İSTANBUL BİLGİ ÜNİVERSİTESİ

SOSYAL BİLİMLER ENSTİTÜSÜ

PAZARLAMA İLETİŞİMİ YÜKSEK LİSANS PROGRAMI

INDIVIDUAL DIFFERENCES IN OLFACTORY INFORMATION: THE NEED FOR SMELL SCALE

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ISTANBUL

2017

Individual Differences in Obtaining Olfactory Information: The Need for Smell Scale

Koku Bilgilerinin Edinilmesinde Bireysel Farklılıklar: Koklama İhtiyacı Ölçeği

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Tez Danışmanı: …Yrd. Doç. Dr. Barış Ursavaş.....

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Jüri Üyesi: … Doç. Dr. Emine Eser Gegez.....

Tezin Onaylandığı Tarih : ....08.06.2017.....

Toplam Sayfa Sayısı: ....81.....

Anahtar Kelimeler (Türkçe)

1) Ölçek geliştirme
2) Koku
3) Koku alma
4) Koklama ihtiyacı
5) Duyusal Pazarlama

Anahtar Kelimeler (İngilizce)

1) Scale development
2) Olfaction
3) Olfactory information
4) Need for smell
5) Sensory marketing

ACKNOWLEDGEMENT

I gratefully acknowledge the support and guidance of my supervisor, Asst. Prof. Barış Ursavaş. Without his contribution and great interest this thesis would never have taken shape. I am also grateful to Assoc. Prof. E.Eser Gegez for her contribution to the richness of this research. I am grateful to have spent time in their tutelage.

I am also grateful to the students of Bilgi University and anyone who has participated in this research by giving their time.

My thanks also go out for my parents and my brother, who have always been a great support and comfort for me. I am forever indebted to my family for giving me the opportunities and experiences that have made me who I am. This journey would not have been possible if not for them, and I dedicate this milestone to them.

I am extremely thankful to N.Utku Ertürk and to all my friends for helping me survive all the stress for two years and not letting me give up. It would have been a lot harder without their support. I should also thank Mert Erbil for his sharings and helpings.

Lastly, I extend my gratitude for my co-workers. I should take my supervisor Cengizhan Bilgin for encouraging me and my team leader Görkem Erdoğan for his patience, encouragement and understanding during the completion of my thesis and finally all the colleagues who participated with my research.

Any omission in this brief acknowledgement does not mean lack of gratitude.

TABLE OF CONTENTS

ABBREVIATIONS

ALT : Associative Learning Theory

NFS : Need for Smell

EFA : Explatory Factor Analysis

PCA : Principal Component Analysis

MSA : Kaiser-Meyer-Olkin

CFA : Confirmatory Factor Analysis

NFT : Need for Touch

TABLES

TEZ ÖZETİ

Bir kulaklığı elinize aldığınızda ilk önce dokusuna mı bakarsınız yoksa elinize alıp ağırlığını mı hissetmeye çalışırsınız? Kulaklığın yeni plastiğinin kokusu ilginizi çeker mi, yoksa kokunun hiç farkında bile olmaz mısınız? Kulaklığın pembe detayları aylardır aradığınız ürünü satın almadan mağazadan çıkmanıza sebep olabilir mi?

İnsanlar çevrelerinden gelen uyaranları değerlendirirken önceliklendirme yaparlar ve bazı duyu organlarından gelen bilgileri diğerlerinden gelen bilgilere yeğlerler. İşte bu tez insanların koklama duyusu yolu ile gelen bilgileri diğer duyu organlarından gelen bilgilere ne derece tercih ettiklerini anlamak üzere bir ölçek geliştirme amacını taşımaktadır. Tez, bireylerin çevrelerini, kişileri, mekanları ve ürünleri değerlendirirken koku duyusuna ne ölçekte başvurduklarını ve koku duyusundan gelen bilgilere ne derece ihtiyaç duyduklarını araştırır. Bu sebeple koku duyusu ve bireysel farklılıklar tezin odağını oluşturur.

Geliştirilen 16 maddelik ölçek bireylerin koklama ihtiyacını ölçmeyi amaçlar. Ölçeğin 16 maddesi toplamda 4 faktöre bağlanır. Bunlar; Hedonik Tercihler, Kişisel Tercihler, Anılar ve Satınalma Tercihleridir. Çalışmada Churchill'in ölçek geliştirme adımları takip edilmiş, güvenilirlik ve geçerlilik testleri uygulanmıştır. Çıktılar, duyusal pazarlama literatürüne paralel olarak sonuçlar bölümünde tartışılmaktadır.

Anahtar Kelimeler; Ölçek Geliştirme, Koku, Koku alma, Koklama ihtiyacı, Duyusal Pazarlama

ABSTRACT

If you take a headphone with your hand, would you first try to touch it or would you try to feel its weight? Would the smell of your earplug's new plastics attract your interest, or would you not even notice the smell? Would the pink coloring details of the headphone cause you to leave the store without buying the product that you have been looking for months?

People prioritize information when evaluating stimuli from their environment and prefer the information from some sensory organs to the information derived from other sensory organs. The primary aim of this research is to develop a scale to measure the degree to which people utilize information derived from the olfactory system in order to make evaluations, especially in marketing contexts. The thesis examines the extent to which individuals look for the olfactory information while evaluating their environment, other people, places and products. For this reason, the focus of the dissertation is to reveal individual differences when it comes to obtaining olfactory information from environmental stimuli.

The 16-item scale developed in this study aims to measure “the need for smell” of individuals. Overall, the items of the scale are linked to 4 factors, which are named as hedonic preferences, personal preferences, memories and purchasing preferences. In the study, Churchill's scale development procedure is followed along with necessary tests for scale reliability and validity tests. The conclusion section discusses study results in parallel with sensory marketing literature.

Key Words; Scale Development, Olfactory, Olfactory Information, Need for Smell, Sensory Marketing

INTRODUCTION

People perceive their environment through sensory organs, which collect and transmit information to the related areas of the brain in order to be processed (Krishna, 2011). In the sensory marketing literature, the sense of smell has attracted less research attention in comparison to other senses (Krishna, 2013). According to Miasma theory, scents were seen as the primary cause of diseases in Europe until the mid 1800. Even Sigmund Freud, who saw sexuality as the major influencer underlying human behavior, underestimated the importance of smell, and its possible connections to arousal (Avery, 2008). Although western cultures have historically ignored or underestimated the possible impact of smell on affection and behavior, eastern cultures developed more interest on the topic. For instance, it is well documented that ancient Egyptians used different kinds of aromas in their rituals (Krishna, 2013). Far East, members of a tribe in New Guinea drove their hands to each other's armpits to mean that 'my smell is with you' (Ozan, 2014).

