 'negative' emotional states, excessive consumption of food often occurs, because we associate taste with emotions, so we often, for example, consume too much chocolate. Satiety leads to a change in the value of the reward, and the taste no longer has such a strong emotional charge.

Research studies that would offer us exact data on the relationship between taste and emotion are not numerous, and it is not easy to conduct them, given the number of research variables, such as the multitude of tastes and combinations of tastes or emotions that they can cause. Some of the existing research, however, has shown that the aforementioned sweet and fatty foods, and also some salty ones, can stimulate the emotion of joy (e.g. ice cream, chocolate, sucrose) (Park, Looney and Mandic, 2011); salty foods are most often associated with sadness (Wang, Wang and Spence, 2016), and bitter food is associated with disgust (Schienle and Wabnegger, 2021). Too much salt, specifically sodium, can even cause depression or anxiety (Rana, according to Sharma, 2017), which is a sign that food should not be too salty for a pleasant experience. On the other hand, however, a lack of salt in the body can cause depressive states in the same way (Tobin, 2014). However, this does not mean that we should automatically put

more salt in our meals, but stick to the recommended daily dose of 6 g for adults and 2 g for children.

In general, it can be said that the flavour that most people prefer is sweet, precisely because the brain perceives that taste as a reward, although a high preference may also exist for other tastes, depending on the culture. Preference for flavours is already acquired in the mother's womb, so sometimes it is difficult to influence a change in (dis)preference for certain foods, but it is not impossible. Tastes also change through life cycles; so, for example, children prefer more intense sweet, sour and salty flavours than adults. What most healthy people have in common, however, is the fact that the stronger the flavour, the easier it is recognized by the brain. So, when designing an experience, it is good to intensify the flavours. Chefs, as well as our grandmothers, know the tricks that can be used to achieve this. Thus, certain flavours can be combined with others (e.g. sweet and salty), so that the brain can recognize them more easily. Perhaps we have often seen a pinch of salt as a mandatory ingredient in cake recipes and wondered why exactly that is. We call such a procedure *intramodal enhancement*, and the same trick can be used by combining taste with smell or some other sensation. We then call it *cross-modal enhancement*.

Therefore, the creation of a pleasant perception of the dining experience will be influenced by our actions and the knowledge that we use as experience designers, as well as the way in which the guests consume the food. So, for example, the consumer will feel the strongest flavour of the food if (s)he eats slowly and chews the food well, because the strongest flavour is released when the touch receptors in the mouth no longer distinguish the consistency of the food, which literally turns into a mush that is easy to swallow. Similarly, more flavour is sensed when food is eaten in small bites. Therefore, we must be aware that dining is a two-way process and

that the consumer actively participates in it, co-designing the experience, which is in line with modern approaches of participatory experiences and co-creation of products and services. This knowledge can also be used when designing a food experience in terms of consumer education.

The use of spicy food in experience design is particularly interesting. Recently, spicy food has become very popular in gastronomy; competitions are organized in which the goal is to eat peppers as hot as possible, the production of domestic, authentic hot sauces has increased, or restaurants use the opportunity to entertain their guests by, for example, putting 'invisible' chili pepper in a pizza that is shared by several guests who are eager to see who will be 'hit' by it. Such events are certainly interesting and attract attention, since we know that spicy is not always pleasant, but also causes physical manifestations such as heat, sweating, and numbness of the tongue. But there are also those who literally enjoy eating spicy food. How so? In fact, spiciness is not classified as a taste, but the brain perceives it as pain, and it has evolved to deter animals from consuming potentially dangerous herbs. So, when consuming spicy food, we feel pain; but, at the same time, the body secretes pain relievers, the so-called endorphins, and also dopamine, the hedonic hormone that boosts our energy. Therefore, many of us feel pain and pleasure at the same time when consuming spicy food, which can even lead to euphoria. In this sense, spicy food can also be used to create an interesting experience. In doing so, we most often use chili peppers, and the ingredient that causes spiciness is called *capsaicin*. Contrary to the general opinion that its intensity is strongest in the pits, its strongest concentration is in the spongy part of the fruit. Since the threshold of tolerance to spiciness is very individual, when designing an experience, the safest way is to check with the guest whether (s)he likes spicy food; and, if an unpleasant feeling occurs after consuming

spicy food, it can be neutralized with milk. Milk, in fact, contains casein, which neutralizes the spiciness of capsaicin.

