THE VISUAL SCENT: HOW IMAGERY SHAPES PERCEPTION IN MARKETING

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THE VISUAL SCENT: HOW IMAGERY SHAPES PERCEPTION IN MARKETING

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ABSTRACT

The integration of the visual and olfactory cues in marketing is effective due to the fact that the brain is capable of creating sensory experiences, especially the multi-sensorial ones, which have a great impact on consumer perception and behaviour. Visual images are the most frequently used forms of mental imagery, which can lead to sensory experience of smell, and activate regions of the brain that are associated with memory and sensory functions. This ability empowers the consumers to create very clear and detailed images in their minds, which in turn influences their mood, preferences and buying products' choices. appeal Such through visuals associating that them recreate with scents memories, can thus increase making the the products more desirable and creating a stronger emotional linkage. These visual cues are effective only when they are congruent with the product's features with the aim of achieving a harmonious sensory experience. Since people become more sensitive to the multimodal signals, brands are looking for new ways of how to include visual and olfactory elements into marketing to increase brand awareness, user involvement, and purchase intention. It is not only important to the marketing field but also to VR, therapeutic environments, and others, as it shows the importance of sensory integration in consumer experiences.

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Keywords: Sensory Marketing; Visual-Olfactive Imagery; Sensory Experience; Need for Smell; Scent Memory

ÖZ

Pazarlamada görsel imgeler ile kokunun bütünleştirilmesi, beynin çok duyulu deneyimler yaratma yeteneğini kullanarak tüketici algılarını ve davranışlarını derinden etkiler. Zihinsel temsilin en baskın biçimi olan görsel imgeler, koku gibi duyusal deneyimleri uyarabilir, hafıza ve duyusal işlemeyle ilgili beyin bölgelerini harekete geçirebilir. Bu yetenek, tüketicilerin duygusal durumlarını, tercihlerini ve satın alma kararlarını etkileyen zihinsel imgeler oluşturmalarını sağlar. Kokuları çağrıştıran görseller, ilişkisel hafızayı harekete geçirerek ürün çekiciliğini artırabilir, ürünleri daha arzu edilir hale getirebilir ve daha güçlü duygusal bağlantılar sağlayabilir. Bu görsel ipuçlarının etkinliği, ürünün özellikleriyle uyumlu olmalarına ve tutarlı bir duyusal deneyimi güçlendirmelerine bağlıdır. Tüketiciler çok duyulu uyaranlara giderek daha fazla yanıt verdikçe, markalar marka algısını geliştirmek, etkileşimi teşvik etmek ve satın alma niyetlerini yönlendirmek için pazarlama stratejilerine görsel ve koku öğelerini dahil etmenin yenilikçi yollarını araştırıyor. Görsel-koku etkileşimlerinin bu şekilde anlaşılması yalnızca pazarlama açısından önemli olmakla kalmayıp, sanal ve artırılmış gerçeklik ile terapötik ortamlarda da potansiyel uygulamalara sahiptir ve tüketici deneyiminde duyusal bütünleşmenin önemini vurgulamaktadır.

Anahtar Kelimeler: Duyusal Pazarlama; Görsel-Kokusal Ġmgeleme; Duyusal Deneyim; Koklama Ġhtiyacı; Koku Hafızası

To all women..

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

df: Degrees of Freedom

η : p-value

β : Beta

p: p-value

LIST OF ABBREVIATIONS

EEG: Electroencephalography

KMO: Kaiser-Meyer-Olkin

NFS: Need for Smell

OLF: Visual-Olfactory Imagery

OMI: The Octomodal Mental Imagery

PCA: Principal Components Analysis

PI: Purchase Intention

PT: Product Type

SD: Standard Deviation

SE: Standard Error

S-O-R: Stimulus–Organism–Response

VIF: Variance Inflation Factor

VP: Visual Placement

VR: Virtual Reality

INTRODUCTION

The decision-making process is inherently unpredictable, as the outcomes of decisions are often uncertain. People gather information to transform doubt into certainty. Information seeking is one of the most important actions customers take when making decisions. Product features, shopping scenarios, and personal characteristics affect how much information is sought. Direct sensory experiences, such as seeing, touching, feeling, smelling, tasting, and trying products, are among the primary ways customers learn about them. Second-hand information about product attributes is sufficient for search goods, but for experience goods, buyers need first-hand product experiences to accurately assess quality. The popularity of sensory marketing shows how important sensory experiences are in helping consumers make decisions. Physical sensations are part of sensory experiences. However, in reality, both imagined and real experiences are captured by sensory perception. Awareness or understanding of sensory data is called sensory perception. Perception and sensation are two different things. People perceive and process sensory experiences when they are transmitted to their brains. Perception occurs when a person is conscious of the sensation they have and analyzes it. Sensory perception, or awareness of the sensation a person has, is what people most often refer to as sensory experience. Sensory perception often involves more than one sense. A person’s emotional and cognitive responses are influenced by sensory impressions through the five senses, and these responses in turn affect attitudes and behaviors (Kim et al., 2021). The sense of vision is considered to be the strongest of all senses. It has been found to be highly correlated with other senses and that the sense of vision has very important effects on people both psychologically and physically (Ji et al., 2016).

Smells can affect human behavior and emotions. The effect of the sense of smell on emotions and behavior can be diverse and can be important in understanding how our senses interact with each other (Arai et al., 2024). Due to their ability to evoke memories and emotions, smells play an important role in customers' purchasing decisions. Smell can affect consumers' perceptions of the quality of goods and services, their purchase

frequency and spending patterns, and their likelihood of returning to a particular business or product. If the brand is reinforced with a well-designed and well-coordinated olfactory experience, i.e., when the smell is used in conjunction with other senses in the product, customers can better understand and interact with the brand because this harmony also creates a flawless and joyful experience (Errajaa et al., 2018).

LITERATURE REVIEW

This literature review aims to discuss studies on the impact of visual and olfactory cues on consumer perception, decision-making process and behavior. It has been shown that visual images can create an olfactory experience and activate brain regions associated with sensory and memory systems, thereby influencing mood, attention and purchase intention. The review discusses the role of congruent visual cues in enhancing product evaluations and emotional responses, where products are presented in a more positive and appealing manner, thus establishing stronger relationships with consumers. Based on these interactions, the review highlights the need for an integrated sensory marketing approach in the current market to increase consumer engagement and enable brands to achieve desired outcomes.

2.1. Sensory Marketing

Sensory marketing has become popular in the recent years as it is known to have a great impact on changing consumer behavior. Sensory marketing as a concept can be associated with the changes in marketing approaches that occurred in the 1970s. This period marked the transition from product marketing to brand marketing. Initially, the sensory characteristics of products were not very important, but by the end of the millennium, companies understood the potential of the senses, especially vision, touch, smell and hearing, to enhance product perception and the creation of brand experience. The application of sensory marketing to business plans encompasses actions aimed not only at increasing sales, but also at establishing loyal relationships with consumers. It also emphasizes the importance of the human factor and subjectivity in marketing and the role of the senses in consumers' interaction with brands. Sensory marketing can be defined as a type of marketing that stimulates consumers with one or more of the five senses, giving customers sensory experiences (Pollák et al., 2021). Many of the choices we make when purchasing products can be influenced by the marketing strategies commonly used in

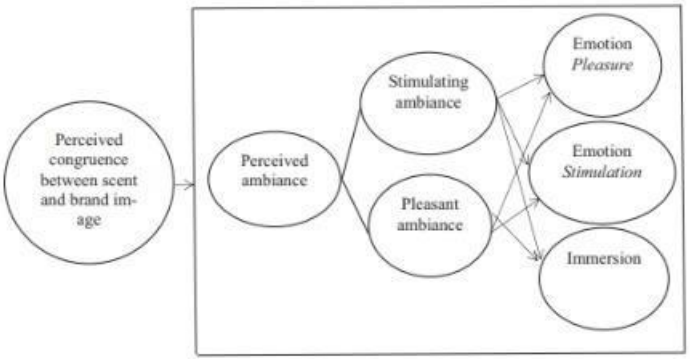
marketing today. Moreover, parameters such as touch and feeling the environment, social interactions, our thought processes and emotions all work together to shape our purchasing habits. Experts believe that our senses play a role in how we perceive things and can even influence our minds. Sensory marketing helps consumers become aware of brand identity and product features, unlike word-of-mouth marketing, which passively conveys messages. As a result, sensory marketing is considered a more effective marketing tactic than word-of-mouth marketing (Lyu & Huang, 2024).

The state of awareness requires heightened sensory perception, which has been shown to be essential for sensory marketing to work. Sensory advertising offers immediate or indirect sensory cues that trigger consumers' senses. The direct method of sensory marketing offers sensory products that convey cues to consumers, such as scented paper strips in perfume magazine advertisements. The indirect approach of sensory marketing stimulates the consumer's imagination through words and images to present sensory cues by displaying multisensory advertising content. Sensory information in marketing does not automatically create sensitivity, and the impact of sensory information on consumer appeal depends on both situational and personal factors (Li et al., 2023).

The study conducted by Krishna et al. (2016) investigates the impact of marketing in increasing the effectiveness of advertisements by engaging customers through the senses of sight, sound, smell, taste and touch. It emphasizes the importance of building lasting connections with customers by addressing their experiences. The authors delve into the effects of stimuli on consumer behavior, emotions and cognitive processes, ultimately shaping how individuals perceive brands and make purchase decisions. Increasing connections and brand recall through experiences is a major focus of discussions on advertising effectiveness today. The use of sounds and smells to evoke nostalgia or create a brand atmosphere contributes to audience engagement and retention. Additionally, engaging and tactile advertisements can mimic the interaction a product can have and further strengthen consumers' connection to the brand. By leveraging these cues, advertisers can develop positive associations with their products that resonate with consumers and encourage brand loyalty. The study highlights how sensory marketing

could potentially transform the advertising landscape over the years. According to the findings of the study conducted by Errajaa et al. (2018), it was discovered that consumers' emotional responses and immersive interactions are significantly shaped by the harmony of the scent with the brand identity. The study focuses on the correlation between the ambient scent and the brand's character, examining how the fit between the two affects consumers' overall perception. The researchers put forward a hypothesis that suggests that consumers tend to be positively affected when there is a fit between these elements. According to the findings, when customers feel that the scent and the brand identity match well, they tend to give emotional responses.

Figure 2.1. Theoretical Model of Errajaa et al. (2018)



*(*Source*: 'Immersion and emotional reactions to the ambiance of a multiservice space: The role of perceived congruence between odor and brand image' by Errajaa et al., (2018), Journal of Retailing and Consumer Services, p.3)*

This research demonstrates the critical role of scent-brand fit in increasing consumers's emotions towards to the brand and customer density in the retail environment, and highlights that the fit between a brand's image and its associated scent significantly improves customer responses. When the scent is congruent with the brand image, consumers experience greater pleasure and greater sensory stimulation. Inconsistent scents or no scent at all produce significantly weaker or even negative effects. A pleasant environment combined with congruent scents increases sensory stimulation in customers. However, adding a scent alone (even a congruent one) does not significantly affect pleasure, suggesting that the presence of a scent alone is not sufficient. Congruent scents

outperform inconsistent scents and odor-free conditions, particularly in inducing positive emotional responses. Incongruent scents can negatively impact consumer perceptions, with lowered pleasure ratings. The study shows that congruent scents can evoke emotions such as comfort, excitement, joy, and relaxation. In contrast, conflicting scents can lead to feelings of confusion or discomfort resulting in experiences. Emotional response is very important as it directly affects customer satisfaction and loyalty (Errajaa et al., 2018). Among all the senses, the sense of smell is perhaps one of the most influential in the context of sensory marketing. Smell is closely linked to emotional and cognitive aspects and is therefore considered a better sense than vision or hearing. Studies show that people can perceive and identify between ten thousand and one million different odors. As a result, odors trigger certain emotional responses depending on an individual's experience. Therefore, scent marketing has emerged as a useful strategy to establish an emotional connection with consumers. For example, the use of scent can convey certain emotions to customers and increase the time customers spend in the store (Pollák et al., 2021). Smells are increasingly used by brand managers for marketing. This interest is due to the desire to provide a suitable environment for customers, increase the brand's reputation, suggest product features, enhance the customer experience and differentiate themselves from other businesses. Practitioners are aware that scents have evocative powers (emotionally charged recall) and cognitive outcomes (memory) (Errajaa et al., 2018).