Today, we know that the sense of smell plays a critical role in survival. It enables us to stay away from hazards, to find food, and to form social relationships (Stevenson, 2010). There are several studies conducted both on humans and animals that point out to the functional role of smell. For example, it is documented that animals find their dates by smell (Avery, 2008). Apparently smell serves in a similar fashion for humans, both in sexual or non-sexual relations. Several studies showed that people can successfully identify their partners' t-shirt by its smell. Moreover, newborn human babies are found to turn their heads in the direction of their mothers' breasts when they get the smell (Avery, 2008).

From a marketing point of view, although the use of smell in branding or new product development is not new, marketers' awareness in understanding the profound impacts of smell in consumer behavior is relatively new (Krishna, 2013). There has been a growing attention in scent marketing in the past decade or two. In today's modern market place, where product differentiation becomes even more difficult with each technological improvement, brands are trying to differentiate themselves and to establish emotional bonds with their customers through experiences evoked by sensory cues (Lindstrom, 2005). Various car manufacturers are promoting "new car smell" to enhance quality perceptions of their customers (Krishna, 2014). Starbucks does not allow any food consumption in its stores that can suppress the smell of coffee (Krishna, 2014).

Since that the literature on scent marketing is only in its emerging phase, there are many areas yet to be explored in this topic. First, it is mostly ambient scent, not product scent, that has been researched. Studies on ambient scent mostly focus on increase in sales, increase in time spent in the store or the perceived time spent in the store. The rationale in selecting these dependent variables can easily be understood since these factors are all relatively easy to measure. In studies where product scent is under scrutiny, the most studied variables are product memory and recall of product attributes. In these studies odor has been found to have a definite effect on various consumer behavior variables, such as purchase and recall of product attributes. What has not been measured in extent in the scent marketing literature, however, is the individual differences in reacting to odors.

Studies on culture, gender and age have established that odor sensitivity differs with each person. For instance, generally women are expected to be more sensitive to odors (Avery, 2008). But the sensitivity level changes if women are having their menstruation or if they are in the trimester period during pregnancy. Odor sensitivity changes with age too. Olfactory nerves wear out during aging and smelling functions are degraded. Threshold age for olfactory nerves to get aged is controversial. But it should be noted that it is only the ability not the importance of smell that decreases by age (Fox, 2009). Additional differences are observed between infants and grownups (Fox, 2009), and different cultural backgrounds (Krishna, 2013). It is clear that culture does not play any role on sensitivity or ability to smell but has a role on odor preferences (Krishna, 2013).

Beyond such general notions as age, gender and culture, there may be an even greater variability in responses to smell on an individual level. For instance, an old man might be more sensitive than a young man depending on the level of involvement. Or a man can be more responsive to certain smells than a woman of same age. So, beside the general notions noted above anyone can be sensitive to odors. Actually %20 of the population declare themselves as highly sensitive to smell (Childers, Cross, Lin, 2014). But it is also noted that people tend to vote themselves with a higher sensitivity to smell (Avery, 2008).

What marketers should explore more in depth is how individual differences affect scent applications, and how to manipulate scent perception when necessary. However, the road to understanding scent effects in marketing begins from the development of valid and reliable measurement scales to observe how people differ

in their responses to scents. The main objective of this dissertation is to fill this gap in the scent literature. Moreover, it is also the objective of this research to discuss individual differences in olfactory processing considering individuals' varying sensitivity to smell. People gather all kind of information through their sensory organs to build up a perception about their environment. Some individuals prefer the information obtained through olfactory system over the information obtained from other senses. This kind of people need the information of smell to perceive their environment. They may call themselves as highly sensitive individuals to smell but that does not necessarily mean that they seek for odor-related information when meeting a person, shopping or going on a date. The scale developed in this dissertation aims to identify individuals acting on the basis of their need of smell.

The framework of the dissertation is consisted of two chapters. Chapter 1 presents scent marketing literature related to this dissertation. Olfactory processing and individual differences are deeply discussed as an introduction. Since that smell has a unique connection to memory and emotions due to its physical closeness to the limbic system, it is important to reveal the dynamics of olfactory processing. As the last step of Chapter 1, scent marketing literature, its shortcomings and applications are discussed. In Chapter 2, the scale development process will be presented. The scale development process followed Churchill's (1979) procedure. The process took approximately 4 months to complete. It started with clarifying the main constructs, continued with in-depth interviews, generating an item pool, purifying the items, and conducting reliability and validity tests. The initial 56-item pretest scale is presented in Turkish but the 20-item final scale is presented both in English

and Turkish. The primary motivations in developing a Need for Smell (NFS) scale is to provide a better understanding and identification of individuals who seek for odor-related information, and to design a measurement tool that will enable marketers and researchers to manage and manipulate individual differences within academic and professional sensory marketing contexts.

CHAPTER 1: LITERATURE REVIEW

1.1. OLFACTION

1.1.1. Role of Olfaction

The daily lives of humans range from basic survival functions to more hedonic experiences. The role of olfaction is related to both functional and hedonic experiences (Lin, 2014; Royet et al., 2003; Warrenberg 2005). Olfaction has an effect on human behavior in various ways, such as enjoyment of foods, product and scent preferences and other complimentary experiences (Lin, 2014). As suggested in Stevenson's (2010) review paper there are 3 possible and main sections of the function of olfaction system; ingestive behavior, avoidance of environmental hazards, and social communication.

Distinguishing between edible and non-edible food by comparing the learned and the perceived flavor, identifying poisoned or spoiled food on the basis of odor are some of the functions of olfaction related to ingestive behavior (Stevenson, 2010). A smell can signal individuals if the object is approachable such as food, a flower, a potential mate or the object should be avoided such as a predator or poison (Axel, 1995). Such negative stimulus or environmental threats are divided into two categories; microbial and non-microbial (Stevenson, 2010). This discrimination is important because the emotion evoked can differ by the stimuli. Microbial stimulus such as feces, vomit, organic decay can cause disgust related emotions, while non-

microbial stimulus such as fire, predators, degraded air, poisons can cause fear related emotions (Stevenson, 2010).

