The Impact of Aromas on Consumers' Emotions: Conscious and Unconscious Evaluation

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Abstract

At present, aromas are increasingly used in multisensory in-store communication to create a more enjoyable purchasing environment that can influence consumer emotions, behaviour and decision-making. We often do not realise the power of an aroma's influence on our mood, but its influence at the point of sale makes sense, of course, if it is used correctly. It is possible to monitor the impact of aromas on consumers' emotions in a variety of ways, whether through classical research methods implemented at a conscious level or through more advanced methods. Obtaining more accurate data on consumers' emotions in this way makes it possible to create a purchasing atmosphere that contributes to increased sales and, ultimately, profit. This paper explores the impact of aromas on consumers' emotions by applying different research methodologies, with the place of implementation being the real-world conditions of the selected retail establishment. The evaluation of the data obtained in the aromatisation and non-aromatisation periods confirmed that the importance attributed to aroma marketing in commercial establishments is well founded. At the same time, by comparing the results, we have identified differences in the conscious and unconscious evaluation of the impact of aromas on consumers' emotions, confirming the practical importance of implementing and using various techniques in research.

Keywords

scent marketing, aromas, emotions, interactive kiosks, face biometrics, consciousness, unconsciousness

1 Introduction

According to Szarková (2001), human senses are an integral part of marketing, because in the past, for example, fragrances and odours were means of ascertaining the freshness of the products and ingredients used. The influence on purchasing and decision-making processes through the senses is referred to as sensory marketing in marketing. Lindstrom (2010) defines sensory marketing as a form of marketing that affects the human senses, but which has not received sufficient attention in the context of traditional marketing. According to Hultén et al. (2009), sensory marketing is based on the principle of sensory perception, meaning that the product is embedded in the buyer's memory, the main task of this type of marketing therefore being to arouse positive emotions or customer reactions. Krishna (2010) perceives sensory marketing as a tool that uses the senses of consumers to influence their behaviour. Besides paying attention to all human senses, marketers are particularly focused on olfactory marketing,

which is the basic and most important sense of orientation in the world of smells and odours, playing an important role not only in the processing of information, but also in human beings, by leaving a permanent trace in our mind (Lindstrom, 2005). The link between smells and odours is described in more detail by Samulová (2017), who states that the essence of olfactory marketing lies in the fact that the smells and odours that a person smells, provoke stimuli in the brain and they are responsible for the emergence of memories or emotions. Brumfield et al. (2008) meanwhile add that the sense of smell in marketing is increasingly perceived as a communication tool, whose task is to arouse desired emotions and reactions. They further explain that smell is the strongest form of communication, a viewpoint which is supplemented by Schmitt (2011) who states that it is proven that the consumer remembers only 2% of what he/she hears, 15% through taste but up to 35% of what he/she feels through the sense of smell.

Aroma marketing is one of the new trends in marketing and represents the influence of aromas on the olfactory senses to support a customer's purchase of goods or services or even enhanced worker productivity. Aromatisation of the production premises has a positive effect on the number of manufactured pieces. Aromatisation of the sales premises has a positive effect on the number of sold pieces. Since the information perceived by smell directly affects the customer's choices, aromas in marketing are used with the specific objective of increasing profit and turnover (Pajonk and Plevová, 2015). Rieunier (2013) explains the concept of aroma marketing as a comprehensive set of possible procedures and steps taken by the manufacturer and the seller to build the multi-perceptual environment of the product or service offered. Aroma marketing as a communication tool also makes it possible to measure the impact on the consumer at the point of sale by acting on the senses, since subconscious perception has a strong influence on human behaviour during shopping. According to Tarczydło (2014), aroma marketing is the art of using the aroma to evoke the desired state and belief that buying a product is the right step. Kita (2013) states that the aroma in marketing is referred to as an interesting tool that influences the customer at the point of sale. This type of marketing is included in sensory marketing and argues that only sensory marketing takes the factor of human perception into account. Customer thinking and purchasing activity are influenced by senses. Paluchová et al. (2016) state that pleasant smell in the environment motivates the customer to stay in the store longer. This state of the environment also has a positive effect on the desire for a product in the form of a willingness to invest more money when buying it. With the wrong choice of aroma, we can create an inappropriate purchasing atmosphere, which will cause this tool not to work (Berčík et al., 2018).