Cowan et al. (2023) suggest in their research that sensory inputs such as scent play a role in enhancing VR experiences by adding emotional depth and immersive experiences. When consistent with the brand, these cues lead to positive brand responses such as improved recall, stronger brand attitudes, and increased loyalty. The findings highlight the importance of integrating olfactory cues into environments to create impactful and memorable brand interactions. Scents can evoke emotions and increase engagement levels more than odorless scenarios. People who encountered scents while immersed in a VR environment reported greater feelings of pleasure and enjoyment than those who did not. The emotional responses triggered by these scents play a role in shaping consumers' overall perception of the experience and associated brand. A key insight highlighted was the importance of ensuring that the virtual environment and the scent used were

congruent. When scents match the visuals and themes in an environment, a perfect ambiance is created that enhances brand connections and the overall experience.

A study by Green et al. (2023) investigates the connection between food and smell in their studies, and how they trigger memories, known as the "Proust Effect." This phenomenon demonstrates how sensory encounters can elicit deep-rooted memories, and was inspired by the famous French writer Marcel Proust's vivid recollection of how a bite of a madeleine cake brought back touching memories from his past. Researchers believe that smells and tastes have the power to trigger feelings of nostalgia due to their connection to the limbic system of the human brain, specifically the hippocampus and amygdala, which are responsible for emotion and memory. This regulates emotions and memories without as many cognitive filters as other senses. Tastes and smells bypass more cognitive filters than other sensory stimuli, allowing them to elicit more precise, emotional, and vivid memories. These sensory-triggered memories often have positive emotional weight, making them an important tool for marketing, personal identity, and psychological well-being. Marketing strategies and personal connections play a significant role, according to a study examining the practical implications of Proustian Effects in a variety of areas, including marketing and personal well-being. For instance, scent and taste applications are used by businesses to elicit responses from consumers and support brand loyalty. Furthermore, the study highlights how remembering food and smells can deepen connections across generations and cultural backgrounds, and explores how sensory encounters are linked to memory formation and recall, highlighting the importance of smells and tastes in understanding emotions and behaviors. The concept of the "Proustian Effect" illustrates the profound impact that sensory stimuli can have in shaping our sense of self and our connection to past memories.

In general, sensory marketing, especially scent marketing, has evolved into a strategic tool that goes beyond simply influencing purchase decisions. It focuses on creating a holistic and emotional brand experience, shaping consumer perceptions, and building long-term brand loyalty (Pollák et al., 2021).

2.2. Visual-Olfactory Imagery

The visual system is thought to be the most dominant of the various sensory systems. In addition to having a significant correlation with other senses, visual perception has a profound psychological and physical effects on humans. Mental imagery through "seeing with the mind's eye" and "hearing with the mind's ear" allows people to have sensory experiences even when they are not physically present. Mental images are formed by recalling, recreating, or combining previously stored information to build tangible representations in working memory. Quantity, vividness, affective tone, and modality are some of the dimensions that define mental imagery. Mental representations may involve one sensory modality or different combinations of several sensory modality. Visual imagery is seen as the most dominant sense, much like the visual sense. Furthermore, visual imagery frequently accompanies other sensory imagery, such as haptic imagery (Ji et al, 2016).

Beyond marketing, these findings have implications for virtual and augmented reality, where non-figurative cues can simulate sensory environments. They also open avenues for therapeutic contexts, such as using olfactory imagery for memory recall or relaxation. By demonstrating the brain's extraordinary capacity to integrate and simulate sensory experiences through abstract visual input, Ji et al. (2016)'s study enlightens innovative ways to use olfactory imagery in a variety of domains. A person's past experiences and learned associations between specific odors and visual stimuli determine how well non-figurative cues evoke olfactory imagery. This highlights how crucial memory and context are for sensory processing. Visual elements that evoke olfactory imagery elicit emotional and cognitive responses similar to those evoked by real odors. This phenomenon is important for applications such as marketing and product design, as these responses can influence mood, focus, and decision making. Non-figurative cues can be used to replicate sensory experiences in virtual and augmented reality, and this has implications beyond marketing. It also opens up opportunities in therapeutic settings, including using olfactory imagery to relax or recall memories. As the brain demonstrates its extraordinary ability

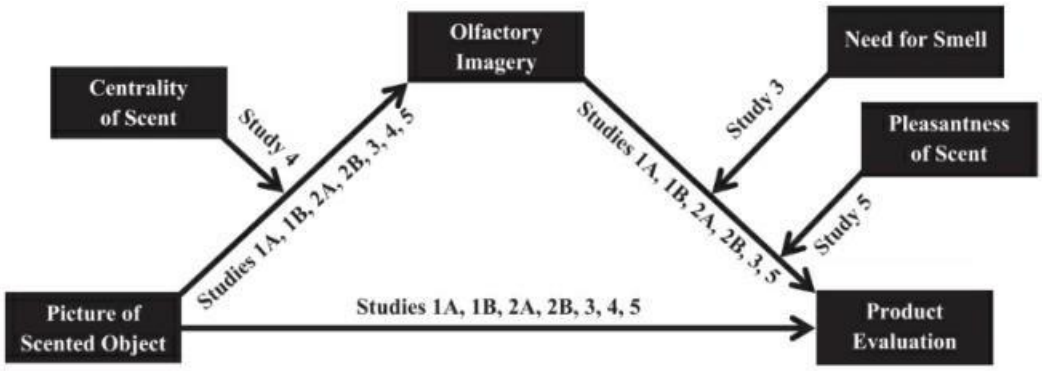
to synthesize and recreate sensory experiences through abstract visual input, new approaches to using olfactory imagery are emerging in various sectors (Ji et al, 2016).

The study of Ruzeviciute et al. (2023) aims to bring in a new perspective to the field of sensory integration by focusing on how olfaction influences distance estimation. Distance perception is usually mediated through vision, but this study shows that the presence of an odor can lead to distorted perceptions where objects appear closer than they actually are. This is in line with the sensory distance theory, which asserts that spatial cognition is a function of the sensory inputs that are received and processed in the brain, and that these sensory inputs are subject to the constraints of the specific modality. Smells are mid-range sensory experiences, unlike, for example, vision or sound. The awareness of a certain smell usually means that the source of the smell is nearby. This is because scent diffusion is a function of physical factors such as intensity, temperature and wind conditions. When an odor is associated with a tangible object, the brain may respond to the olfactory information as if it were an indicator of a closer distance, thus affecting visual distance estimation. Work on olfactory and visual distance perception suggests that object-associated odors can systematically influence spatial perception. In the course of the experiments, objects with congruent scents (for instance, lemon with citrus scent) were estimated as being closer than the unscented objects, regardless of the distance between the objects and the participants' attempts to estimate the distance accurately. This bias seems to be heuristic, is not influenced by participants' motivation or intention to correct it, and it appears only when the scent is related to the object. On the other hand, the incongruent scents (e.g. lemon with lavender scent) had no effect, which highlights the role of object-scent congruency in the perception. Likewise, in the low cognitive load condition, the odor bias was statistically reliable, and increasing cognitive load reduced it to insignificance. These findings suggest a cross-modal interaction between olfactory and visual information, where congruent odors affect distance estimation in an automatic and situation-dependent manner. Interestingly, the effect remains unchanged even with the shifts in emotional parameters including the pleasantness and arousal scores, suggesting that the effect is perceptual rather than emotional in nature. Thus, the results of the this study demonstrate how scent can shape consumer experiences and spatial

perception and may be useful for designing consumer environments and marketing strategies that incorporate multiple senses.

Based on Sharma and Estes' study (2024) findings; pictures have the power to improve evaluations of products by triggering thoughts of smell in our minds enhancing appeal and allure. Visual cues that bring to mind scents can enhance the perceived attractiveness and quality of products significantly. When mental images of scents are simulated through visuals; consumers tend to perceive the product's appeal and desirability favorably. Participants in this research who viewed images of fruits or baked bread gave higher ratings to those items and experienced stronger cravings compared to those exposed to neutral or unrelated images. Positive assessments were directly impacted by how vivid the mental olfactory imagery was. Detailed and pleasing fragrance representations were more likely to be evoked by products with intriguing pictures. The strongest effects of olfactory imagery elicited by congruent visuals were observed in products that have scent as a primary characteristic, such as food, cleaning products, and perfumes. The effects of non-scented or less scent-relevant products (such electronics) were negligible.

Figure 2.2. Theoretical Model of Sharma and Estes (2024)



*(*Source*: 'Seeing is smelling: Pictures improve product evaluations by evoking olfactory imagery' by Sharma and Estes, (2024), International Journal of Research in Marketing, p.8)*

Sharma and Estes's (2024) study study highlights the impact of cues in enhancing consumer perceptions and creating engaging product encounters.It underlines the

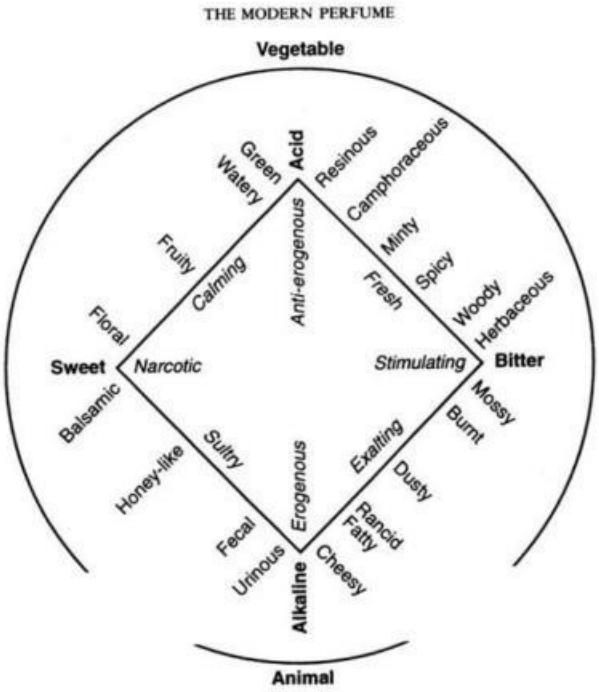
importance of leveraging visuals to enhance experiences and improve marketing strategies significantly.

The way new technologies are changing sensory marketing in digital environments is explored by Petit et al. (2018). While visual and auditory cues are easily communicated online compared to smell, olfactory cues are bridging this gap. The study highlights the potential of scent-enhancing technologies to create shopping experiences, particularly in industries such as home care products, foodstuffs, and cosmetics. Digital platforms can use words and images to make you imagine smells when there is no smell present. For example, describing something as “refreshing orange” to create a sensory memory.

2.3. Olfactive Family

While some believe scents smell differently to each individual, Zarzo and Stanton’s research (2009) supports the idea that fragrance perception can be mapped with consistently. A rose (or any scent) can be objectively analyzed and categorized using sensory maps. They aimed to create a sensory map using odor descriptors common in perfumery, leveraging proximity and distance to represent similarity and dissimilarity. Their approach combines numerical (rating-based) and semantic (word-based) methods, enabling a comprehensive understanding of fragrance profiles. Zarzo and Stanton compared their results with historical maps like Jellinek's Odor Effects Diagram as shown in Figure 2.3. and contemporary tools like Michael Edwards’ Fragrance Wheel as shown in Figure 2.4. Statistical methods (e.g., PCA) revealed a "reasonable match," suggesting cross-system consistency despite minor discrepancies. Their work identifies "best reference substances" for key descriptors, advancing the goal of standardization. The research provides a pathway for more precise fragrance engineering and marketing, but subjective experiences will always play a role. Zarzo and Stanton’s work lays the groundwork for interdisciplinary applications, reinforcing the interconnectedness of sensory perception, consumer behavior, and product development.

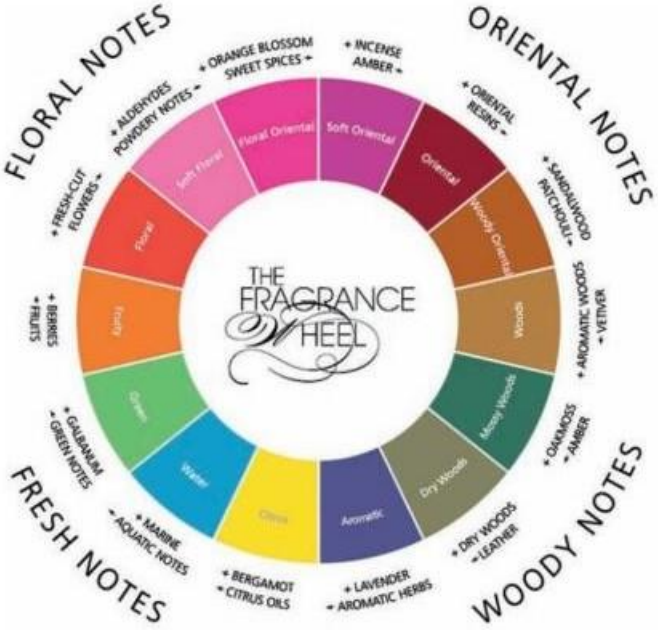
Figure 2.3. Odor Effects Diagram proposed by Jellinek (1951)



*(*Source*: 'Die Psychologischen Grundlagen der Parfümerie. Alfred Hüthig Verlag, Heidelberg by Jellinek, (1951))*

Jellinek's Odor Effects Diagram (1951) categorizes scents along two axes: erogenous vs. anti-erogenous and narcotic vs. stimulating. Hybrid effects (e.g., calming, fresh, sultry) provide nuanced psychological impacts of scents. He aimed to guide the fragrance creation for psychological and emotional effects. Jellinek's pioneering work, although outdated in some views, remains foundational, bridges the gap between experimental research and the art of perfumery.