On the other hand, a more hedonic dimension of olfaction is related to mate selection. The hedonic experiences and emotions associated with detection of odors (Yeshurun and Sobel, 2010) are one of the most dominant role of olfaction. In a recently conducted study, smell has been identified by females as the most important feature a man should have (Herz, 2007).

The above literature review posits that all the functions of smell are related to either the survival of the human or the sustainability of the species (Stevenson, 2010; Stevenson, 2011; Lin, 2010). The features of olfaction ensure that basic functions are working properly; salutary foods are selected, rotten and poisoned foods are avoided, the person is safe, and the perfect mate is selected.

Even though the role of olfaction is vital for human survival, people tend to underestimate the importance of smell in their daily lives (Martin, Apena, Chaudry, Mulligan & Nixon, 2001). The dominant role of smell has also been neglected by prior marketing researchers (Avery, 2008). Such accounts, however, do not lower the genuine value of olfaction (Morrin, 2010).

1.1.2. Biological Basics

The olfactory organ for humans is the nose. Biological structure of olfaction is quite complex and rather a slow process. Humans can distinguish an object visually in 45 milliseconds while it takes 450 milliseconds to distinguish an object by olfactory

cues (Henz & Engen, 1996). Remembrance of autobiographic memory is twice slower by smell cues compared to a visual or verbal cues (Goddard, Pring & Felmingham, 2005). Contrary, information obtained through olfactory system is more robust compared to other sensory systems (Herz, 2006). Olfactory process starts with the intake of the odor stimuli into the nose by breathing or sniffing. In the nasal cavity, these stimuli get caught by the olfactory receptors. With the arousal of olfactory receptors, they turn odor molecules into the electrical impulses. Impulses are first transmitted to the olfactory cortex, then to the limbic system. (The role of limbic system will be discussed in the next chapter).

The sense of smell dissociate from other senses in a few ways. One of these dissociations is the frequency of use. Unlike other senses, the sense of smell is more easily to be stimulated since that the olfactory receptors lie in the nasal cavity. That is, whenever people breathe, they take in olfactory stimuli to the nasal cavity. In other words, it would not be inaccurate to suggest that breathing is equal to smelling. Considering that an ordinary individual breathes 20.000 times per day on average, the importance of olfaction becomes even more apparent (Lindstrom, 2005). Although it is widely accepted that only %10 of the breathing air can reach up to the receptors (Avery, 2008). The molecules of olfaction are carried to the olfactory mucosa, immediately after the smelling. Olfactory mucosa is a coin-big area in the nasal cavity of the nose which contains olfactory receptors (Krishna, 2013).

Humans have 5 to 6 million olfactory receptors in their nasal cavity (Axel, 1995) while rabbits have 100 million receptors, and dogs, which are proven to be better at

smelling (Krishna, 2013) have 220 million olfactory receptors (Fox, 2009). Research indicates that the sense of smell is relatively weak in humans compared to other animals, yet the importance of smell preserves its place for human survival (Fox, 2009). The main difference between humans' and dogs' sense of smell (Krishna, 2013), is not in the variety but in the intensity of odors that is needed to be perceived (Ozan, 2014). Dogs can perceive 1000 times less intense odors compared to humans (Ozan, 2014).

There are 350 different kinds of olfactory receptors (Krishna, 2013). Each receptor sends a signal to the glomerulus, which is a spherical bulb responsible of building correlations between olfactory nerves and the brain. Various patterns occur with the activation of glomerulus, which corresponds to different types of smells. A permutation of 350 olfactory receptors yields to millions of different connections, which makes it even more difficult to comprehend the complexity of the system (Krishna, 2013). Olfactory receptors contain over 5 million neurons (Axel, 1995; Buck 2005) that can send impulses to the brain (Krishna, 2013). Neurons turn odor molecules into electrical impulses to be interpreted as liked or disliked at the end of the process (Krishna, 2013). These impulses are transmitted to the olfactory cortex of the brain, which is also responsible for identifying different smells (Krishna, 2013).

Axel and Buck's Nobel Prize winning research in 2004 on the identification of olfactory receptors discovered a family of 1000 different genes, which are responsible for different types of receptors. Sense of vision is coded only by 4 genes for comparison (Krishna, 2011).

Each receptor can distinguish more than one smell, also the reverse is valid. This causes even the tiniest chemical alterations to activate different receptors. For instance, even though octanol smells likes orange, a tiny molecular alteration causes it to become octanic asit, which smells like sweat (Ozan, 2014).

Axel and Buck's researches on the issue also suggest that the intensity of the source of the odor effects our perception of odor type. Such that, as low intensity of indole is perceived as flowery smell, high intensity of the same compound is perceived as rotten meat or feces (Ozan, 2014).

1.1.3. Odor Associations

Impulses directed from the receptors in the nasal cavity are transmitted to the limbic system of the brain. All senses interact with the limbic system (Herz, 2010). However, there are some unique qualities pertaining to olfactory processing.

All the other senses except the olfactory are first transmitted to thalamus, which is also an area of the limbic system. Impulses are filtered by thalamus and then transmitted to related areas of the brain to be processed properly (Herz, 2010). This, however, is an indirect transmission since a cognitive filter (Ozan, 2014) is involved. In contrast, olfactory nerves are directly linked to the amygdala-hippocampus without being transmitted through thalamus (Herz, 2010). Additionally, the olfactory nerve is separated from amygdala only by two synapses (Aggleton & Mishkin, 1986; Cahill, et, 1995; Krishna, 2013). Amygdala is a small, almond-shaped area of the limbic system, which is known as the control center for