The impact of aromas on consumers' emotions has been confirmed over a long time by several studies. The concept of emotions according to Corsini (2002) can be explained as a mental state characterised by degrees of feeling and accompanied by physiological changes and motor manifestations, observations which complement those of Hoffman and Turley (2002), who state that a smell can provoke such a strong emotional reaction in a person that it causes a change in behaviour. Neumann (2011) explains that the second most common trigger of emotions or their changes after vision is smell. Fragrances are successful in evoking emotions in the consumer because they are processed in the so-called olfactory ball and through it are distributed directly to the part of the brain where emotions arise, writes Lewis (2015). Sørensen (2008) complements this, explaining that decision-making in a person without the influence of emotions is not possible. Ernekol and Merve (2015) report that the feelings a person experiences during the day are 75% regulated by some smell, hence fragrances are the best way to evoke the past. According to Yeshurun et al. (2009), the aroma we smell for the first time is associated with an event, but if we smell it again, it can activate our mind and evoke memories in a modified form. Doty et al. (1985) describes that there are differences in the recognition and influence of fragrances between men and women. Women tend to recognise smells better than men, and stronger brain responses to odours have also been reported in women. Danková and Naščáková (2017) state that with the help of a fragrance it is possible to positively influence not only the behaviour of consumers and their emotions, but also the productivity of employees or create a positive connection with society, institution, equipment, or space. However, the authors consider it to be a limitation that this form of marketing only begins to act when it enters the aromatised space. Neumann (2011) meanwhile adds that a smell can also affect humans in a negative way and cause premature departure from the shop. Finally, Hoffman et al. (1994) outline that from the age of about 24 years a person will begin to experience progressively more chronic olfactory problems, causing a change in olfactory sensitivity that makes it harder to influence people by means of aromas as they get older.

The impact and effectiveness of aroma marketing is very difficult to measure because its goal is to build long-term brand loyalty through an emotional connection at the point of sale (Virkkunen, 2015). Currently, the collection of feedback using classical research methods is no longer sufficient, because consumer perceptions and behaviours are also strongly influenced by the environment. The application of different methods of obtaining feedback allows us to record much more accurately the emotional states, feelings, and moods of consumers, which are based on the subconscious perception and reactions of a person through the sensory apparatus. Biometric methods are among the tools of neuromarketing research, which currently not only complement but also partially replace the classical methods of feedback identification (Fugate, 2007). These are measurements of the physiological responses of the body (not directly of the brain) to external stimuli that pass through our senses. Biometric measurement provides secondary and time-delayed analysis of excitement and therefore cannot be considered as reliable indicators of emotions themselves (Plassmann et al., 2010). Therefore, the biometric response does not necessarily correspond to a cognitive

response at a conscious or subconscious level described by Pradeep (2010). This group of techniques includes facial coding, eye tracking, skin conductivity (GSR), facial electromyography, implicit association test and physiological measurement. If the aim is to record in more detail the subconscious influences on customer decision-making, neuroimaging methods are necessary in marketing research to examine the human brain. Although the conscious and rational side is also represented in our decisions, it is specifically by using neuroimaging methods that it is possible to identify the subconscious needs and emotions of the consumer (Dooley, 2011). Bercea (2012) states that non-imaging methods are neuromarketing tools that can be divided into those that record brain metabolic activity and those that record the electrical activity of the brain. The category of neuroimaging instruments includes functional magnetic resonance imaging (fMRI), electroencephalography (EEG), magnetoencephalography (MEG) and others.

2 Methodology

The main objective of the paper is to evaluate the impact of selected aromatic compounds on consumer emotions using different research techniques in real-life retail operations. The basic premise is that there is a difference between consumer emotions that are observed during the aromatisation-free period and those seen during the aromatisation period. The research process itself consisted of two phases:

- carrying out an online association test to obtain explicit information on consumer preferences in respect of the aromas associated with the selected sales department;
- implementation of field data collection through neuromarketing approaches on the impact of selected aroma compounds on consumer perception in food selection in real-life commercial operating conditions.