Furthermore, there is also a natural connection between food and the feeling of disgust, which we owe to evolution; disgust is a reaction to natural signs warning us of inedible food, by which we ensure the survival of the species. On the other hand, when in a situation of struggle for survival, such as in a period of hunger, the frontal, thinking part of the brain is equipped to overcome the initial disgust, to help us in the consumption of food that is not particularly attractive, but helps us survive. In the same way, disgust towards certain foods is culturally conditioned; thus, some foods will be completely acceptable for consumption in a certain culture, while, in another one, they will be considered extremely repulsive. While most restaurants, for obvious reasons, will not have the primary goal of provoking a feeling of disgust when designing an experience, it is not impossible to create a strong experiential attraction based precisely on the topic of disgusting food, which, for example, Malmö and Berlin have used with their museums of disgusting food.

Another topic which deserves special attention in the realm of food experience design is the consumption of alcohol. It is common knowledge that alcoholic beverages stimulate relaxation and create a good mood if their consumption is appropriately dosed. Drinking alcohol activates a neurotransmitter called GABA (Gamma Aminobutyric Acid). This is an amino acid that acts as the primary inhibitory neurotransmitter for the central nervous system, and it works by reducing the excitability of neurons by inhibiting nerve transmission. This literally means that GABA acts as a brake; so, when consuming alcohol, it slows down motor skills and vision, it regulates anxiety, and causes relaxation or a feeling of sleepiness and fatigue. Therefore, the consumption of alcohol, at first glance, seems suitable

for designing pleasant experiences. This, of course, has its negative aspects, which depend on the amount of alcohol consumed. It can be said that drinking alcohol can cause a whole spectrum of emotions, and these are related precisely to its quantity, so alcohol consumption can be divided into four phases:

- the 1st phase relates to positive feelings of comfort, relaxation and happiness, in which the inhibitory characteristic of GABA is released;
- the 2nd phase affects more powerful emotional arousal, which can vary from sadness to anger and aggression;
- the 3rd stage leads to memory loss;
- the 4th stage reduces the brain to basic functions, so it is not unusual that we talk of someone in this stage as being 'blind drunk'.

Therefore, it would be useful to know how much alcohol to serve in order to stimulate positive associations and memories of that moment. Concrete guidelines are very difficult to put forward, since – just as with food aversions – the threshold of tolerance is very variable from person to person. If you manage to keep the guest in the 1st stage, the success of the experience design is guaranteed. On the other hand, if the guest enters the 3rd or 4th stage, not only will (s)he not rate the experience as pleasant, but most likely (s)he will not even remember it. A relatively new product called *Sentia* is available on the market (Figure 2), marketed as a new generation of mood-enhancing spirits. After its consumption, one feels relaxed, in the same way as after the consumption of alcohol; however, the drink does not produce the negative effects that alcohol consumption causes. It is a plant-based drink, produced by GABA Labs, based on scientific research, and which, instead of alcohol, we might be able to use to design experiences in the future. We owe it to Professor David Nutt, an English neuropsychopharmacologist with over 40 years of experience

in research on alcohol and its effects, and botanist Vanessa Jacoby. The drink combines exotic ingredients collected from around the world (e.g. blends of rose, hawthorn, liquorice, lime blossom, passionflower, hibiscus and agave syrup) to create a sensory experience. Here's how the spirit is presented:

> What if you could have that relaxed feeling without losing control and waking up with a headache? Try Sentia, a plant-based non-alcoholic beverage with active botanical ingredients (ABI) that naturally activate GABA in your brain, creating a balanced, relaxed and social feeling. A delicious and healthy alternative for relaxing and celebrating life, ... Are you in the mood for sensual floral notes or are you more interested in a rich smoky taste? Sentia. Top drink. Functional science." (Supermarket budućnosti / The Supermarket of the Future, 2022)

Figure 2. Sentia, a naturally stimulating GABA spirit, without the negative consequences of alcohol consumption

Photo by Daniela Angelina Jelinčić

The strong connection between the brain and taste perception will be even stronger if we include multisensory stimuli in the experience design. Therefore, it is not only taste that is important, but also all the other senses: sight, hearing, smell and touch. It has already been discussed that stimulation of the sensations increases the likelihood of evoking emotions. Often we are not even aware of it, but the aforementioned tools used by individual senses (colours, forms, rhythm, scale, tonality etc.), especially when used as multisensory stimuli, help the brain to understand the 'message' we send by designing an experience. The human brain is always looking for a structure so as to understand the message with more ease and store it in memory, which will help in repeating such an experience in the future. Therefore, it is important to design pleasant experiences and to consider other senses that can have an impact on the food experience itself.