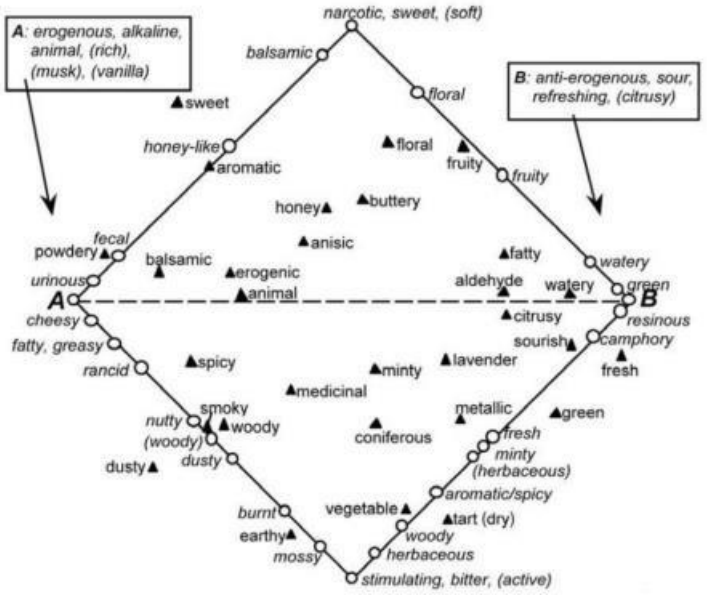
Figure 2.4. The Fragrance Wheel by Edwards (2008)



*(*Source*: 'Fragrances of the world: Parfums du monde (24th ed.) by Edwards, (2008))*

Zarzo and Stanton's focuses on two-dimensional sensory map with historical frameworks like Paul Jellinek's Odor Effects Diagram and Michael Edwards' fragrance classification. Their statistical analysis validates Edwards' fragrance wheel, demonstrating consistent placement of odor descriptors across systems.

Figure 2.5. Multidimensional Sensory Odor Map by Zarzo and Stanton (2009)



*(*Source*: 'Understanding the underlying dimensions in perfumers' odor perception space as a basis for developing meaningful odor maps' by Zarzo & Stanton, (2009), Attention, Perception and Psychophysics, 71(2), 225–247, p.12)*

Zarzo and Stanton's map aligns with Edwards' classification, enhancing the scientific robustness of the fragrance wheel. Adjustments to the fragrance wheel (e.g., moving fruity scents between floral and green) reflect perceptual nuances. Data from Zarzo and Stanton's research reveals stark differences in the distribution of floral, woody, and fresh scents across men's and women's fragrances.

Key Findings:

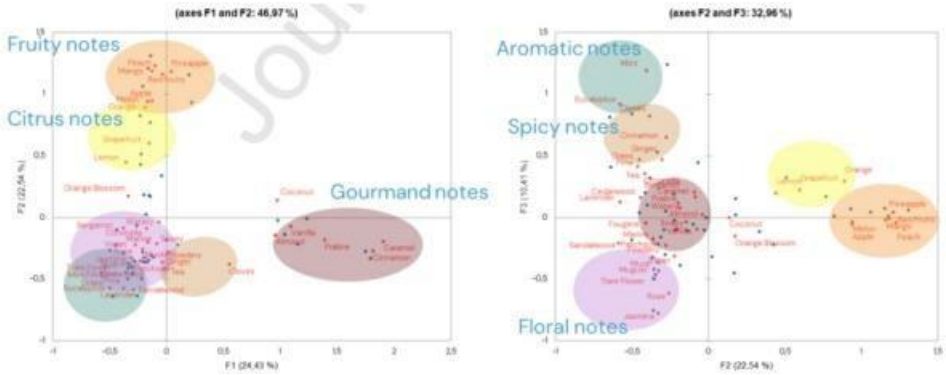
- Floral Scents: Predominantly feminine (42% in women's fragrances, 1% in men's).
- Woody Scents: Heavily masculine (15% in men's fragrances, 2% in women's).
- Fresh Scents: More common in men's top notes (93%) than women's (52%).
- Cultural differences challenge these binaries (e.g., unisex scents in Islamic and Pacific cultures).

Zarzo and Stanton's odor map explains only about 33% of data variability, suggesting that many odors cannot be neatly categorized. The complexity of human olfactory receptors

further complicates efforts. The research underscores the interplay between science, culture, and marketing in fragrance classification. While progress has been made in aligning sensory maps and enhancing classification frameworks, the subjective and complex nature of olfactory perception ensures that the journey toward a universal system continues. This complexity presents opportunities for innovation in personalized and inclusive fragrance and scented-product design.

Figure 2.6. shows Porcherot et al. (2024)'s olfactive classification.

Figure 2.6. Olfactive Notes and Families by Porcherot et al. (2024)



*(*Source*: 'Driving fragrance development to deliver emotional benefits in several markets' by Porcherot et al., (2024), Science Talks Volume 10, June 2024, 100345, p.2)*

In Figure 2.6. scents, ingredients and essential oils are categorized as follows:

Table 2.1. Demonstration of the Figure 2.6.

Olfactive Family	Ingredients and Essential Oils
Aromatic Notes	Mint, Lavender, Grass, Eucalytus
Citrus Notes	Orange, Lemon, Grapefruit, Bergamot, Citronella
Floral Notes	Jasmine, Rose, Tiare, Muguet, Violet
Gourmand Notes	Vanilla, Almond, Praline, Caramel
Fruity Notes	Melon, Apple, Mango, Peach, Pineapple, Red Fruits
Spicy Notes	Cinnamon, Ginger, Clove

*(*Source*: 'Driving fragrance development to deliver emotional benefits in several markets' by Porcherot et al., (2024), Science Talks Volume 10, June 2024, 100345, p.2)*

2.4. Need for Smell

Newborns have a fully developed sense of smell, which is a vital component of their early growth processes. Studies using observational and EEG methods show that newborns have the ability to distinguish between a variety of odors from birth. The sense of smell enables vital processes, including postnatal attachment and feeding behavior and orientation. Current understanding of olfactory function is based primarily on behavioral and autonomic responses and facial expressions (Gellrich, 2024). Our sense of smell represents one of the earliest senses to evolve according to evolutionary principles. People have a fundamental need to actively seek out and use odor information when making purchase choices. This construct is based on both theoretical research and empirical findings, including expert and consumer input. The sense of smell serves as a powerful sensory pathway that directly reaches limbic system components, including the amygdala and hippocampus. The neurological pathway allows olfactory cues to trigger vivid memories and emotional responses that scientists call the Proust phenomenon. The dual function of scent stems from its ability to provide information while also acting as a powerful emotional trigger during product evaluation (Koller et al., 2023).

The need for smell exists in two basic dimensions: informational/self-protective and autotelic/emotional. The informational/self-protective dimension describes how smell serves cognitive and biological needs by helping people detect product quality and spoilage; warn of dangers through unpleasant odors such as smoke or toxins. The autotelic/affective dimension describes the experiential enjoyment of smells, which can trigger feelings of pleasure and nostalgia. The two domains are theoretically consistent with the 'Need for Touch' construct in that motivations exist in both analytic goal-oriented and emotional experience-oriented forms. The two dimensions remain theoretically distinct but show expected connections because they often influence how people perceive smells (Koller et al., 2023).

This dual dimension represents how people experience odors in various contexts. During a wine tasting, an individual experiences an odor for its emotional value (autotelic/emotional) while simultaneously evaluating the wine's quality and flaws

(informational/self-protective). Gibson's (1966) theory suggests that people naturally seek pleasant odors while avoiding unpleasant odors, which supports the motivational balance between approach and avoidance behaviors. The dual nature of the olfactory experience requires understanding in order to analyze consumer actions and create marketing approaches that target both rational and emotional aspects of olfactory perception (Koller et al., 2023).

2.5. Purchase Intention

Colors, shapes, and images can evoke smells and memories (Lyu and Huang, 2024). In a study conducted by Mattila and Wirtz (2001), the harmony between ambient scents and music, especially arousal levels, was observed to determine their effects on consumers' perceptions and behaviors in stores. They investigated whether the harmony of these variables increased customer satisfaction levels, time spent in the store, and customers' purchase intentions by using lavender (a relaxing scent with a low arousal level) and grapefruit (an invigorating scent with a high arousal level) with low and high arousal levels of music. The study also points to the need to create synchronized sensory experiences in retail stores and how synchronization of sensory inputs leads to an enhanced consumer experience and increased sales.

Roschk et al. (2016) compiled the findings of 66 studies conducted between 1982 and 2016 with a total of 15,621 participants. They aimed to provide more accurate and precise effect size measurements to help retail managers make effective decisions regarding the use of atmospheric cues. The study revealed that music, scent, and color scheme affected consumers' pleasure, satisfaction, and behavioral intentions. Scent positively affected all outcomes through its arousal effect. According to the study, women enjoy scents more than men, which is consistent with physiological studies.

Fürst et. al (2020) explored the impact of compatibility, on consumer perception by looking into how complete matching of sensory attributes can affect product assessment and purchase likelihood. The scent plays a role, in shaping customers perceptions of a

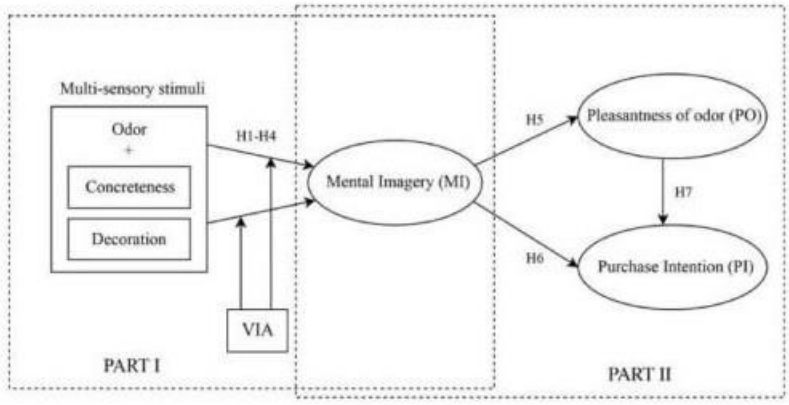
products appeal and effectiveness when it aligns with its purpose. Products that smell like citrus give a sense of cleanliness and freshness while beauty products, with a floral scent can make you feel more sophisticated or relaxed. In some cases where the fragrance doesn't match the products intended use like a sports drink smelling like vanilla that might not be as appealing to customers. For instance: A lavender-scented candle in delicate purple packaging accentuates the product's relaxing appeal by improving both olfactory and visual harmony. Although it can still have a beneficial influence on perception, partial congruency—such as a congruent fragrance but an incongruent packaging color—has a less overall impact than fully congruent sensory stimuli. Congruent fragrances boost customer satisfaction and trust, increasing the likelihood that they will buy the product. Stronger emotional involvement is fostered by a congruent fragrance, which also improves the whole sensory experience and increases brand loyalty. A product's appeal may be diminished by cognitive dissonance caused by incongruent sensory aspects (such as a fresh mint fragrance combined with harsh or dark imagery).

According to Petit et al. (2018), audio cues can enrich the visual and textual cues in order to replace the lack of scent. For instance, videos showcasing the effervescence of a drink may evoke sensations of freshness and taste. In this manner, involving senses in the marketing strategies can change brand perception and the probability of a customer’s purchase. These experiences create emotional responses such as excitement, nostalgia or relaxation and trigger the consumers when they are associated with actual or perceived olfactory elements. The way these responses affect customer behaviour may make them likely to buy products from a website and also build confidence in the products.

Lyu and Huang (2024) conducts research to understand how elements in advertising affect customers’ perception of fragrances and their buying behavior by linking specific scents to specific colors such as orange for citrus scents and green for herbal scents. Visual cues such as pictures of fruits, flowers or even natural environments also help the link between scents to be made clearer. If the visuals used in the advertisements are clear and coherent, this makes the envisioned fragrance to seem more real hence increasing the attractiveness of the product. Advertisements that create mental images related to scent

do lead to positive attitude toward the product and emotional association. It has been established that when customers can picture the scent of a product, then the quality, usefulness and desirability of the product is thought to be higher. This perception in turn increases the probability of buying the product. Harmonious visual characteristics enhance trust and credibility of the product's claims, thus leading to higher purchase intention. For instance: Soft pastel-colored images are used with floral olfactory direction. On the contrary, if there are mismatched senses, then there is a high likelihood that people will get confused and lose interest. Visual signals stimulate consumers' sense of smell, preparing them for decision-making, which increases the likelihood that intent will be translated into action.