The online association test was designed to identify consumer preferences more closely and thus facilitate a more precise pre-selection of aromas suitable for the department of pastries and bakery products. The test was conducted in the form of CAWI (Computer Assisted Web Interviewing) on the target segment of customers for the selected category of store. The test used the branded tool Group Solver, which combines data mining, machine learning and advanced statistics, enabling the processing of open responses of respondents through a self-calibration tool and quantifying the qualitative findings (insights). The incentive for

respondents to indicate the first association associated with the sales department in the picture was that of Kaufland's bakery and pastry department. Based on the results, the aromas most closely described by the respondent associations were chosen and associated with the sales department in question. 56 respondents participated in the test.

The collection of implicit (unconscious) and explicit (conscious) feedback in real conditions of retail operations was ensured by an interactive kiosk (Fig. 1).

A special technology was used for the collection, which allowed unconscious feedback to be obtained in addition to classical feedback using facial biometrics. A camera was installed in the device, which, through software and artificial intelligence, recognised basic aspects (person's presence, gender, age, and emotional response). The device has to be operated under conditions where the participant's face was clearly visible, with their forehead being within 2.5 m of the kiosk. This modified device has several functionalities and in addition to collecting feedback, it also allows aromatisation through the Aroma Streamer additional aromatisation unit, which, based on pre-specified time intervals, releases a selected aroma into the space. Conscious customer feedback was meanwhile recorded by means of a modified graphical scale of colour-distinguished smileys, displayed on the modified visuals in corporate colours (Fig. 2). This visual was created to align with the design of the operation and to make the kiosk more attractive to buyers who might then give feedback.

Unconscious feedback was captured by computer image processing, which was obtained through a camera at the head of the display. In addition to hardware, the system also contains software that allows visualisation of emotions and real-time recognition of persons in the range of measurement of this technology (Fig. 3). The emotion
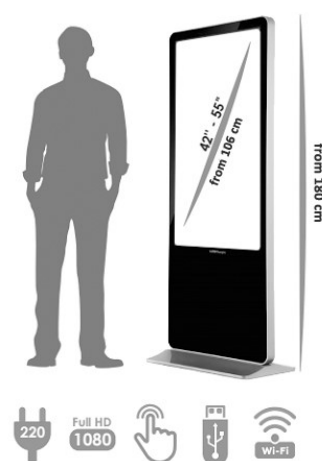

Fig. 1 Interactive kiosk for data collection

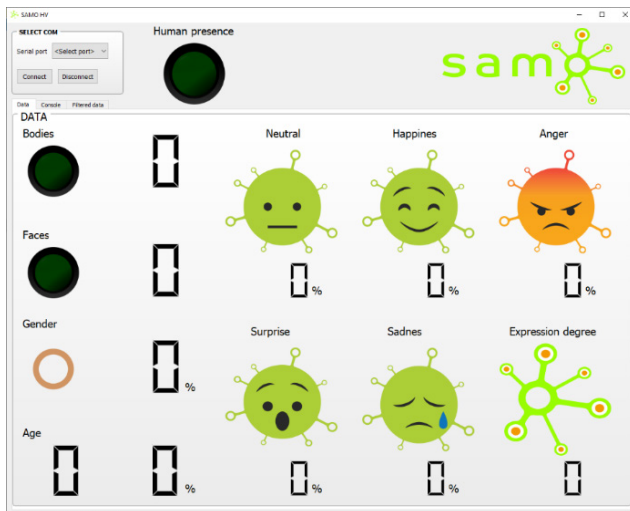**Fig. 2** Demonstration of the collection of conscious feedback

Fig. 3 Software for displaying and recording emotions

recording platform processed data from the face biometrics of customers in the background without any display, so the functionality of the panel was not limited in any way.

The effect of aromatisation has also been assessed through selected economic indicators in the selected retail establishment. The subject of interest was the collected data on sales within the individual subcategories of pastry and bakery products in the Kaufland Petržalka store. The information obtained was compared in two periods – the aromatisation period (21.11.2019–10.12.2019) and the aromatisation-free period (1.11.2019–20.11.2019). The aroma of freshly roasted coffee from the German company REIMA Airconcept was deployed. The data provided by Kaufland Slovenská republika v.o.s. were adjusted by coefficients in order not to misuse the sensitive data of the company. As part of statistical methods, we used the non-parametric Kruskal-Wallis test and Dunn's post-hoc analysis to track

the differences in aggregated data. The reason for using the Kruskal-Wallis test, which is designed to track ($k \geq 3$) independent files, was a comprehensive comparison of data from a data set that contained a longer period of time and a longer impact of several aromas.