emotions (Herz & Engen, 1996; Krishna, 2013). It is accepted to be unfeasible to experience, externalize and express emotions, and -due to its functional role in the configuration of long-term memories- to learn and remember information without proper functioning of the amygdala (Herz, 2010). Amygdala is also responsible for the activation of emotional reactions (Herz, 2010). Olfactory nerve is also separated from hippocampus by three synapses (Eichenbaum, 2001). "Hippocampus is involved in the selection and transmission of information in working memory, short-term and long-term memory transfer, and in various declarative memory functions" (Eichenbaum, 2001). In short, hippocampus is a part of memory processing and formation (Krishna, 2013). The physical closeness of the olfactory nerve, the amygdala and the hippocampus gives the olfactory system an advantage in terms of memory and emotion processing (Herz, 2010). Marketing research studies denote that information gained thorough the olfactory system lasts longer compared to the other sensory cues (Krishna, 2011), and emotional reactions and the olfactory system are bounded (Cahill ,et, 1995; Royel et al.,2003). These studies and their results will be discussed exhaustively in the further chapters. But the physical structure of the limbic and olfactory systems sheds light onto the reason why the above mentioned phenomenon occurs (Krishna, 2011). Neuroevolution research findings support the bound between olfaction and emotion. As stated in Herz's (2010) review paper, the structure of the limbic system (e.g., the amygdala and hippocampus) evolved out of the tissue that was originally olfactory cortex. Herz (2010) also states that the emotional and associative learning substrates of the

brain grew out of the tissue that was originally dedicated to the processing of the sense of smell.

1.1.4. Olfaction, Cognition & Emotion

1.1.4.1.Olfaction and Emotions

As stated in Lin's (2014) study detectable scents or odors can automatically induce emotions both for normal and sensitive individuals. As explained in the previous section, olfactory system has a privileged and superior access to the limbic system, which is one of the oldest and the most primitive sections of the brain (Fox, 2009). So, as Herz (2010) states, olfaction is phylogenetically our oldest and the most primitive sense. Limbic system sends the olfactory signals to the cortex, which is a region that produces cognitive responses (Fox, 2009). The system works as follows: when a person gets the smell of a stimulus object (e.g. vanilla), the brain automatically produces an emotional reaction to the smell before the person even identifies what the object is and eventually says "Oh, That's vanilla!" (Fox, 2009). When we see a landscape photo we start thinking like "Nice view of the see and the mountains. I remember visiting a place like this with my parents when I was a child. I felt happy back then." And we get sentimental. But if we are stimulated by the smell, the process is reversed. When a person smells an object, the immediate reaction toward the smell is hedonic (i.e. "I like/dislike it") in nature (Herz, 2006). The individual puts a smile on his/her face or an expression of pleasure if the smell

is pleasurable. The smell can remind the person of the mountains, and then he/she might think “It smells like the place that I have been to with my parents when I was a child. There was a sea and a lovely mountain.” (Ozan, 2014). The biological explanation of this phenomenon lies in the proximity and direct access of olfaction nerves to the limbic system as mentioned in the previous section (Aggleton & Mishkin, 1986; Cahill, et, 1995; Herz &Engen, 1996; Krishna, 2013).

The issue of categorizing emotions aroused by smell is rather controversial (Lin, 2014). Even though most researchers have accepted the view of dual dimension as pleasant/unpleasant (Herz, Schankler and Beland, 2004; Lin, 2014) there are also some specific emotions peculiar to smell. Happiness and relaxation are the examples of pleasant emotions while disgust, fear and anxiety are related to unpleasant emotions (Porcherot et al., 2010; Chrea et al., 2009). Pleasant odors can attract (Hummel and Nordin, 2005; +Lin, 2014) or relax us (Fox, 2009) or increase creativity (Fox, 2009). We tend to find average people more attractive if there is a presence of a pleasant odor (If the person is obviously attractive, then the effect of smell for attraction decreases) (Fox, 2009). A study shows that anxiety level of cancer patients who were undergoing MRI decrease by %63 when they were exposed to heliotropin (vanilla) during the process (Fox, 2009). Unpleasant odors can cause negative emotions such as disgust (Stevenson, 2011) to warn us (Hummel and Nordin, 2005; +Lin, 2014). Disgust is a basic emotion to prevent humans from the consumption of rotten/spoiled food to secure the survival (Stevenson, 2011). Unpleasant body odor or fragrance can decrease the attraction level. In addition, work conducted on people who have an obvious unpleasant odor suggests that it is

more likely for such people to be evaluated less professional by their peers (Fox, 2009). However, some studies categorize odor-elicited emotions in 5 dimensions; disgust-irritation, happiness-well-being, awe-sensuality, soothing-peaceful and energizing-refreshing (Chrea et al., 2009; Porcherot et al., 2010) while others point out cultural effects on specific emotions (Ferdenzi et al., 2011). The bond between olfaction and emotion is so strong that anosmia (permanent or temporary inability to perceive smell) is associated with depression and a sense of a dull/colorless world (Douek, 1988).

Studies on categorization reveal that emotional responses to odors are immediate and independent from cognitive control (Winkielman, Zajonc, and Schwarz, 1997; Russell, 2003), which again emphasizes that amygdala is the basis for the immediate response and the automaticity (Cardinal, 2002).

Research in consumer behavior suggests that pleasant or unpleasant smells can affect judgments (Chebat & Michon, 2003), purchase decisions (Bagozzi et al. 2000; 2 Lerner and Keltner 2000) and alter consumer behavior (Chebat and Michon, 2003; Bagozzi et al. 2000; Lerner and Keltner, 2000). As stated in Lin's dissertation (2014) "it is posited in these studies that the influence of emotions on behavior is determined by their valence". Using neurobiological data, Bechara (2005) also suggests evidence supporting the correlation between scent and decision making.

1.1.4.2. Olfaction and Memory

The biological relationship between olfaction and memory is explained in previous sections. But the aforementioned relationship was intuitively discovered by people long before it was verified by biological data. Authors like Proust calls for attention to odors in his books. “Proust phenomenon” is described as “The scent, when reintroduced, brought back memories” (Krishna, 2013).

Smell is not the only cue that has the ability to bring back memories, but obviously it is the strongest (Krishna, Lwin, Morrin, 2010). Memories evoked by smell are likely to be long-lasting (Aggleton & Waskett, 1999). Additionally, memories brought back by smell are more emotional compared to those evoked by other stimuli (Morrin, 2010).