Figure 2.7. Theoretical Model of Lyu and Huang (2024)

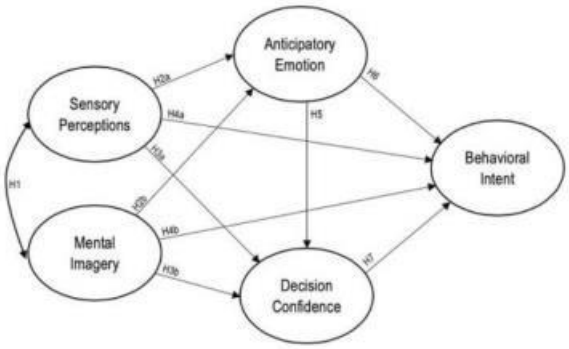


*(*Source*: 'Visual elements in advertising enhance odor perception and purchase intention: The role of mental imagery in multi-sensory marketing.' by Lyu and Huang, (2024), Journal of Retailing and Consumer Services, p.5)*

In the study conducted by Kim et al. (2021), researchers investigate how sensory perceptions, mental imagery, anticipatory emotions, and decision confidence interact in consumers' decision-making process when it comes to purchasing. Sensory perceptions, especially visual and tactile perceptions, are highly correlated with mental imagery, indicating that real and imagined sensory experiences are interdependent. Both sensory perceptions and mental imagery influence anticipatory emotions and decision confidence, and the mediating role of anticipatory emotions and decision confidence on behavioral intention was examined. Positive anticipatory emotions increase decision confidence and

directly and indirectly improve behavioral intention. Therefore, the study highlights that sensory perceptions have a stronger influence than mental imagery, especially in the context of store-based retailing, demonstrating the importance of the interdependence of emotional and cognitive in the consumer decision-making process. Therefore, anticipatory emotion is identified as a critical factor in the consumer decision-making process, especially when the consequences of the decision are not fully known. Outcome-based emotions are emotional responses to events that have already occurred; while anticipatory emotions are emotional anticipations of future events influenced by sensory perceptions and mental imagery. These emotions are important because they allow consumers to evaluate the possible outcomes of a decision, the potential benefits and risks of a purchase.

Figure 2.8. Theoretical Model of Kim et al. (2021)

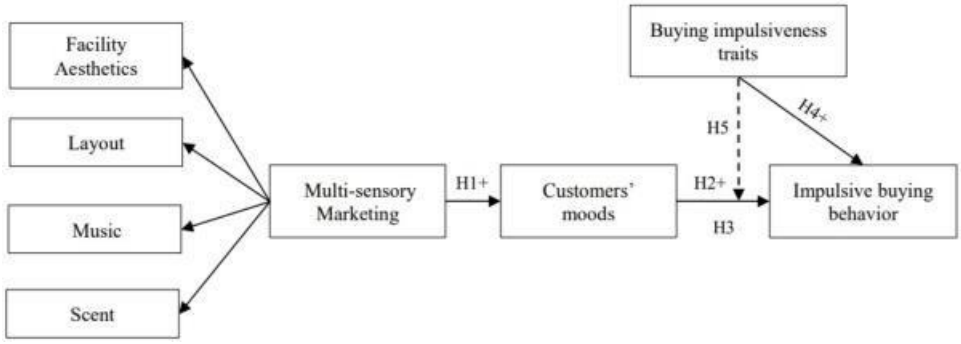


*(*Source*: 'The roles of sensory perceptions and mental imagery in consumer decision-making' by Kim et al., (2021), Journal of Retailing and Consumer Services, p.4)*

Le et al.'s study (2024) examines how multi-sensory marketing affects customers' emotions, impulsive buying characteristics and impulsive buying habits in various environments by leveraging the Stimulus–Organism–Response (S-O-R) model as a framework. Russell and Mehrabian's model (1974) introduced The S-O-R Model and discussed the influence of factors such as the environment on internal responses such as emotions and how this connection influences purchasing decisions and consumer behavior in different domains. The Stimulus-Organism-Response (SOR) model is the fundamental theory that explains how sensory stimuli produce emotional, cognitive, and

appetitive responses in consumers. Sensory inputs such as touch and vision are crucial in eliciting emotional responses. For instance, positive touch creates a pleasant sensation in the body, resulting in positive affect, increased judgment, and purchase intention. Similarly, vivid mental imagery allows people to picture specific events that will occur in the future, while still preserving the emotions associated with these stimuli and generating emotional responses. This is because the emotion-generating ability of mental imagery is related to the ability to elicit memories and simulate burdens, resulting in more positive anticipatory feelings if the predicted scenario is positive (Kim et al,2021).

Figure 2.9. Research Model of Le et al. (2024)



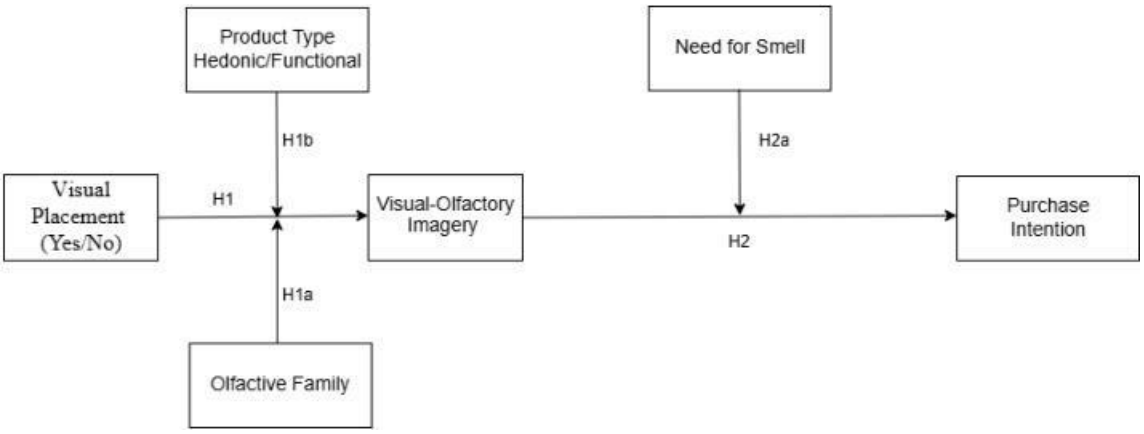
*(*Source*: 'Multi-Sensory Marketing and Impulsive Buying Behavior: The Role of Impulsive Buying Traits' by Le et al., (2024), Emerging Science Journal, Vol. 8, No. 5, p.4)*

Le et al.'s study (2024) explores the strategic value of multi-sensory marketing in creating retail environments that foster positive emotional states and encourage impulsive purchasing. Additionally, the findings highlight how individual differences in impulsive buying traits shape consumer responses, offering valuable insights for personalizing marketing strategies. This research fills gaps in previous researches by incorporating multi-sensory marketing and impulsive buying traits as variables and provides managerial implications for businesses and retailers to develop effective marketing strategies to encourage impulsive purchases and increase sales.

PROPOSED MODEL AND HYPOTHESES

3.1. Proposed Model and Hypotheses

Figure 3.1. Proposed Model



3.1.1. Visual Placement and Visual-Olfactory Imagery

Visual aesthetics are very crucial for ad effectiveness. They can create mental images that determine the consumers' perception and general attitude toward the product. The compatibility between handedness and object orientation (e.g., a spoon on the right for right-handed people) increases mental simulation. This simulation increases purchase intention for products perceived as attractive, while it can have the opposite effect for unattractive products (Krishna et al. 2016).

According to Hossu et al. (2024), non-figurative visual cues, non-figurative visual cues, when properly constructed, can conjure up images of specific odors in the mind. The brain's capacity to associate previously encountered smells with abstract visual features is involved in this process. The olfactory cortex, orbitofrontal cortex, and areas associated with memory and sensory integration are among the brain regions identified as active during odor imagery in the study. The power of mental imagery is demonstrated by the fact that these activations occur even when there is no real fragrance present. The effectiveness of non-figurative cues in inducing odor imagery depends on the individual's

prior experiences and learned associations between visual stimuli and specific odors. The effectiveness of non-figurative cues in triggering odor imagery depends on the individual's previous experiences and the learned associations between visual stimuli and specific odors. This highlights the importance of context and memory in sensory processing. Olfactory imagery triggered by visual cues elicits emotional and cognitive responses similar to those triggered by real odors. These responses can affect mood, attention, and decision making, making this phenomenon important for applications such as marketing and product design.

Therefore, it can be hypothesized that:

H1: Including a visual placement in an ad significantly increases consumers' visual imagery compared to text-only descriptions.

3.1.2. Olfactive Family

Gagarina and Pikturniene's (2015) study explores the ways in which various ambient fragrance types and intensities affect people's ability to make decisions. The link between olfactory cues and heuristics—mental shortcuts frequently used during decision-making—is the main focus of the study. fragrances are divided into two categories by the study: relaxing fragrances (like lavender or vanilla) and stimulating aromas (like spicy or citrus). Arousing smells have been shown to make consumers depend more on simplification heuristics, such the availability heuristic, which bases decisions on information that is easily remembered. On the other hand, soothing fragrances encourage more careful and intentional processing, which lowers the need for heuristics and pushes customers to pay closer attention to details. When making decisions, scent intensity is also quite important. No matter the kind, stronger intensities have a tendency to raise cognitive load and increase dependence on heuristics. In order to deal with the sensory overload, people are more prone to simplify their decision-making when they perceive ambient odors to be potent or overwhelming. Arousing smells made people feel more

enthusiastic, which in turn made them more likely to use instinctive or emotional heuristics.

Olfactive families divide the scents into several groups according to the features that they have in common. The citrus scents are often described as fresh, citrusy, and vibrant which include lemon, orange among others; the aromatic scents are described as herbal, spicy, and woody which include rosemary, basil, and thyme. These families can also affect the strength and the kind of olfactory images that are elicited by pictures of scented objects.

The citrus fragrances are most often described as simple, clean, and refreshing, which may make them better at eliciting clear and detailed olfactory associations. Citrus is commonly associated with freshness, life, and clarity and images of citrus fruits are expected to conjure the same feelings (Krishna, 2012).

Aromatic fragrances which includes herbs offer more rich and varied sensory cues. These scents can be more general or more detailed, often associated with environment, food, or even medicine (Schifferstein & Blok, 2002). The imagery that is conjured up by aromatic scents may be more confused and less well-defined than that of citrus scents, possibly needing more processing to create olfactory mental models (Herz, 2010).

Therefore, it can be hypothesized that:

H1a: The effect of the visual placement on visual-olfactory imagery is moderated by olfactive family, such that compatible fragrance families enhance visual-olfactory imagery more effectively.

3.1.3. Product Type

Hedonic products are those purchased for pleasure, enjoyment, or indulgence (e.g., shower gels that provide a luxurious or relaxing experience), whereas functional products serve a practical purpose, emphasizing utility and performance (e.g., floor cleaners used to clean and disinfect) (Dhar & Wertenbroch, 2000; Alba & Williams, 2013).

Scents are used more strategically in hedonic products because it is used in a way that adds to the pleasure that the product is trying to offer. For instance, a tropical-fragranced shower gel with a scent of coconut can make the user imagine that he or she is on a beach, making the shower gel product even more desirable (Krishna, 2012). On the other hand, for the functional products, scent is considered to be an ancillary feature of the product rather than its core feature. Therefore, although the lemon-scented floor cleaner may have a smell associated with cleanliness, its actual benefit is derived from its cleaning capabilities (Bone & Ellen, 1992).

When considering of shower gel, the consumer's first thought is usually about the scent, as this feature enhances the sensory pleasure of the product. This also applies to floor cleaners, where the scent is seen as an added bonus rather than the main benefit.

Therefore, it can be hypothesized that:

H1b: The effect of a visual placement on visual-olfactory imagery varies by product type (hedonic or functional), such that the effect is stronger for hedonic products.

3.1.4. Purchase Intention

Joaquim Silva et al. (2021) studied the impact of scents, on passengers' perceptions of public transportation services, in a bus setting. They conducted experiments using bus services to see how different fragrances influenced passenger experiences and emotions.The findings indicate that pleasant scents can enhance enjoyment for travelers result ing in feelings of relaxation and pleasure. The emotions play a role as they influence passengers' perceptions of their journey directly. Moreover the research indicates a link, between encounters and customer loyalty; passengers who encounter pleasant odors are inclined to consider using the bus service again and recommend it to others. As per the findings, which highlight the value of marketing in transport implementing subtle scents could enrich passengers' travel experiences and foster a stronger emotional connection, with the service provided.