3 Results and discussion

We have chosen suitable aromas for the selected department of pastry and bakery products using an online association test using the Samolab® platform for remote demand. 56 respondents took part in the test, 48% of them being men and 52% women. There was roughly equally proportional representation in terms of age. 32% of respondents were in the aged 18–24 category, 29% were aged 25–49, 21% aged 50–64 and 18% aged 65 or over. With the association test, we identified the thought associations most closely associated with the purchasing environment in the monitored department of the selected store. We processed the collected open answers through the Group Solver tool to organise the most frequently occurring associations that were associated with the shopping department of pastry and bakery products. Based on these findings, we proceeded to attribute the available aromas. Table 1 shows how respondents answered the question "What is most associated with the aroma of the pastry and bakery department?" Based on their answers, the available aromas corresponding to the association preferences of the respondents have been profiled. Most often, the fragrant associations were associated with the smell of fresh coffee, freshly baked bread, vanilla, caramel, cheesecake and croissants in the pastry and bakery department. We also communicated the results of the association test with representatives of the Aroma Marketing company and based on our findings and their recommendations, we decided to select a suitable aroma – freshly roasted coffee.

The aim of the aroma of freshly roasted coffee in the pastry and bakery products department was to increase the sales quantity of sweet and salty baked pastries, the purchase of

Table 1 Initial selection of aromas for testing in real conditions using GroupSolver®

	TOP 5	
1	Fresh coffee	Cappuccino, roasted coffee, cocoa, caramel, chocolate
2	Freshly baked bread	Sourdough bread, cumin, sunflower seeds, cinnamon
3	Vanilla	Vanilla, sweet milk, coconut
4	Caramel cheesecake	Nuts, almonds, cheesecake, vanilla
5	Croissant	Roasted coffee, cake

which is largely impulsive and, in addition, includes fast-moving goods of daily consumption. That is why we placed the Aroma Streamer with the selected aroma in the above-mentioned department, but the collection of feedback took place in the next department – colonial, i.e. coffee and tea. Based on an initial comparison of recorded data from responses at a conscious level in the period without and with the aromatisation deployed, changes in the assessment of the atmosphere of the observed purchasing department can be seen (Fig. 4). In the non-aromatisation period based on average values, this department was rated at 1.452 and 1.682 (Fig. 5) in the aromatisation period, indicating partial deterioration.

The deterioration could have been caused by the pre-Christmas atmosphere, when there were more people in the store, which is also related to the deterioration of the purchasing environment and air quality (higher concentration of dust particles CO_2 and dust PM1).

In addition to the conscious assessment of the purchasing environment, unconscious feedback was monitored in the selected sales department using a special kiosk for unconscious feedback collection. For this collection we used a modified smart kiosk that was able to recognise the emotions of a person based on the facial biometrics of every person who looked directly at the display of the device. An average of 250 people per day were recorded during the non-aromatisation period. On the chart (Fig. 6) we can see the average daily values of the emotions of
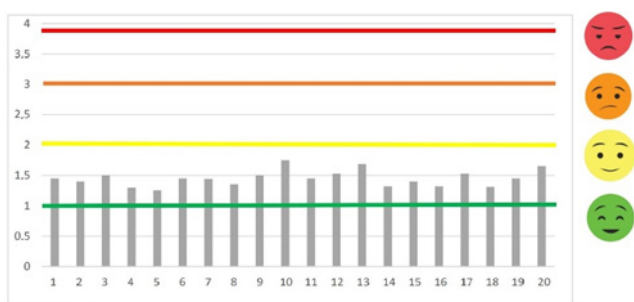