As Herz states (1988, 2000), “empirical evidence regarding the ability of scent to enhance memory is only beginning to emerge.” In a study conducted by Krishna, Lwin, Morrin (2010) participants are divided into two groups. In one group, participants received a scented pen while the pens received by the other group were scentless. Then both groups were given a list, which described 11 various features of the pens. In 5 minutes, 24 hours and 2 weeks of intervals, participants were asked to write down the features of the pen as more as they could remember. Notice that, scent was not used as a stimulus during the remembrance task. Participants who were given the scentless pen were able to write less features compared to the other group. Additionally after two weeks, the scented group added 6 more features to the list, while the scentless group could add only 3 (Krishna, 2013). According to

the experiment's results, the scent of the product did not only increase the remembrance of the product, but the details about the product (Krishna, 2013). Another study shows that people have better memory when they are exposed to an ambient scent during deep sleep (Rasch, Buchel, Gais, & Born, 2007). The results show that the use of scent is not only effective by conscious awareness but also by subconscious processes (Morrin, 2010).

1.1.4.3. Olfaction and Learning

There are two opposite views on how odor preferences occur; innate view and learned view (Herz, 2006, 2010; Krishna, 2013). The innate view claims that people are born with preferences to like or dislike a specific odor (Herz, 2006; Krishna, 2013). The innate theory is widely supported by data obtained from studies conducted on animals. This view is not empirically proven on humans (Herz, 2006; Herz, 2010). There is some evidence that infants tend to move to the source of sweet scents instead of bitter scents (Krishna, 2013) or grimace when they taste quinine, and smile when they taste sweet (Herz, 2010). But again this preference is based on taste which is hardwired (Herz, 2010).

In contrast to the innate view, the more widely accepted learning view states that people develop preference to like or to dislike certain odors according to acquired emotional associations (Engen, 1988, 1991; Herz, Beland & Hellerstein, 2004). According to this view, what we have when we were born is only a tendency to learn to like or dislike specific odors (Herz, 2010). The scents generally considered

as being stinky such as feces or trash, and the scents considered as being nice such as flower or coffee, surprisingly was not stinky or nice when we were born (Krishna, 2013). These are the preferences acquired later in life. One-month old infants are not annoyed with the smell of feces because they did not learn that feces is something to be annoyed and conditioned by toilet training (Krishna, 2011). More importantly, they have not yet observed other people's reactions to such odors (Krishna, 2013). In 1958, researchers made babies smell feces and urine and did not observe an expression of disgust as normally expected from adults (Stein, Ottenberg, Roulet, 1958). Studies conducted on odor preferences present results coherent to the learned view. The results show that until the age of 5, children's response to odors differ from that of adults (Herz, 2006).

One other reason for the rejection of innate view is the biases. As Krishna (2013) states, "perception of odors are very easily manipulated with external cues." In 2001 (Herz &Clef) conducted an experiment. Participants entered two separate rooms within a week's break, one labeled as parmesan and the other labeled as vomit. Even though the smell of the rooms were no different (both rooms were scented with a mixture of isovaleric acid and butyric acid), participants who entered the room labeled vomit expressed annoyance, while the other participants quite enjoyed the smell (Slaton, 1997; Lin, 2014; Bulsing et al;2009). Visual cues may manipulate odor perceptions and preferences (Engen, 1972). In a study, scentless color was added to the food and beverages which led people to evaluate them more flavoury and intense (Dubose, Cardello & Maller, 1980). Zellner and Kautz (1990) found that color appropriate odor combinations were rated as more intense compared to

the ones that were only scented. Similarly participants rated red-colored white wine as smelling closer to red wine than white wine (Morrat et al 2000). This shows that individuals are more likely to recognize the smell in congruent colors (Fox, 2009). There is a lesson in the literature explained above for marketers. If marketing professionals want to eliminate unpleasant odors, they can simply label them differently to manipulate people's odor perception. Once a French producer mistakenly bottled two different kinds of party beverages in wrong bottles. To their surprise, they did not receive any complaints from customers. As Krishna (2013) states, no complaints were received simply because consumers' perception was misled by the label of the beverages. According to the learned view theory, the factors that cause differences in odor preferences are; personal experiences, historical reasons and cultural reasons (Krishna, 2013). Firstly, personal experiences are the unique experiences for each person. Odor preferences are personal because they are basically acquired experiences (Fox, 2009). For example, if you smell the scent of a lavender for the first time during a massage that you enjoy, you will probably like the smell for the rest of your life, even if you smell it independently from the massage center (Krishna, 2013). Another study shows that people who had a previous negative dentist experience tend to rate the smell eugenol (found in dentists offices) unpleasant and show negative responses such as fear, while the people who did not have a negative past experience rated the same smell positively and showed elicited neutral responses (Robin, Alaoui-Ismaili, Dittmat & Vernet- Mauri, 1998). Secondly, historical grounded reason may affect people's odor preferences. In a study in 1966, the smell of methyl salicylate

(wintergreen) received one of the lowest ratings by British participants (Moncrieff, 1966). The same study re-conducted in 1978 with American participants found that Americans rated the same smell positively (Cain & Johnson, 1978). Because wintergreen was used in analgesics medicines in England during the World War II, the smell reminded the British war-related memories and, therefore, these people associated the smell with negative feelings. Americans, on the other hand, did not have this kind of an experience so that they associated the smell with something sweet (Herz, 2010). Third of all; cultural reasons offer the most extensive evidence to the learned view theory. Odor preferences differ amongst cultures (Herz, 2007). The same smell can elicit different responses in different cultures (Herz, 2006). There is no common odor that evokes the same emotional responses in all cultures (Schleidt, Hold & Attila, 1981). It is known that the U.S. army's attempt to make a smell bomb failed due to the lack of a scent that would repel soldiers regardless of their culture (Dilks, Dalton & Beauchamp, 1999). For example, generally the smell of cheese is considered nice in Western-oriented countries, whereas the same smell is considered putrid (Herz, 2007). One other evidence on cross cultural differences in the interpretation of smell relates to home scents. The smell of a home is generally considered positive and nostalgic. When we notice a smell that reminds us of home, we feel home (Lwin, Wijaya, 2010). But which type of smell is regarded as home smell differs across cultures. This is supported also by the in-depths interviews conducted for this dissertation. Some participants suggested that each house may have its own unique smell, and that smell reminds them of people associated with that individual home.