According to Le et al. (2024) the connection between sensory stimuli and consumer behavior is heavily influenced by individual's moods at the moment when making a purchase. Positive moods often trigger buying decisions as it taps into human's self reward seeking behavior. Impulsive shopping can be a coping strategy for even bad feelings.

The use of scents in branding and sensory marketing has become more common as companies look for new ways to engage consumers. Selecting particular scents, brands try to engage customers' feelings, increase the perception of the product and services offered, and develop the general brand position. This approach is successful in setting the right mood that would appeal to the desired audience, increase the level of engagement and unique positioning of the brand. The scents are a critical factor in the buying process of the consumers as they help to relay memories and feelings. The use of scent can make consumers perceive products and services as higher quality, and may also affect how often and how much they spend, as well as whether they will return to a certain place or product. A well-crafted and well-coordinated olfactory experience, that is the scent complements the brand, its products, or other senses, including music and interior design, enhances these outcomes. This harmony leads to a smooth and pleasant experience and allows consumers to better comprehend and interact with the brand in a positive manner (Errajaa et al, 2018).

By combining elements and vivid descriptions, like "freshly picked lavender" can elevate the way scents are perceived and boost both the sensory experience and desire to make a purchase (Lyu and Huang, 2024).

Therefore, it can be hypothesized that:

H2: Visual-olfactory imagery positively influences purchase intention.

3.1.5. Need for Smell

Newborns are born with a fully developed sense of smell, which plays a key role in early development, such as bonding and feeding. Studies using behavioral and neurological methods show that they can distinguish odors from birth (Gellrich, 2024). Smell is one of

the earliest senses to evolve and strongly influences consumer behavior, with people actively using smell to guide their purchasing decisions. The olfactory system is directly connected to the emotional centers of the brain, triggering memories and emotions known as the Proust phenomenon (Koller et al., 2023).

The sense of smell operates on two dimensions:

Informational/Self-Protective – helps detect quality, spoilage, or danger (e.g. smoke).

Autotelic/Emotional – provides sensory pleasure and nostalgia.

Understanding this dual nature is important for marketers to appeal to both the rational and emotional aspects of olfaction (Koller et al., 2023).

Therefore, it can be hypothesized that:

H2a: The relationship between visual-olfactory imagery and purchase intention is moderated by an individual's need for smell.

RESEARCH DESIGN & METHODOLOGY

The analysis of the data was carried out using the IBM SPSS Statistics 25 program. In the analyzes, firstly, the frequency and percentage values of the demographic information of the participants were calculated. In addition, descriptive statistics were calculated for the Visual-Olfactory Imagery (OLF), Need for Smell (NFS), Purchase Intention (PI). Then, normality and multicollinearity analysis were performed with reference to the skewness and kurtosis values of the research data. Parametric analysis methods were applied within the scope of the research questions. In this context, the relationship between Visual-Olfactory Imagery (OLF), Need for Smell (NFS), Purchase Intention (PI) was applied to Pearson product moment correlation analysis.

Finally, regression analysis was performed to determine whether Picture of a Scented Object, Product Type (Hedonic vs. Functional), Olfactive Family and Visual-Olfactory Imagery (OLF), Need for Smell (NFS) variables predicted the Purchase Intention (PI) level.

4.1. Universe and Sample

The population of this research is all adults between the ages of 18 and 66 and above who are actively involved in social life. In this context, all adults between the ages of 18-66 and above, regardless of whether they are employed or unemployed, represent the universe of this research. Because " Purchase Intention (PI) " is a situation that concerns all individuals. Therefore, the universe of such research consists of all emerging adults.

Due to the large size of the research universe, the "convenience sampling" method was preferred in this study in the context of the "accessibility" criterion (Gravetter, Forzano, 2012). In this method, which is a "non-probabilistic" sampling method, the probability of sampling each unit in the universe is unknown (Cohen, Manion, & Morrison, 2007). In this study, considering that the number of units that make up the universe is not known exactly and that the research subject covers a very large universe, an appropriate sampling

method that provides relative convenience in data collection was used. In appropriate sampling, which is one of the widely used methods in social sciences; There is a participant group that is suitable for the researcher in terms of both the ability to represent the universe and the ability to collect data.

The sample used for this study is adults aged 18-66 and above and the data collection process was carried out with 259 people who agreed to contribute to the study.

4.2. Data Collection Tool

Twenty-four statements representing the three main variables that comprise the research model presented in Figure 3.1. were directed to participants through a questionnaire. A section containing demographic information about the data source and sampling was added to the questionnaire, and the scale was presented to the respondents.

Regarding the survey language, the survey is conducted in Türkiye, so the scales are first listed in English and then translated into Turkish to be included in the survey. The Turkish version of the survey can be found in Appendix B, and the English version in Appendix C.

Below, a detailed presentation of each of the variables and measures and the literature the scales are based upon can be found.

4.2.1. Visual-Olfactory Imagery Scale (OLF)

It consists of 9 items to measure the level of Visual-Olfactory Imagery. In this study, the focus is on smell imagery, which is triggered by the visual presentation of a product. The 9 items used in the study belong to the olfactory dimension of the Octomodal Mental Imagery (OMI) scale. The Octomodal Mental Imagery (OMI) Scale is a comprehensive tool developed by Jalayer Khalilzadeh (Khalilzadeh et al., 2023). The expressions in the scale aim to assess whether a smell comes to life in your mind when you see a product

and is one-dimensional. The level of agreement with each statement is determined as (1 = Strongly disagree, 7 = Strongly agree).

Table 4.1. The Octomodal Mental Imagery (OMI) Scale

	Statement	Source
OLF1	Bu ürüne baktığımda bir koku algılarım.	Khalilzadeh et al., (2023)
OLF2	Bu ürünle ilgili bir koku hissederim.	
OLF3	Bu ürünü gördüğümde zihnimde bir koku canlanır.	
OLF4	Bu ürünü gördüğümde zihnimde canlanan koku bende temizlik hissi uyandırır.	
OLF5	Bu ürünü gördüğümde zihnimde detaylı olarak bir koku hayal edebilirim.	
OLF6	Bu ürünü gördüğümde zihnimde oluşan koku çok nettir.	
OLF7	Bu ürünü gördüğümde zihnimde oluşan koku çok güçlüdür.	
OLF8	Bu ürün zihnimde bir koku uyandırıyor.	
OLF9	Ürünü gördüğümde bir koku hayal edebiliyorum.	

4.2.2. Need for Smell Scale (NFS)

The NFS scale was developed by Koller et al. (2023). In this study, 11 items of the scale were evaluated as a 2-factor structure (informational and Autotelic/affective). The level of agreement with each statement is determined as (1 = Strongly disagree, 7 = Strongly agree).

Table 4.2. Need for Smell (NFS) Scale

	Statement	Source
NFS1	Bazı ürünleri satın almaya değer olup olmadığından emin olmak için önce koklamak gerekir.	
NFS2	Ürünlerin kokusu benim için belirli bir uyarı işlevine sahiptir.	
NFS3	Bazı ürünlerin kokusundan, malzemelerinin gerçek olup olmadığını anlayabiliyorum.	
NFS4	Ürünleri değerlendirirken koku alma duyuma güvenirim.	
NFS5	Bir ürünü kokladığımda, kalitesini değerlendirmeme yardımcı olur.	
NFS6	Bir ürünü koklarsam, onun hakkında daha iyi bir fikir edinebilirim.	Koller et al. (2023)
NFS7	Bazı ürünlerin kokusu, benim iyi hissetmemi sağlar.	
NFS8	Belirli ürünleri koklamak benim için bir keyiftir.	
NFS9	Bazı ürünleri koklamaktan hoşlanırım.	
NFS10	Bazı ürünlerin kokusu, onları satın almam için bir teşvik edici etkidir.	
NFS11	Ürünlerin kokusu ruh halimi etkiler.	

4.2.3. Purchase Intention Scale (PI)

The scale was developed by (Salisbury, Pearson, Pearson, & Miller, 2001). The statements in the scale are intended to evaluate your purchase intention for the product in an image. The measurement rating is (Likert type: 1 = Strongly disagree → 7 = Strongly agree).

Table 4.3. Purchase Intention (PI) Scale

	Statement	Source
PI1	Bu görseldeki ürünü kullanırım.	Salisbury, Pearson, Pearson, & Miller (2001)
PI2	Bu görseldeki ürünü satın alırım.	
PI3	Bu görseldeki ürün benim satin alabileceğim bir üründür.	
PI4	Kendimi bu ürünü kullanırken düşünebiliyorum.	

DATA ANALYSIS AND RESULTS

In this part of the study, the results of the analysis of the data are included. At the beginning, the results of the descriptive statistics for demographic variables were presented. Then, analyses of factor and reliability, regression analyses, analysis of variance and finally independent sample t-test were shared.

5.1. Descriptive Statistics for Demographic Variables

In this study, participants are asked questions about their age, gender, education level, employment status and income level. The demographic responses of the participants are shown in Table 5.1. below. The demographic information collected is listed in the frequency column.

Table 5.1. Sociodemographic Characteristics

Gender	N	%
Female	167	64.5%
Male	89	34.4%
Not to prefer say	3	1.2 %
Education		
High School	20	7.7%
Bachelor's degree	166	64.1%
Master's degree / Doctorate	73	28.2%
Age		
18-25	53	20.5%
26-35	125	48.3%
36-50	39	15.1%
66 and above	5	1.9%
Economic Situation		
26.000 TL and below	55	21.2%
27.000 TL – 52.000 TL	58	22.4%
53.000 TL -78.000 TL	59	22.8%
79.000 TL – 104.000 TL	36	13.9%
105.000 and above	51	19.7%

According to Table 5.1., 64.5% of the participants are women, the small portion (1.2%) choosing not to disclose gender shows a minimal impact on representativeness. The majority have at least a Bachelor's degree (92.3%), indicating a highly educated sample. Nearly half of the sample is aged 26–35, making this the dominant age group. A large proportion earns between 27,000 and 78,000 TL (45.2% combined), which can be considered middle-income. High-income earners (79,000 TL and above) account for 33.6%, indicating a significant upper-middle-class segment.

5.1.1. Factor Analysis

In the research model used for this study, the relationships between 3 basic variables are questioned. These are the Visual-Olfactory Imagery (OLF), Need for Smell (NFS), Purchase Intention (PI) variables. One of these three variables, Need for Smell (NFS), were subjected to factor analysis. Principal Component Analysis was applied to the 24 statements that comprise the variable.

Factor analysis serves as a methodological tool to clarify the theoretical constructs underlying a specific data set and to quantify how well these constructs represent the original variables. Furthermore, this analytical approach is utilized to explore the correlations among observed variables and to model these relationships using one or more latent variables. The primary statistical technique in factor analysis is the correlation coefficient, which evaluates the relationship between two variables. When computing the correlations in factor analysis, it is assumed that a linear relationship exists between the factors and the variables. Thus, the correlation value is a crucial consideration in factor analysis (Tabachnick et al., 2007).

To establish construct validity in scales, the minimum threshold for the difference between the top two factor loadings from items aggregated across various factors can be reduced to 0.32. Homogeneous samples lead to lower variance and factor loadings. Therefore, researchers seeking high factor loadings should collect data from a heterogeneous sample group instead of a homogeneous one (Kline, 1994).

Once the conditions for factor analysis are met, it is essential to evaluate the dataset's appropriateness for Explanatory Factor Analysis (EFA). To achieve this, one should first examine the results of the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity. These tests are commonly referenced in the literature for assessing the strength of relationships and the factorability of variables. The KMO focuses on sample adequacy, while Bartlett's Test of Sphericity evaluates the relationships among patterns within the dataset. A KMO value of 0.6 or higher and a p-value below 0.05 in Bartlett's Test of Sphericity indicate that the data is suitable for factor analysis.

The Kaiser-Meyer-Olkin Sampling Proficiency Test measures common variance among items. The KMO value provided by the researchers indicates whether the sample size is adequate for exploratory factor analysis (EFA). A KMO value between 0 and 1, specifically 0.6 or higher, signifies a sufficient value for factor analysis.

5.1.1.1. Factor and Reliability Analyses of Need for Smell (NFS) Scale

Information about the factor analysis of the NFS scale is given below.