The sense of taste

Food experiences are primarily about the sense of taste. What is taste, actually? Taste is a sensation that belongs to the gustatory system and by which we perceive chemicals present in food. *The gustatory system* is a broader term than *taste* itself, and it implies a sensory system that uses special nerve receptors on the upper side of the tongue, whose purpose is to detect the flavour of the food being eaten. Food has flavour molecules, but it would be more accurate to say not that it is the food that has the flavour, but that it is the brain that creates it. For we all see and taste the same thing, but we interpret it differently.

Taste is the most complex behavioural system of the brain; it includes perception, emotions, memories, consciousness, language and decision-making and belongs to the highest order of information processing. What exactly does it mean? The brain, therefore, perceives the information it receives through external stimuli on two levels: low

and high levels of information processing. The low level relates to cognition by the senses (in this case: taste), while the high level of information processing relates to the integration of information in various parts of the brain so that the brain draws a meaning from it. In this, the stimulus is first compared with previously-collected information that we keep in the temporal lobe as a memory. If the brain can compare a certain flavour with something we have already experienced before, it easily connects and characterizes it as sweet, sour, mushy, crunchy, red, pungent etc., and it concludes that it is a certain type of food already known, and assigns a valence to it, according to personal preferences (tasty or unpalatable). If the brain is not able to compare such a stimulus with previous experience, it will find nothing in the temporal lobe, because there are no such memories. Therefore, it is forced to look for information in other parts of the brain in order to be able to understand the information and create meaning from it. This is precisely why we are talking about a high level of information processing, which also happens when learning about the world by way of other senses, but this processing is especially active in the case of taste.

The starting point of flavour perception occurs in the mouth. The sense of taste is stimulated when the substance we put in the mouth has a chemical reaction with the taste receptor cells, which are located on the taste buds in the oral cavity, primarily on the tongue. Humans have between 2,000 and 10,000 taste buds, each consisting of 50-100 specialized sensory cells. The number of taste buds varies between people, and this number decreases with ageing. Upon stimulation, the taste buds interact with chemicals from the food. Specifically, three nerves are responsible for taste: the facial nerve (*chorda tympani*), which occupies the front two thirds of the tongue; the glossopharyngeal nerve (*glosspharyngeus*), occupying the last third of the tongue; and the vagus (wandering) nerve. All of them, together

with the trigeminal nerve, send messages to the brainstem and combine signals in the arousal areas. After that, the signals go further to the brain and meet the smell signals where the brain detects the flavour, which feels as though it is coming from the mouth. The complexity of taste is also visible, because it does not work without smell. If you plug your nose and try to consume food, you will definitely succeed, but with the absence of taste – and consequently, of course, without the experience and enjoyment. More precisely, taste is, in fact, smell which we feel through the mouth; we perceive it as if it were in the mouth, although the nose is more responsible for sensing it. The very detection of the flavour takes place in the so-called *anterior insula*, where taste and smell signals meet. The additional complexity of taste is confirmed by the fact that not only does it not function without smell, but it also includes touch. This is why food consistence is extremely important in experience design. Therefore, when designing a gastronomic experience, we will have to fulfil expectations of the food's consistence: food that we expect to be crunchy should not be mushy, and food we expect to be smooth should be without lumps. Except, of course, if we want to cause a surprise – but more about that in the chapter *Creating a dining experience*.

Which taste sensations do we recognize? For a long time it was believed that the brain recognizes four basic tastes: bitter, sweet, salty and sour. However, in the early 20th century, Japanese scientists also discovered a fifth taste, umami, for which we do not have a clear translation in the English language, but we could most closely describe it as the taste of meat or the taste of mushrooms, since that taste is the easiest to recognize in those foods. It is a combination of amino acids and proteins, and in English it is usually translated as *savoury*, and is related to food belonging to the category that is salty or spicy rather than sweet.