The view that odor preferences are learned is based on the Associative Learning Theory (ALT), which is defined as "the process by which one event or item comes to be linked to another as a function of an individual's past experiences" (Wasserman, Miller, 1997). For example, imagine a stimulus object A and our response to this object as A+. Now, let's imagine another stimulus object, B, however, this time we do not have a specific response to B. If we are exposed to stimulus B through stimulus A, our response to A is still A+. However, this time, our response to B is also A+. Through learning and association, we react to B the same way as we react to A (Herz, 2010). The concept holds the same for odor preferences also. The fundamentals of olfactory associative learning depend on what has been experienced when the individual was first exposed to the smell, and what that individual recalls later (Engen, 1982; Herz, 2004, 2010). If a person is exposed to a smell for the first time during a pleasurable experience, that person will probably like the smell for the rest of his/her life (Herz, 2007).

Another support to associative learning view comes from the evolutionary theory (Herz, 2006). The theory views humans as generalists, who are born ready to learn to adapt to the environment. In that sense, humans are different from the specialist species who live in a particular environment, and are born with specific odor preferences to survive (Herz, 2006).

1.1.5. Olfaction and Individual Differences

Even though the past decade has witnessed an increase in research on scent marketing (Krishna, 2011) there is still a lack of studies on smell focusing on individual differences between consumers (Lin, 2014). One study suggests that %20 of the respondents rated themselves as sensitive to smells (Childers, Cross and Lin, 2014). So, it is apparent that further exploration is needed in this area.

Individuals' ability of odor detection, identification, and threshold can differ with age, gender, and personality (Larsson, Finkel and Pedersen 2000; Doty Shaman and Dann 1984). Due to the ability of smell, odor associated memory and emotions and personal hedonic preferences can differ greatly (Lin, 2014).

Research posits that our smell ability becomes fully functional when we are 3 months old in the womb (Herz, 2006). Research also suggests that newborns are highly sensitive to smell (Fox, 2009), and teenagers are 200 times more sensitive to smell compared to the mid-aged adults (Hagel & Singer, 1999). The sense of smell shows an increasing ability until the age of 8, goes fixed for a while, and then, shows a decline with aging (Fox, 2009). For example, the ability of ambient scent to enhance consumer expenditures in a shopping mall was found to significantly diminish among older shoppers (Chebat et al., 2009). The beginning age of decline in smell sensitivity is a controversial issue. While some studies claim that the decrease starts from the mid 20's, other studies claim that the ability of smell is connoted to physical and mental health, not age (Fox, 2009).

In-depths interviews conducted for this dissertation found that elder people trust more in their sense of smell. Moreover, elder people also stated that the importance of smell is increased in their daily lives, due to dramatic decrease in other senses.

Most research supports the view that women have a better ability than man in their sense of smell (Fox, 2009). They perform better in such tasks as odor detection, discrimination and identification (Fox, 2009). Menstrual cycle is claimed to be effective on women's sensitivity to smell. During ovulation the gap between women and men widens (Herz, 2006). A similar gap can also be observed amongst boys and girls. Girls perform better than boys at smelling tests (Fox, 2009). However, they do not show any differences in odor preferences (Herz, 2006).

One study has shown that shy people are more likely to be sensitive to smell (Fox,2009). Messages obtained through olfactory system may strongly alert smell sensitive people, which in turn cause such people to be uncomfortable and introvert (Fox, 2009).

Cultural effects on sensitivity to smell have attracted research attention but research found no empirical evidence that shows that ability of smell varies across cultures. But as explained in the previous sections, due to associative learning perception differs amongst cultures and there is no cultural consensus on liked or disliked fragrances. For example the smell of porridge may elicit sad memories for the Chinese since that it is a food delivered at the funerals. Or smell of fire can upset Indians since they burn their deads (Krishna, 2013). In China, new car smell is not found appealing so they leave green tea leaves in the car to remove the smell. Contrary, in the U.S. the same smell is considered not only desirable and pleasant

(Krishna, 2013), but also the most pleasant feature of buying a new car (Lindstrom, 2005). The smell of leather is associated with animals and dirt in Japan, whereas in U.S. it is associated with freshness and quality (Krishna, 2013).

Yet, it can be said that a general consensus across cultures on odor preference is present. For instance, scents associated with cleanliness, fruits and nature-related odors are generally accepted to be liked odors (Lwin, Wijaya, 2010). A similar pattern also exists for disliked odors; the smell of rubbish, rotten or spoiled food is considered unpleasant (Krishna, 2013). The notion behind this consensus is that; all the aforementioned categories are less associated with emotional learning. They do not cause emotional responses learned by personal experiences. So, if there is less emotional connection, the cultural gap disappears (Krishna, 2013).

A trained brain and a nose do matter for the identification (Fox, 2009) but not for the ability (Avery, 2008) of smell. Scent professionals are trained to be able to identify and classify different scents but they do not perform significantly better at threshold tests (Avery, 2008).

An individual's ability to smell may vary due to temporary causes such as smoking (Vennemann, Hummel and Berger, 2008), aging (Murphy, 2002), pregnancy (Cameron, 2007; Nordin et al, 2004). Chemotherapy treatments (Cameron, 2007; Nordin et al, 2004; Bernhardson et al, 2008; Steinbach and Hummel, 2009), side effects of drugs (Bromley, 2000), and some diseases (Le Floch, 1993) can also alter the ability to smell (Lin, 2014). Pregnant women or chemotherapy patients report physical reactions such as nausea, headache, chest compression or other allergic

reactions due to increased levels of smell sensitivity (Cameron, 2007; Nordin et al, 2004; Bernhardson et al, 2008; Steinbach and Hummel, 2009; Lin, 2014).

Although there is consensus in the literature that smoking alters the ability to smell, respondents in the in-depth interviews said smoking has no such effect on their abilities. However, one individual reported that his ability to smell has changed after quitting smoking.

In public, it is widely believed that preferences of and responses to odor change during pregnancy. On the other hand, no empirical study has been conducted to support this view (Herz, 2006). Alternatively, sensitivity to smell can change in the trimester period of pregnancy. Studies show that %61-67 of pregnant woman reported increased sensitivity to scents during their trimester, especially to stinky odors (Lin, 2014).

Marketers should be careful with the use of smell. As the sensitivity to a scent increases, people can get distracted by the scent. They will think more of the smell then the other promotions or the product itself (Lin, 2014). In our in-depth interviews respondents who declared themselves as sensitive to smell, mentioned that they get irritated with too much scent-stimulus during shopping experience and, thus, get distracted. They stated this irritation mostly cause them to leave the store earlier, sometimes even before the shopping is completed and even experience physical reactions like headache. But notice that these symptoms occur only when there is too-much scent.