Table 5.2. Factor and Reliability Analyses of NFS Scale

Factor Name	Factor Item	Factor Loading	% Variance	Cronbach's Alpha
Need for Smell	NFS7	0.876	62.803	0.842
	NFS8	0.874		
	NFS9	0.763		
	NFS10	0.729		
	NFS11	0.704		

In the study, Kaiser-Meyer-Olkin value = 0.821 and Bartlett's Test value = 582.1 ($p<.001$) for NFS Scale. Since the KMO value is 0.821, it can be assumed that the data obtained from the sample is sufficient. According to Tavşancıl (2014), the optimal variance rates fall between 40% and 60%. The study's 62.803% variance rate is considerably higher than the ideal range. 'Principal compenent analysis' extraction method was used in combination with a 'varimax' rotation. In the factor analysis, items 1, 2, 3, 4, 5, and 6 were removed

because they did not fit the factor structure. Items 7, 8, 9, 10 and 11 associated with the NFS scale demonstrate an acceptable level of reliability.

5.1.1.2. Factor and Reliability Analyses of Visual-Olfactory Imagery Scale (OLF)

Information about the factor analysis of the OLF scale is given below.

Table 5.3. Factor and Reliability Analyses of OLF Scale

Factor Name	Factor Item	Factor Loading	% Variance	Cronbach's Alpha
Visual Olfactory Imagery	OLF8	0.880	65.804	0.920
	OLF9	0.853		
	OLF3	0.849		
	OLF2	0.816		
	OLF6	0.813		
	OLF5	0.786		
	OLF7	0.774		
	OLF1	0.706		

In the study, Kaiser-Meyer-Olkin value = 0.897 and Bartlett's Test value = 1520.112 ($p<.001$) for OLF Scale. Since the KMO value is 0.897, it can be assumed that the data obtained from the sample is sufficient.

Factor analysis revealed a structure consisting of one factor. Factor accounts for 65.804% of the total variance and includes 8 items. 'Principal component analysis' extraction method was used in combination with a 'varimax' rotation. In the factor analysis, item 4 was removed because it did not fit the factor structure. Items 1, 2, 3, 5, 6, 7, 8, and 9 associated with the OLF scale demonstrate an acceptable level of reliability.

5.1.1.3. Factor and Reliability Analyses of Purchase Intention Scale (PI)

Information about the factor analysis of the PI scale is given below.

Table 5.4. Factor and Reliability Analyses of PI Scale

Factor Name	Factor Item	Factor Loading	% Variance	Cronbach's Alpha
Purchase Intention	PI1	0.960	89.066	0.958
	PI2	0.955		
	PI3	0.948		
	PI4	0.911		

In the study, Kaiser-Meyer-Olkin value = 0.843 and Bartlett's Test value = 1239.697 ($p<.001$) for PI Scale. Since the KMO value is 0.843, it can be assumed that the data obtained from the sample is sufficient.

As a result of factor analysis, a single-factor structure emerged. The factor explains 89% of the total variance and consists of 4 items. 'Principal component analysis' extraction method was used in combination with a 'varimax' rotation.

5.2. Regression Analysis

Regression analysis is a basic statistical technique used to model and statistically test the relationship between a dependent variable and one or more independent variables. In its simplest form, linear regression, the relationship between the dependent variable and the independent variable(s) is represented by a linear equation. This model is especially used in testing the assumption of causality between variables and predicting the future. The coefficients obtained in regression analysis allow to interpret the effect of the independent variables on the dependent variable in terms of both direction and magnitude. However, for the reliability of the model, some basic assumptions (linearity, normality of error terms, homogeneity of variance, absence of autocorrelation) must be met (Field, 2013).

5.2.1. Simple Linear Regression Analysis of H1

Simple linear regression analysis is conducted to discover the relationship between Visual Placement and Visual-Olfactory Imagery (OLF).

Figure 5.1. Simple Linear Regression Model for Visual Placement and Visual-Olfactory Imagery (OLF).

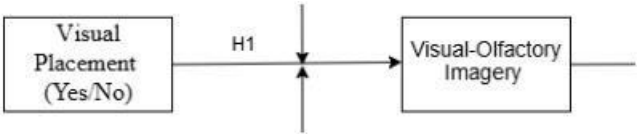


Table 5.5. Simple Linear Regression of Visual Placement and Visual-Olfactory Imagery

Dependent Variable: Visual-Olfactory Imagery				
Independent Variable	Beta	t-value	Adjusted R Square	p-value
Visual Placement	0.170	63.981	0.025	<0.001

As seen in Table 5.5., Visual Placement has an impact on Visual-Olfactory Imagery ($p<0.001$). There is no multicollinearity problem as VIF value of the independent variable is less than 10 (Visual Placement =1,000). The overall explanatory strength of the model is 17% with $R=0.17$, $R_2=0.029$, $F= 7.666$.

H1: The presence of a visual placement positively influences visual-olfactory imagery. H1 hypothesis is accepted.

5.2.2. Findings on the Moderating role of Olfactive Family between Visual Placement and Visual-Olfactory Imagery (H1a)

Figure 5.2. Model of the Moderating Effect of Olfactive Family (Orange and Lavender)

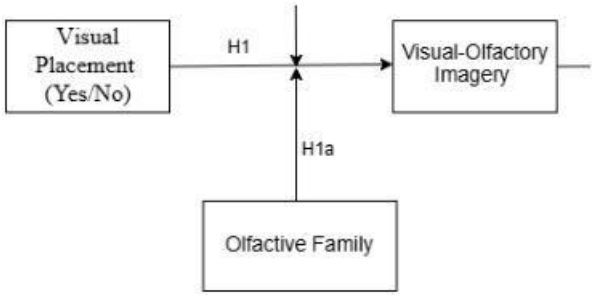


Table 5.6. The Moderator Role of Olfactive Family in the Relationship between Visual Placement and OLF

			95% Confidence Interval			
Variables	Estimate	SE	Lower	Upper	t	p
Constant	49.06	1.02	47.04	51.08	47.85	<.001
VP	2.002	1.55	-1.052	5.056	1.29	0.197
OF	-1.09	1.49	-4.04	1.854	-.731	0.465
VP ✻ OF	2.74	2.23	-1.656	7.153	1.22	0.220

SE = Standard Error; Estimate= none standardized Beta(β); VP= Visual Placement; OF= Olfactive Family; R=0.198; R_2= 0.039)

The Visual Placement and Olfactive Family variables included in the regression analysis significantly explained 3% (R_2=0.039) of the change over the result variable, Visual-Olfactory Imagery (OLF). In Table 5.6., non-standardized regression coefficients (β) showing the effects of each predictor variable on the outcome variable are given. The Visual Placement had no direct effect on both Olfactive Family and Visual-Olfactory Imagery (OLF) (β= 2.00; t= 1.29; p=0.197; β= -1.09; t= -0.731; p>0.05).

Accordingly, it was determined that products containing images in images had an effect on the Visual-Olfactory Imagery (OLF) variable. It was determined that the Olfactory Imagery variable had no effect on the Visual-Olfactory Imagery (OLF) variable. Since

the interaction between Olfactory Imagery × Visual Placement is not significantly related to the Visual-Olfactory Imagery (OLF) variable, it is understood that the Olfactory Imagery variable has no moderating effect on the relationship between Olfactory Imagery × Visual Placement (β= 2.74; t= 1.22; p>0.05) (Table 5.6.).

H1a: The effect of the visual placement on visual-olfactory imagery is moderated by olfactive family, such that congruent olfactive families enhance visual-olfactory imagery more effectively. H1a hypothesis is rejected.

5.2.3. Findings on the Moderating role of Product Type between Visual Placement and Visual-Olfactory Imagery (H1b)

Moderator analysis is a statistical technique that examines the effect of a third variable (moderator) that affects the severity or direction of the relationship between the independent variable and the dependent variable. In other words, the moderating variable describes "when" or "under what conditions" the relationship between the two variables is stronger or weaker. It is usually tested on interaction terms within the scope of multiple regression analyses. Moderated analysis is often used in the social sciences to understand the impact of individual differences or contextual factors (Baron & Kenny, 1986). Such analyses make important contributions, especially in testing theoretical models and revealing more complex relationships (Hayes, 2018). The moderating effect of Product Type (Hedonic vs. Functional) on the relationship between Visual Placement and Visual-Olfactory Imagery (OLF) was analyzed.

Figure 5.3. Model of the moderating effect of Product Type (Hedonic and Functional)

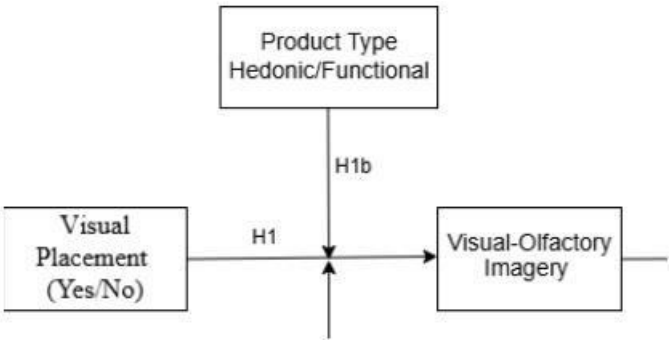


Table 5.7. The Moderator Role of Product Type in the Relationship between Visual Placement and OLF

			95% Confidence Interval			
Variables	Estimate	SE	Lower	Upper	t	p
Constant	47.51	1.04	45.45	49.56	45.49	<.001
Picture of Scented Object	3.780	1.61	0.0668	0.766	2.34	0.020
Product Type	2.140	1.49	-0.088	0.560	1.43	0.154
VP ✻ PT	-1.04	2.23	-0.599	0.371	-0.46	0.643

SE = Standard Error; Estimate= none standardized Beta(β); VP= Visual Placement; PT= Product Type; OLF= Visual-Olfactory Imagery R=0.207; R^2= 0.042)

The Visual Placement and Product Type variables included in the regression analysis significantly explained 4% (R^2=0.0425) of the change on the result variable, Visual-Olfactory Imagery (OLF). In Table 5.7., non-standardized regression coefficients (β) showing the effects of each predictor variable on the outcome variable are given. While Visual Placement had a direct effect on Visual-Olfactory Imagery (OLF) (β= 3.78; t= 2.34; p=0.02), Product Type was not directly effective on Visual-Olfactory Imagery (OLF) (β= 2.14; t= 1.43; p>0.05). Accordingly, it was determined that products containing images in images had an effect on the Visual-Olfactory Imagery (OLF) variable. It was determined that the Product Type variable had no effect on the Visual-Olfactory Imagery (OLF) variable. Since the interaction between Product Type × Visual Placement is not significantly related to the Visual-Olfactory Imagery (OLF) variable, it is understood that the Product Type variable does not have a moderator effect on the

relationship between Product Type × Visual Placement (β= -1.04; t= -0.46; p>0.05) (Table 5.7.). This shows that the Product Type variable (hedonic-funtional) has no moderating role in the relationship between the Visual Placement and the Visual-Olfactory Imagery (OLF) variable.

H1b: The effect of the visual placement on visual-olfactory imagery is moderated by product type (hedonic vs. functional), such that the effect is stronger for hedonic products. H1b hypothesis is rejected.

5.2.4. Simple Linear Regression Analysis of H2

Simple linear regression analysis is conducted to discover the relationship between Visual-Olfactory Imagery (OLF) and Purchase Intention (PI).

Figure 5.4. Simple Linear Regression Model for Visual-Olfactory Imagery (OLF) and Purchase Intention (PI)

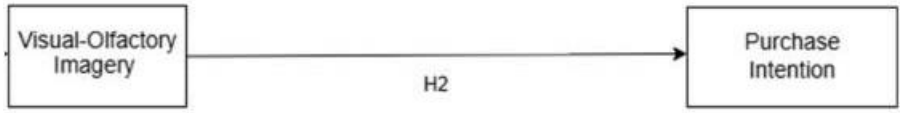


Table 5.8. Simple Linear Regression of Visual-Olfactory Imagery and Purchase Intention

Dependent Variable: Purchase Intention				
Independent Variable	Beta	t-value	Adjusted R Square	p-value
Visual-Olfactory Imagery	0.197	4.778	0.035	<0.001

As seen in Table 5.8., Visual-Olfactory Imagery has an impact on Purchase Intention (PI) (p<0.001). There is no multicollinearity problem as VIF value of the independent variable

is less than 10 (Visual-Olfactory Imagery =1,000). The overall explanatory strength of the model is 19% with R= 0.197, R_2=0.039, F=10.391.

H2: Visual-olfactory imagery positively influences purchase intention. H2 hypothesis is Accepted.