Fig. 4 Conscious evaluation of the sales department in the period without aromatisation (1.11.2019–20.11.2019)
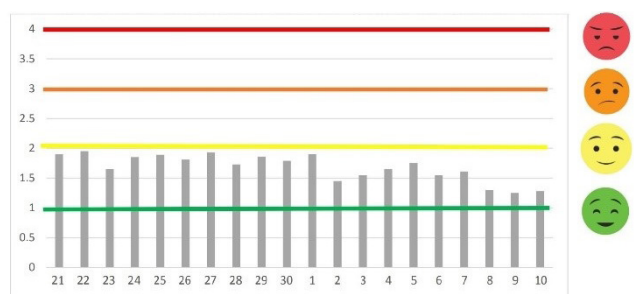

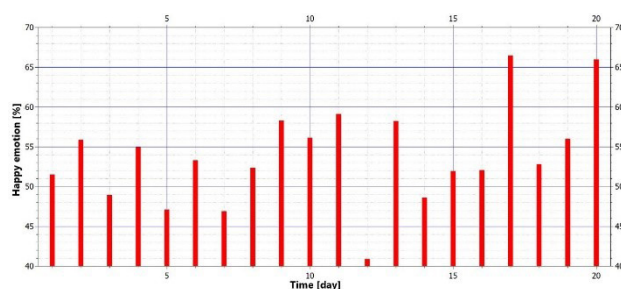Fig. 5 Conscious evaluation of the sales department with aromatisation (21.11.2019–10.12.2019)

Fig. 6 Unconscious perception of sales department without aromatisation (happy emotion)

happiness "happy" in the reporting period without aromatisation. The overall value of this emotion over the period in question reached an average of 53.6%.

In the reporting period with the aromatisation of the aroma of freshly roasted coffee, more significant differences in daily average values can be seen (Fig. 7). The overall average value for this period was 58.9%, an improvement of 5.3%. In case of emotional response, even a relatively small change indicates a significant change in the subconscious perception of the sales department. Due to the increased traffic in the shop during this period, the average daily number of customers detected was up to 311 people. The pre-Christmas atmosphere could also contribute to a better subconscious perception of the environment.

The emotion of sadness was also monitored. From the graph (Fig. 8), it is possible to see the average daily values of this emotion in the non-aromatisation period. Over the whole reporting period, the average value of emotion of sadness was 53.2%. The distortion of detection of this emotion could also be partly due to the position of the person during the detection in front of the device (facial angle).

For the same reporting period of 20 days, with aromatisation deployed, we noted an improvement based on the average of the values of the reference period. The average emotion of sadness "sad" reached 49%, which in this case is an improvement of 4.2%. The average daily evolution of the emotion of sadness "sad" can be seen in the graph (Fig. 9).
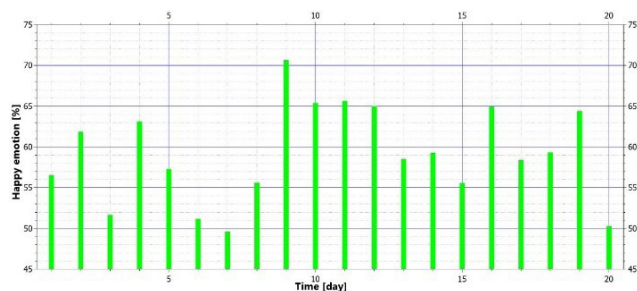

Fig. 7 Unconscious perception of the department with aromatisation (happy emotion)
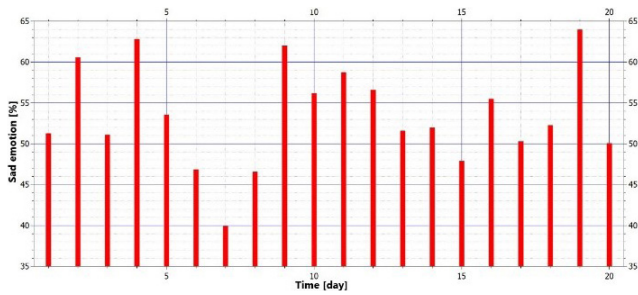
Fig. 8 Unconscious perception of the sales department without aromatisation (sad emotion)
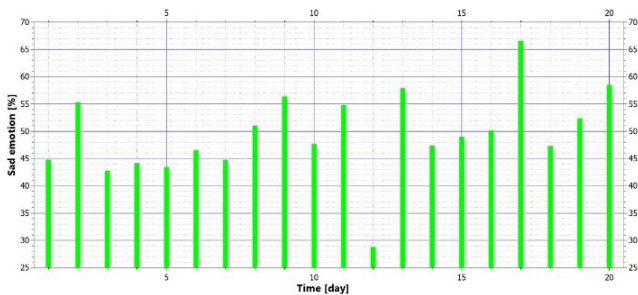