1.2. SCENT MARKETİNG

Krishna defines sensory marketing as “marketing that engages the consumers' senses and affects their perception, judgment and behavior.” (2011). Consider the experience of going to the library. As soon as you enter the library noises seem to be toned down. The books are organized neatly. You reach for a book and you grab it. You may perceive the smell of the book. These are some examples of why going to the library is a unique experience. Some events showed that people prefer going to the library and feel the “real books” instead of reaching e-sources even though online sources are more easily accessible (Krishna, 2013). The reason for this preference lies in the engagement of our senses, which elicit an experience.

Sensory marketing can help to create a unique bonding and emotional engagement between the brand and consumer (Lindstrom, 2005), define consumer perceptions of abstract notions of the product and affect the perceived quality (Krishna, 2011). Sensory triggers may become unconscious triggers, which can be more effective to attract consumers compared to salient words or sounds (Krishna, 2011).

Even though we experience brands by using all of our senses (Lindstrom, 2005), marketing professionals seem to be stuck in a paradigm; most of the promotion activities seem to be focused on sight and sound (Lindstrom, 2005). In an experiment conducted by Lindstrom and Brown (2005) respondents stated the importance of their senses in the following order; sight, smell, sound, touch and taste. As seen here, none of the senses are being excluded and smell comes right after vision. But the sight and sound oriented sensory marketing approaches cause

marketing professionals to miss out some potentially key aspects of successful branding and promotion activities. This positive bias toward sight and sound leads consumers to face too many visual and auditory stimuli, which in turn causes a dramatic decrease in consumers' attention to commercials and other promotional stimuli. Since an average consumer is exposed to 86,500 television commercials per year (Ries & Ries, 2002) marketers now have even more reasons to find new ways to attract consumer attention and interest if they want to differentiate their market offerings in a successful fashion.

Some companies already started to integrate sensory applications into their marketing promotions. One of the oldest examples is a project undertaken by Singapore Airlines in 1973. While the other airlines focused on functional promises such as cabin design, food, comfort and pricing, Singapore Airlines promoted a complete flying experience as entertainment. From the styling and colors used on flight attendants' uniforms to how the attendants should smile and interact with passengers, the company redesigned all relevant elements in its service to create a fully sensory experience. Later, in the 90's the company announced and integrated "Floridian Waters", a new sensory element, to enhance the sensory quality of its service (Lindstrom, 2005). The aroma was sprayed into the cabin as well as on hot towels, and even on flight attendants' uniforms (Krishna, 2010). Since the 70s many companies have used promotional activities that engage senses (Krishna, 2013). For example Axe Dark Temptation deodorants aired a commercial that promoted the irresistibility of chocolate (Krishna, 2010). Some other companies have taken into account senses to develop new and exciting product features. For example, most

detergent brands have begun to add lemon scent to their products after discovering the positive response of consumers to fruity scents rather than soapy scents (Krishna, 2010).

Yet, there are still many questions to be answered by sensory marketing literature, and there are so much to be discovered on the effects of sensory stimulus on consumer behavior. Happily, recent years have witnessed an increase in research interest on sensory marketing (Krishna, 2011). As Krishna stated (2011) "in the past two decade some consumer behavior researchers have incorporated elements of vision, touch, audition, smell and taste in their research." As Peck and Childers states (2008) posited "out of the 81 sensory studies in consumer behavior focusing on taste, touch, smell, and hearing, over one third (28) have been published within the last 5 years".

Within the sensory marketing literature, scent marketing is an under researched area. However, there has been a growing attention on this topic as well (Morrin, 2010). Scent marketing is described as using scents "to set a mood, promote products or position a brand" (Vlahos, 2007).

Scent marketing can differentiate the brands and improve consumers' satisfaction levels as well as sense of well-being in the marketplace (Morrin, 2010). Researchers and marketers are trying to understand how the evaluation of smells relates to product judgments, purchase experience, and various other dimensions of buyer behavior (Lin, 2014). "The challenge that marketers face is how to utilize the properties of scents effectively, both in terms of cost and in terms of efficiency" (Krishna, 2013). Scent marketing implies that the presence of certain smells can

arouse emotion of potential customers (Krishna, 2013). There are a couple of dimensions of using a scent as a tool for marketing (Morrin, 2010).

Firstly, a scent can be used as a primary product attributes (Morrin, 2010). Primary product attributes refer to product or ambient scent where an odor is the primary attribute in buying a product, such as body perfumes or room sprays (Morrin, 2010). However, it is a controversial issue if a fragrance can be a trademark for a brand. It seems that non-functional scents seem to be appropriate for a scent trademark (Krishna, 2013). For example, an orange juice producer cannot use the orange fragrance as a trademark but a car company can (Krishna, 2013). This means that a scent can be used as a secondary attribute to create discrimination (Krishna, 2013) or to enhance product memory (Morrin, 2010). Secondary product attributes refer to products where a scent is not the main objective to buy a product but it still is a distinctive feature, as in the smell of play-dough (Morrin, 2010). A different and distinctive trademark such as a logo, sound could be experienced as a secondary product attribute, too (Krishna, 2013). One last topic should not be ignored; a scent signature only works if the consumer is able to smell product directly (Krishna, 2013).

Thirdly, there are other creative ways of using scents in promotional activities (Krishna, 2013; Morrin, 2010). One method of using scent properly is through the use of scent strips. Companies started to use printed paper with a fragrance for promotional campaigns (Krishna, 2013). Direct marketers insert smelling microcapsules to mails that becomes active when the mail is opened (Pffanner, 2007). In a collaboration of Starbucks and Omni Hotels, blueberry muffin scent

strips were printed on the USA Today newspapers, which were conveniently found at the hotel lobby (Elliot, 2007). The use of scent strips is a tricky issue, though. A New Yorker politician who attached scent strips to the mailings found that garbage smell – one of the most disliked scents- was emitted from the mailings once they were opened (Krishna, 2013). Ellen and Bone's study (1998) showed that scratch-n-sniff patches had no significant effect in product evaluation, and if the smell is incongruent it had a negative effect. The effect of congruency will be discussed in the next chapters.