5.2.5. Findings on the moderating role of Need for Smell (NFS) between Visual-Olfactory Imagery and Purchase Intention (PI)

Figure 5.5. Model of the moderating effect of NFS

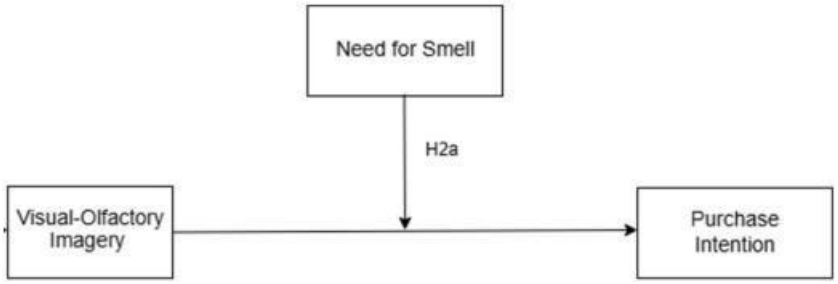


Table 5.9. The moderator role of NFS in the relationship between and OLF and PI

			95% Confidence Interval			
Variables	Estimate	SE	Lower	Upper	t	p
Constant	48.58	10.57	27.751	69.41	4.59	<.001
OLF	-0.713	0.219	-1.145	-.280	-3.25	0.001
NFS	-1.024	0.27	-1.571	-.447	-3.69	<.001
OLF * NFS	0.0225	0.005	0.015	0.033	4.02	<.001

SE = Standard Error; Estimate= none standardized Beta(β); NFS= Need for Smell; PI= Purchase Intention; OLF= Visual-Olfactory Imagery R=0.337; R_2= 0.113)

The Visual-Olfactory Imagery and Need for Smell variables included in the regression analysis significantly explained 11.3% (R2=0.113) of the change on the result variable, Purchase Intention (PI). In Table 5.9. non-standardized regression coefficients (β)

showing the effects of each predictor variable on the outcome variable are given. Visual-Olfactory Imagery was found to have a direct effect on Purchase Intention (β= -0.713; t= -3.25; p<0.001), while similarly, Need for Smell had a direct effect on Purchase Intention (β= -1.02; t= -3.69; p<0.001).

Since the interaction between Visual-Olfactory Imagery (OLF) × Need for Smell (NFS) is significantly related to the Purchase Intention (PI) variable, it is understood that the Need for Smell (NFS) variable has a moderating effect on the relationship between Visual-Olfactory Imagery (OLF) × Need for Smell (NFS) (β= 0.002; t= 4.02; p <.001) (Table 5.9.).

According to the results of the model, in which the moderating effect of the individual's need to smell was examined in the relationship between visual-olfactory images and purchase intention, it was determined that visual-olfactory images directly and positively affected the purchase intention (β=-0.713; t= -3.25; p<0.001).

Considering the moderating effect of the individual's need to smell, it has been observed that purchasing intentions increase with the increase in visual-olfactory images and those with a high level of the individual's need to smell (High (+1SD)) have more purchasing intentions than those with an average level. It is estimated that the individual's need for smell is low (Low (-1 SD; p>0.05)), no significant relationship was found between the increase in visual-olfactory images and purchase intention.

H2a: The relationship between visual-olfactory imagery and purchase intention is moderated by the individual's need for smell, such that the effect is stronger for individuals with a higher need for smell. H2a hypothesis is accepted.

Table 5.10. Demonstration Summary of Hypotheses

HYPOTHESES	Accepted	Rejected	Moderator
H1: The presence of a visual placement positively influences visual-olfactory imagery.	✓		
H1a: The effect of the visual placement on visual-olfactory imagery is moderated by olfactive family, such that congruent olfactive families enhance visual-olfactory imagery more effectively.		✓	
H1b: The effect of the visual placement on visual placement is moderated by product type (hedonic vs. functional), such that the effect is stronger for hedonic products.		✓	
H2: Visual-olfactory imagery positively influences purchase intention.	✓		
H2a: The relationship between visual-olfactory imagery and purchase intention is moderated by the individual's need for smell, such that the effect is stronger for individuals with a higher need for smell.			✓

5.5. Analysis of Variance

One-way analysis of variance (One Way ANOVA) is a parametric statistical test that allows for the comparison of means between three or more independent groups. This type of analysis is used when the dependent variable is continuous and the independent variable is categorical. The main objective of ANOVA is to determine whether the differences between the groups are only random or statistically significant. In analysis of variance, the total variance is decomposed into both intergroup and intragroup variance; By means of the F-statistic, these two variances are compared. If the F-value obtained is significant, this indicates that there is a significant difference between at least the two groups, but post-hoc tests (e.g., Tukey HSD, LCD, Bonferroni, Duncan) are needed to determine which groups have differences (Field, 2013). One-way ANOVA is widely used

in many fields such as education, psychology, sociology, and health sciences, and ensuring its assumptions (normality, homogeneity of variances) is critical for the validity of the analysis results (Gravetter & Wallnau, 2017).

5.5.1. One-way ANOVA for Age Range and Purchase Intention (PI)

The analysis of variance conducted between five groups with age range and Purchase Intention (PI) shows that there's a statistically significant difference between 18- 25 and 51-65 (p=0.037), 66 and above (p=0.042), whereas for 26-35, there is a statistically significant difference with 51-65 age range (p=0.012) 66 and above (p=0.032). The results are displayed on Table 5.11. and 5.12. The mean difference is significant at the 0,05 level Post hoc LCD Test.

Table 5.11. One-way ANOVA for Age Range and Purchase Intention (PI)

Purchase Intention (PI)	N	Mean	F	Sig.
18-25	53	16.8491	2.69	0.031
26-35	125	16.6960		
36-50	39	17.8974		
51-65	37	19.7297		
66 and above	5	23.0000		

Table 5.12. Post-Hoc Test for Age Range and Purchase Intention (PI)

Dependent variable	Age range		Mean Difference (I-J)	Std, Error	Sig.
	18-25	26-35	.1530	1.051	.884
		36-50	-1.048	1.353	.439
		51-65	-2.880	1.374	.037
		66 and above	-6.150	3.002	.042

	26-35	18-25	-.1530	1.051	.884
		36-50	-1.201	1.177	.308
		51-65	-3.033	1.201	.012
		66 and above	-6.304	2.926	.032
Purchase Intention (PI)	36-50	18-25	1.048	1.353	.439
		26-35	1.201	1.177	.308
		51-65	-1.832	1.472	.215
		66 and above	-5.102	3.048	.095
	51-65	18-25	2.880	1.374	.037
		26-35	3.033	1.201	.012
		51-65	1.832	1.472	.215
		66 and above	-3.270	3.057	.286
	65 and above	18-25	6.150	3.002	.042
		26-35	6.304	2.926	.032
		36-50	5.102	3.048	.095
		51-65	3.270	3.057	.286

5.5.2. One-way ANOVA for Education level and Purchase Intention (PI)

The analysis of variance conducted between three groups with education level and Purchase Intention (PI) shows that there's a statistically significant difference between Master's degree / Doctorate and High School (p=0.037), Bachelor's degree (p=0.025). The results are displayed on Table 5.13. and Table 5.14. The mean difference is significant at the 0,05 level Post hoc LCD Test.

Table 5.13. One-way ANOVA for Education Level and Purchase Intention (PI)

Purchase Intention (PI)	N	Mean	F	Sig.
Master's degree / Doctorate	73	15.890	3.43	0.034
High School	20	19.300		
Bachelor's degree	166	17.933		

Table 5.14. Post-Hoc Test for Education Level and Purchase Intention (PI)

Dependent variable	Age range		Mean Difference (I-J)	Std, Error	Sig.
Purchase Intention (PI)	Master's degree / Doctorate	High School	-3.409	1.625	.037
		Bachelor's degree	-2.043	.9045	.025
	High School	Master's degree / Doctorate	3.409	1.625	.037
		Bachelor's degree	1.366	1.524	.371
	Bachelor's degree	Master's degree / Doctorate	2.043	.9045	.025
		High School	-1.366	1.524	.371

5.5.3. One-way ANOVA for Gender and Purchase Intention (PI)

The analysis of variance is performed between three groups with gender and Purchase Intention (PI). The results show that there is no statistically significant difference between gender for Purchase Intention (PI) (p=0.291. The results are displayed on Table 5.15.

Table 5.15. One-way ANOVA for Gender and Purchase Intention (PI)

Purchase Intention (PI)	N	Mean	F	Sig.
Female	167	17.455	1.42	0.291
Male	89	17.674		
Not to prefer say	3	11.666		

5.5.4. One-way ANOVA for Income and Purchase Intention (PI)

The analysis of variance is conducted between five groups of income levels and Purchase Intention (PI). The results show that there is no statistically significant difference between different income levels with p=0.197.

Table 5.16. One-way ANOVA for Income and Purchase Intention (PI)

Purchase Intention (PI)	N	Mean	F	Sig.
26.005,50 - 52.011 TL	58	19.1	1.52	0.197
26.005,50 TL and below	55	17.6		
52.011 - 78.016,5 TL	59	17.3		
78.016,5 - 104.022 TL	36	16.1		
104.022 TL and above	51	16.7		

5.6. Independent Sample T-Test

5.6.1. Independent Sample T-Test for Purchase Intention (PI)

An independent sample t-test was conducted to see the difference between "no picture" and "picture" purchase intentions depending on whether respondents had a picture on the product. The results show that there is no statistically significant difference between the two groups as p=0.303.

Table 5.17. Independent Sample T-Test on Purchase Intention (PI) Across Picture

		Statistic	df	p	Mean difference	SE difference
PI	Sample's t	1.03	257	0.303	0.839	0.812

Note: H_a $\mu_{no\ pic} \neq \mu_{pic}$

Table 5.18. Group Descriptives on Purchase Intention (PI) Across Picture

	Group	N	Mean	Median	SD	SE
PI	No Picture	143	17.8	19.0	6.38	0.533
	With Picture	116	17.0	18.0	6.65	0.617

An independent sample t-test was conducted to see the difference between participants' purchase intentions based on product type (hedonic-functional). The results show that there is a statistically significant difference between the two groups and p=0.022. Therefore, manipulation control questions can be considered successful with these results. When the manipulation control questions are examined, it is seen that the participants tend to buy more based on the functional product type.

Table 5.19. Independent Sample T-Test on Purchase Intention (PI) Across Product Type

		Statistic	df	p	Mean difference	SE difference
PI	Sample's t	-2.30	257	0.022	-1.85	0.802

Note: H_a $\mu_{no\ hedonic} \neq \mu_{functional}$

Table 5.20. Group Descriptives on Purchase Intention (PI) Across Product Type

	Group	N	Mean	Median	SD	SE
PI	Hedonic	126	16.5	17.5	6.42	0.572
	Functional	133	18.4	20.0	6.48	0.562

The differentiation of the participants' purchasing intentions for the olfactive family (orange-lavender) was examined. No difference was found in the independent sample t-test result (p=0.639). The results show that there is no statistically significant difference between the two groups as p=0.303.

Table 5.21. Independent Sample T-Test on Purchase Intention (PI) Across Olfactive Family

		Statistic	df	p	Mean difference	SE difference
PI	Sample's t	0.469	257	0.639	0.380	0.810

Note: H_a μorange ≠ μlavender

Table 5.22. Group Descriptives on Purchase Intention (PI) Across Olfactive Family

	Group	N	Mean	Median	SD	SE
PI	Orange	124	17.7	19.0	6.40	0.575
	Lavender	135	17.3	18.0	6.61	0.569

DISCUSSION

This study aimed to examine the effects of visual elements – especially images of scented objects, product types, and olfactory family representations – on consumers' mental odor images and the reflections of this imagery on purchase intention. As a result of quantitative analyses, it was observed that visual-olfactory images have a significant effect on purchase intention.

The research findings show that odor associations, especially those supported by visuals, create a stronger image in consumers' minds and that this imagery can affect behavioral tendencies. This result is consistent with previous studies in the literature such as Ji et al. (2016) and Xiao et al. (2020), supporting that visual and olfactory harmony increases the vividness of mental images and strengthens the emotional impact.

Overall, this thesis study demonstrates the power of intersensory interactions in marketing and provides concrete data on how an element that cannot be experienced physically, such as smell, can be effectively communicated through visual means.

IMPLICATIONS

The findings of this study have both theoretical and practical implications. Theoretically, the study supports multisensory integration frameworks in marketing and psychology by reinforcing the importance of visual-fragrance congruence in consumer perception. It opens avenues for further research on sensory synergy in product evaluation by emphasizing the importance of mental imagery as a mediator between visual input and consumer decision-making.

Practically, the results provide valuable insights for marketers, fragrance houses, FMCG companies and fragrance development managers. Using evocative visuals that is consistent with the scent on packaging, advertising, and digital platforms can increase perceived scent intensity and desirability, ultimately increasing purchase intention. For example, using tropical fruits for fruity scent families or floral motifs for romantic scents can effectively convey the essence of the product without the need for physical sampling. These strategies are particularly important in e-commerce, where consumers cannot directly experience the scent.