Fig. 9 Unconscious perception of the department with aromatisation (sad emotion)

Differences in selected microemotions in the non-aromatisation and aromatisation periods were verified using the Kruskal-Wallis test ($p < 0.001$) and Dunn's post-hoc analysis (Table 2). It can be concluded that for all aromatic stimuli, respondents achieved higher values of "happiness" emotion than those in non-aromatisation conditions. It follows from the above that the aromatisation of the sales department has a positive effect on the subconscious perception of customers.

For the microemotion of sadness 'sad', using the Kruskal-Wallis test ($p = 0.813$), we concluded that the difference in this microemotion in the compared periods based on average was not statistically significant. Based on the observed changes and a comparison of the sales recorded in different categories in the sales department of pastry and bakery products, a demonstrable difference between the period without and with aromatisation can be seen (Table 3).

The focus of the monitoring of the impact on sales was not only the department of pastry but also colonial (coffee, tea) given that the department was located directly next to the department of pastry; in addition, a collection kiosk was placed in this department. By comparing total sales in the periods under review, we found that sales increased by 12% in the aromatisation period, which amounts to EUR 56,347.55. This increase may, in addition to aromatisation, also relate to the seasonal impact of the pre-Christmas period. For the existing aromatisation costs, which, when renting the aromatisation unit, represent a monthly cost of EUR 50.64 excluding VAT per establishment, including the aromatisation filling at minimum performance, it can be concluded that those operating costs will be compensated for by the retail trade in the form of an increase in turnover within the categories covered. After taking all the factors that may have influenced the increase in turnover of these categories of goods into account, it can be stated that the company will compensate the costs associated with aromatisation with a 0.5% increase in sales.

4 Conclusion

With an online association test, we found that most people associate the department of pastries and bakery products with the smell of coffee and freshly baked bread. To choose the right aromas, we consulted the representative of the Aroma Marketing company, who, after consulting our findings and the available range of aromas,

Table 2 Statistical significance of differences in pair comparison of stimuling

	0	1	2	3	4	5	6
0	1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1	<0.0001	1	0.747	0.379	0.083	0.827	**0.023**
2	<0.0001	0.747	1	0.585	0.158	0.916	0.051
3	<0.0001	0.379	0.585	1	0.360	0.512	0.143
4	<0.0001	0.083	0.158	0.360	1	0.129	0.602
5	<0.0001	0.827	0.916	0.512	0.129	1	**0.040**
6	<0.0001	**0.023**	0.051	0.143	0.602	**0.040**	1

Table 3 Comparison of sales in the department of pastry and bakery products in the period with and without aromatisation

Period	Backshop	Pre-packed pastries	Coffee	Tea	Total
Aromatisation	149319	189598	135393	43639	517948
No aromatisation	131371	168924	117748	43558	461601
Index	**1.14**	**1.12**	**1.15**	**1.00**	**1.12**

advised us to apply the aroma of freshly roasted coffee in a selected retail establishment. The research part of perception and evaluation of the purchasing atmosphere was carried out by combining conscious and unconscious feedback in two periods of 20 days without aromatisation of space and 20 days with aromatisation. Already based on an initial comparison of the results recorded at a conscious level, we found that the non-aromatisation shopping environment was assessed on average at 1.452 and with an aromatisation of 1.682. This finding suggests a slightly worse perception of the shopping environment during the aromatisation period. The lower environmental rating may have been due to the higher concentration of buyers in the aromatisation period due to the pre-Christmas period, which naturally related to higher environmental factors (higher concentration of CO_2 and MP1 dust particles). The rating we noted through the analysis of unconscious feedback based on facial biometrics in the non-aromatisation period showed a happiness emotion of 53.6%, during which the device analysed an average of 250 people per day. During the period using the aromatisation unit, the daily average of the detected persons was 61 higher, i.e. 311. This increase in shoppers was also due to the impact of the upcoming Christmas. The deployed aroma of freshly roasted coffee was better assessed at unconscious level, and the average daily value of happiness emotion was 58.9%, which represents an unconscious improvement of 5.3%. Differences in perception at the unconscious level were also confirmed by the Kruskal-Wallis test ($p < 0.001$) and Dunn's *post hoc* analysis, which confirmed the higher values of "happy" happiness in the aromatisation period.