LIMITATIONS

Despite its contributions, the study has several limitations. The study relied on visual and imagined odors, not real odor stimuli. This limits ecological validity, as responses may differ in a real-world olfactory context. Uneven distribution across demographic categories (e.g., fewer participants over the age of 66) may have affected the robustness of some subgroup analyses. Data were collected digitally, which limits control for environmental factors that may affect screen size, attention, and imagery. Despite theoretical support, the moderator variables (product type and odor family) did not reach statistical significance. This may be due to the limited variability of responses or the nuanced nature of these moderator effects; this may require larger or more segmented samples for detection.

CONCLUSION

This study contributes to research in sensory marketing by highlighting the importance of multisensory integration (especially olfactory and visual congruence) in consumer behavior. By demonstrating that visual elements (specifically, images of scented objects and odor family representations, such as a lemon image on a lemon-scented hand soap package) significantly influence mental odor imagery and consumer purchase intention, the study highlights the powerful communication of scent through visuals. These findings not only support existing theories on intersensory perception but also provide practical guidance for marketers operating in virtual environments such as e-commerce. While acknowledging limitations related to ecological validity and sample size, the study provides valuable groundwork for future research to further explore the human brain mechanisms behind visual-olfactory congruence and its role in consumer decision-making.

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APPENDICES

Appendix A. Ethics Board Approval

THIS information is provided in print.

Appendix B. Abbreviations and Results

Constructs & Items	Statements	Results
	Visual-Olfactive Imagery (OLF)	
OLF1	When I look at this product, I perceive a scent.	Retained
OLF2	I sense a scent related to this product.	Retained
OLF3	When I see this product, a scent comes to mind.	Retained
OLF4	When I see this product, the scent comes to mind makes me feel clean.	Retained
OLF5	When I see this product, I can imagine a scent in detail in my mind.	Retained
OLF6	When I see this product, the scent that comes to mind is very clear.	Retained
OLF7	When I see this product, the scent that comes to mind is very strong.	Retained
OLF8	This product evokes a scent in my mind.	Retained
OLF9	When I see the product, I can imagine a scent.	Retained
	Need for Smell (NFS)	
NFS1	Some products need to be smelled first to be sure whether they are worth buying.	Removed
NFS2	The smell of products has a certain warning function for me.	Removed
NFS3	I can tell whether the ingredients of some products are real from their smell.	Retained
NFS4	I trust my sense of smell when evaluating products.	Retained
NFS5	When I smell a product, it helps me evaluate its quality.	Retained
NFS6	If I smell a product, I can get a better idea about it.	Removed
NFS7	The smell of some products makes me feel good.	Retained
NFS8	Smelling certain products is a pleasure for me.	Retained
NFS9	I enjoy smelling certain products.	Retained
NFS10	The smell of some products is an incentive for me to buy them.	Retained

NFS11	The smell of products affects my mood.	Removed
	Purchase Intention (PI)	
PI1	I use the product in this image.	Retained
PI2	I buy the product in this image.	Retained

PI3	The product in this image is a product I can buy.	Retained
PI4	I can imagine myself using this product.	Retained

Appendix C. Questionaire in Turkish

Sayın Katılımcı, Takip eden sayfalarda tüketicilerin ürünlerle ilgili değerlendirmeleri konusunda görüşleriniz sorulacaktır. Bazı sorular birbirine benzer ya da aynı görünebilir ancak her sorunun bir amacı bulunmaktadır. Soruların doğru veya yanlış cevapları yoktur. Bu çalışmaya katılımınız tamamen isteğe bağlıdır; katılmayabilirsiniz veya herhangi bir noktada bırakabilirsiniz. Bu anket kapsamında kişissel bilgileriniz talep edilmeyecektir. Cevaplarınız tamamen bilimsel amaçlarla kullanılacaktır. Anketin doldurulması yaklaşık 7 dakikanızı alacaktır. Sorularınız olursa bizimle temasa geçebilirsiniz. Katılımınız için şimdiden teşekkür ederiz.

Q1. Lütfen çalışmaya katılım durumunuzu belirtiniz.

• Evet, 18 yaşından büyüğüm ve bu çalışmaya katılmayı onaylıyorum.

• Hayır, bu çalışmaya katılmak istemiyorum

	Lütfen aşağıdaki ifadelere katılım düzeyinizi belirtiniz.	Kesinlikle katılmıyorum.	Katılmıyorum.	Kısmen katılmıyorum.	Ne katılıyorum ne katılmıyorum.	Kısmen katılıyorum.	Katılıyorum.	Kesinlikle katılıyorum.
Q2	Bazı ürünleri satın almaya değer olup olmadığından emin olmak için önce koklamak gerekir.	1	2	3	4	5	6	7
Q3	Ürünlerin kokusu benim için belirli bir uyarı işlevine sahiptir.	1	2	3	4	5	6	7
Q4	Bazı ürünlerin kokusundan, malzemelerinin gerçek olup olmadığını anlayabiliyorum.	1	2	3	4	5	6	7
Q5	Ürünleri değerlendirirken koku alma duyuma güvenirim.	1	2	3	4	5	6	7

Q6	Bir ürünü kokladığımda, kalitesini değerlendirmeme yardımcı olur.	1	2	3	4	5	6	7
Q7	Bir ürünü koklarsam, onun hakkında daha iyi bir fikir edinebilirim.	1	2	3	4	5	6	7
Q8	Bazı ürünlerin kokusu, benim iyi hissetmemi sağlar.	1	2	3	4	5	6	7
Q9	Belirli ürünleri koklamak benim için bir keyiftir.	1	2	3	4	5	6	7
Q10	Bazı ürünleri koklamaktan hoşlanırım.	1	2	3	4	5	6	7
Q11	Bazı ürünlerin kokusu, onları satın almam için bir teşvik edici etkidir.	1	2	3	4	5	6	7
Q12	Ürünlerin kokusu ruh halimi etkiler.	1	2	3	4	5	6	7
Lütfen gördüğünüz ürünü dikkatlice inceleyin.								
A								
B								
C								

D	 berrak. duş jeli Lavanta Özlü
E	 parla. Lavanta
F	 parla. Portakal
G	 parla. Lavanta
H	 parla. Portakal

	Lütfen aşağıdaki ifadelere katılım düzeyinizi belirtiniz.	Kesinlikle katılmıyorum.	Katılmıyorum.	Kısmen katılmıyorum.	Ne katılıyorum ne katılmıyorum.	Kısmen katılıyorum.	Katılıyorum.	Kesinlikle katılıyorum.
Q13	Bu ürüne baktığımda bir koku algılarım.	1	2	3	4	5	6	7
Q14	Bu ürünle ilgili bir koku hissederim.	1	2	3	4	5	6	7
Q15	Bu ürünü gördüğümde zihnimde bir koku canlanır.	1	2	3	4	5	6	7
Q16	Bu ürünü gördüğümde zihnimde canlanan koku bende temizlik hissi uyandırır.	1	2	3	4	5	6	7
Q17	Bu ürünü gördüğümde zihnimde detaylı olarak bir koku hayal edebilirim.	1	2	3	4	5	6	7
Q18	Bu ürünü gördüğümde zihnimde oluşan koku çok nettir.	1	2	3	4	5	6	7
Q19	Bu ürünü gördüğümde zihnimde oluşan koku çok güçlüdür.	1	2	3	4	5	6	7
Q20	Bu ürün zihnimde bir koku uyandırıyor.	1	2	3	4	5	6	7
Q21	Ürünü gördüğümde bir koku hayal edebiliyorum.	1	2	3	4	5	6	7
Q22	Ürüne bakarken '…..... ' kokusunu hayal ettim.							
	Lütfen aşağıdaki ifadelere katılım düzeyinizi belirtiniz.	Kesinlikle katılmıyorum.	Katılmıyorum.	Kısmen katılmıyorum.	Ne katılıyorum ne katılmıyorum.	Kısmen katılıyorum.	Katılıyorum.	Kesinlikle katılıyorum.
Q23	Bu görseldeki ürünü kullanırım.	1	2	3	4	5	6	7
Q24	Bu görseldeki ürünü satın alırım.	1	2	3	4	5	6	7
Q25	Bu görseldeki ürün benim satın alabileceğim bir üründür.	1	2	3	4	5	6	7

Q26	Kendimi bu ürünü kullanırken düşünebiliyorum.	1	2	3	4	5	6	7
Q27	Lütfen cinsiyetinizi belirtiniz. Kadın Erkek Belirtmek istemiyorum.							
Q28	Lütfen eğitim seviyenizi belirtiniz. Lise Üniversite (Lisans) Yüksek Lisans / Doktora							
Q29	Lütfen yaşınızı belirtiniz. 18-25 26-35 36-50 51-65 66 ve üstü							
Q30	Lütfen gelir durumu belirtiniz. 26.005,50 tl ve altı 26.005,50 - 52.011 tl 52.011 - 78.016,5 tl 78.016,5 - 104.022 104.022 tl ve üstü							

Appendix D. Questionaire in English

Dear Participant,

In the following pages, your opinions will be asked regarding consumers' evaluations of products. Some questions may appear similar or identical, but each has a distinct purpose. There are no right or wrong answers. Participation in this study is entirely voluntary; you may choose not to participate or may withdraw at any point. No personal information will be requested in this survey. Your responses will be used solely for scientific purposes. Completing the survey will take approximately 7 minutes. If you have any questions, you can contact us. Thank you in advance for your participation.

Q1. Please indicate your participation status in this study.

• Yes, I am over 18 years old and I consent to participate in this study.

• No, I do not wish to participate in this study.

	Please indicate your level of agreement with the following statements.	Strongly disagree. 1	Disagree. 2	Somewhat disagree. 3	Neither agree nor disagree. 4	Somewhat agree. 5	Agree. 6	Strongly agree. 7
Q2	In order to be sure whether some products are worth purchasing, I need to smell them first.							
Q3	The scent of products has a signaling function for me.	1	2	3	4	5	6	7
Q4	I can tell whether a product's ingredients are real based on its scent.	1	2	3	4	5	6	7
Q5	I rely on my sense of smell when evaluating products.	1	2	3	4	5	6	7
Q6	Smelling a product helps me assess its quality.	1	2	3	4	5	6	7
Q7	When I smell a product, I can form a better idea about it.	1	2	3	4	5	6	7

Q8	The scent of certain products makes me feel good.	1	2	3	4	5	6	7
Q9	Smelling specific products is a pleasure for me.	1	2	3	4	5	6	7
Q10	I enjoy smelling certain products.	1	2	3	4	5	6	7
Q11	The scent of some products encourages me to buy them.	1	2	3	4	5	6	7
Q12	The scent of products affects my mood.	1	2	3	4	5	6	7
Please examine the following product carefully.								
A								
B								
C								
D								

E								
F								
G								
H								
	Please indicate your level of agreement with the following statements.	Strongly disagree.	Disagree.	Somewhat disagree.	Neither agree nor disagree.	Somewhat agree.	Agree.	Strongly agree.

Q13	When I look at this product, I perceive a scent.	1	2	3	4	5	6	7
Q14	I feel a scent related to this product.	1	2	3	4	5	6	7
Q15	When I see this product, a scent comes to my mind.	1	2	3	4	5	6	7
Q16	The scent I imagine when I see this product evokes a sense of cleanliness.	1	2	3	4	5	6	7
Q17	When I see this product, I can vividly imagine its scent.	1	2	3	4	5	6	7
Q18	The scent that comes to my mind when I see this product is very clear.	1	2	3	4	5	6	7
Q19	The scent that comes to my mind when I see this product is very strong.	1	2	3	4	5	6	7
Q20	This product evokes a scent in my mind.	1	2	3	4	5	6	7
Q21	I can imagine a scent when I look at this product.	1	2	3	4	5	6	7
Q22	While looking at the product, I imagined the scent of "… .....".							
	Please indicate your level of agreement with the following statements.	Strongly disagree.	Disagree.	Somewhat disagree.	Neither agree nor disagree.	Somewhat agree.	Agree.	Strongly agree.
Q23	I would use the product shown in this image.	1	2	3	4	5	6	7
Q24	I would buy the product shown in this image.	1	2	3	4	5	6	7
Q25	The product in this image is one that I would consider purchasing.	1	2	3	4	5	6	7
Q26	I can imagine myself using this product.	1	2	3	4	5	6	7
Q27	Please indicate your gender. Female Male Prefer not to say							
Q28	Please indicate your level of education. High school University (Undergraduate)							

	Graduate / Doctorate
Q29	Please indicate your age. 18–25 26–35 36–50 51–65 66 and above
Q30	Please indicate your income level. 26,005.50 TL or below 26,005.50 – 52,011 TL 52,011 – 78,016.50 TL 78,016.50 – 104,022 TL 104,022 TL and above