Within five basic emotions, we also watched the level of emotion of sadness. During the observation period without aromatisation, the average daily values of emotion of sadness stood at 53.2%. As part of the overall recording of unconscious feedback, we can conclude that this data may have been partially misrepresented due to the wrong angle of the face during the scanning of a person at the angle of vision of the device. Unconscious assessment during the reporting period with aromatisation recorded average daily emotions of sadness of 49%, in this case an improvement of 4.2%. Although it may seem that this is only a very small improvement, the unconscious assessment is of great importance even for such small differences. In this case, however, the difference within the periods compared was not statistically significant.

Based on the survey, although the change in the perception of the purchasing environment has not been confirmed by the classical way of data collection, it has been shown through the application of different research methodologies aiming to monitor the impact of aromas on consumer emotions that there has been a demonstrable change in the better rating, confirmed at an unconscious level. The results of the survey show that the aromatisation of the sales department has a subconscious impact on customers and, ultimately, on purchasing behaviour, which is reflected in higher turnover in some of the categories of goods observed. By applying aromatisation with the aroma of freshly roasted coffee in the bakery products department, we found an increase in sales of up to 12% in the product categories observed during the aromatisation period. However, with this change in sales, we also need to consider the possibility that this increase may have been partly influenced by seasonality. At the same time, it must be stated that the increase in turnover may have been influenced by other factors, such as current price actions, the supply of bakery goods, but also the rate of inflation.

Getting feedback directly in the real conditions of the store is justified, as it reflects real perception and customer satisfaction. The results show that there are differences in the conscious and unconscious assessment of the sales department's atmosphere, and it is therefore appropriate to use different research approaches for feedback collection. Their considerable added value consists not only in obtaining direct feedback on the purchase process (not with the passage of time), but also in enabling a precise understanding of subconscious customer perception, which can usefully inform managerial decisions.

The solution represents a rental cost of at least € 300/month for the retailer, depending on the size and overall design of the equipment in terms of functionality. The return on these costs consists in the fact that management can use the device to display in-store advertising as well as to obtain not only conscious but also unconscious feedback, the latter of which sheds considerable light on what actually drives consumer decisions (modern psychology states that 90% of decisions are unconscious). At the same time, feedback is obtained directly in the purchase process without the customer's participation (the device scans every passing customer except children). In addition to emotional feedback, the device is also able to recognise the gender and approximate age of those who come within its range at a readable angle with an accuracy of $+/-$ 10 years. This means that the feedback can also be classified according to individual market segments. All data is anonymised and cannot be assigned to a specific person, in accordance with the Data Protection Act and GDPR.

Our research has limitations, though. The rating of the online sales environment may not always be effective because it does not reflect emotions/opinions directly in the purchasing process. In addition, the answers are mostly distorted because they present only very satisfied and very dissatisfied customers. Another problem is that older customers tend not use online tools, or at least not to the extent that they are willing to express their opinion in this way. Nevertheless, the shopping experience and the opportunity for customers to be a direct part of the evaluation process have come to the fore here. These technologies can be fully adapted to the design of the commercial establishment, thereby avoiding any possible impairment to the homogeneity of the shop. For management, the feedback from these devices can represent a significant added support for decision-making in the form of implicit feedback directly from the point of sale.

Despite yielding many interesting findings, this research had many shortcomings which we intend to address in the future with similar research monitoring longer periods of operation, which will enable year-on-year comparisons, for example. Another possible improvement might involve modification of the feedback by effectively filtering the responses of children who tend to play with the display, which may serve partially to distort the data collected during processing. At the same time, we plan to compare the data obtained in a situation where aromatisation is used with an otherwise identical situation where aromatisation is absent. We also intend to perform microbiological analyses, enlisting the expertise of certified laboratories so as to demonstrate the effectiveness of selected aromas in the elimination of bacteria and fungi.

Acknowledgement

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