1.2.1 Ambient Scent

One of the most researched areas of scent marketing in recent years is ambient scents. Ambient scent refers to scent emitted into air in hotels, retail stores, casinos or restaurants as an element of an environment's atmospherics (Kotler, 1973), and is accepted to be extraneous cues (Bosmans, 2006) rather than a way to transmit product features to consumers (Mitchell, Kahn & Knasko, 1995). Many studies posit that ambient smells have the potential to affect consumer behavior in various ways (Morrin & Ratneshwar, 2003).

It is believed that ambient scents create a positive mood and lead to better store and product evaluation, which results in higher sales figures (Morrin, 2010). For instance, DobuleTree Hotel prepared fresh chocolate chips and placed them somewhere near the customers during their check-in process. Managers aimed to create a home-feeling atmosphere as soon as the customers arrived at the hotel

(Krishna, 2013). A similar application of ambient scent was also conducted by British Airways. They placed Meadow Grass scent in their business lounges to provide a comfortable environment for their customers (Bosmans, 2006). In parallel with these applications, one study has found that the ambient scent can lead to better store and product evaluation (Spanberg, 1996). The findings of another study back-up the notion that consumers may misattribute the positive emotions elicited by the smell to the product or to the store (Bosmans, 2006; Crowley, & Henderson, 1996). Alternatively, some studies claim that the relationship between ambient scent and consumers' mood is weak (Morrin, 2010) and sales figures can be high- if the smell is perceived as pleasant and if there is no music in the background. If there is a music playing in the store the effect of ambient scent vanishes (Morrin et al, 2005). Congruency between ambient scent and the store/product might have an impact on evaluations (Morrin, 2010). One study showed that when there is congruent versus incongruent ambient scent, consumers can spend more time getting product information (Mitchell, Kahn & Knasko, 1995). In a clothing store, sales were found to increase when men's section was scented with masculine smell and women's section with feminine smell. In contrast, Spangenberg, Graohman, Sprott & Tracy (2006) and Morrin & Chebat (2005) found that the observed effect is presented only for impulsive buyers. Another study showed that the amount of money that consumers spend can be increased if there is congruent ambient scent. Another study suggested that product or store evaluations increase in the presence of pleasant smell only if there is congruent background music (Spanberg, Graohman & Sprott, 2005).

The relation between ambient scent and memory is controversial. A study found that users look much longer to the product packages on the computer screen when there is a pleasant smell in the environment (Morrin, Ratneshwar, 2002, 2003; Morrin, 2010). This implies that a pleasant smell in the environment may lead to better brand recognition and retrieval (Morrin, 2010). One study showed that ambient scent may retrieve memories and affect product decisions (Kahn & Knasko, 1995), and enhance product evaluation. The study showed that there is no difference between the use of ambient scent and no scent at all on memory but if there is a smell, congruent smell performs better compared to incongruent odor. One other study "found that memory for (recalled) verbal statements was better with an incongruent ambient odor vs. a congruent odor only if the odor was present at both encoding and retrieval" (Krishna, 2012).

Ambient scent can also manipulate the perceived time spent in the store, not the real time. It is found that perception of duration shortens in the presence of pleasant ambient scent (Spangenberg, Crowley, Henderson 1996). In a study focusing on real time spent in the store, researchers found that the actual time spent in the store has increased %15 within the presence of a pleasant smell compared to no smell (Gueguen & Petr, 2006).

Overall, it can be said that ambient scent plays a significant role on product evaluations. In fact Bosmans (2006) states that pleasant ambient scents may be more effective on product evaluations than other environmental factors.

One other issue in ambient scent literature is the cross studies. Some studies show that when there is too much stimuli, consumers get distracted or overwhelmed, and

especially in the scope of smell, sensitive consumers can get irritated. In Morrin and Chebat's study (2005) it was found that the lowest amount of money was spent when there was background music and a pleasant smell in the environment. Also scent adaptation might be a challenge for scent marketers (Pierce, Wysocki, Aronov, Webb, Boden, 1996). As olfactory receptors can get tired when exposed to a permanent odor, consumers -especially in perfume stores or restaurants- can get odor-impaired after being in the store for a while (Krishna, 2013).

Even though effects of ambient scent are relatively clear, how ambient scents effect product evaluations are not salient (Bosmans, 2006). Also deciding on ambient scent is not an easy task considering the difficulty in categorization of smells, and the difference in variety of stores, products and locations (Krishna, 2013). But before using an ambient scent, it should be considered whether to use or not to use an ambient scent (Krishna, 2013).

1.2.2. Product Scent

Research on product scent is more limited compared to research on ambient scent (Krishna, 2013). Product scent can enhance memory associated with the product (Krishna, Lwin and Morrin, 2010), enhance the perceived quality (Krishna, 2013), and increase product evaluation (Fox, 2009). In a practice, product scent is used for memory retrieval. Westin Hotels use scented pencils in the hotel rooms. For later consumers will sense the smell and recall the West-in Brand wherever they use the pencil again, if the consumers take the pencil with themselves while leaving the

hotel (Krishna, 2013). In a study, participants received the same two shampoos, except their smell. One shampoo was scented with a pleasant odor and the other one was scentless. Later, participants were asked to rate both shampoos. The scented shampoo evaluated higher, and respondents reported that it was better for pouring, foaming and shining hair (Fox, 2009). Finally, the oldest product scent study showed that product scent enhanced the product evaluation. In 1932 Laird conducted a silk stocking test. In the study women evaluated silk stocking when they were scented in flower fragrance in a door-to-door survey. In another experiment, two identical Nike shoes were placed in the same two rooms. One of the rooms was scentless while the other was scented with a floral fragrance. Subjects were asked to fill out a questionnaire after leaving the rooms. It was found that %84 of the subjects preferred the product in the scented room and they estimated the price of it %10.33 higher than the product in the scentless room (Lindstrom, 2005).

In support of these findings, Proctor & Gamble claimed that its household cleaning product scented with lavender was perceived as more homely and feminine among its Latin-based customers (Krishna, 2013). Although product scent is found to result in more positive product evaluations, in-depth interviews conducted for this dissertation revealed that non-sensitive individuals do not seem to be effected by the product smell. Also, they do not tend to evaluate the products by their smell. On the other hand, sensitive individuals seem to be irritated by too much odor probably due to too much sensory stimulation. Lin's (2014) study revealed that strong odors may cause sensitive individuals to suffer from migraines when they are exposed to

too much sensory stimuli, and cause a negative impact on consumer well-being. This may sound controversial to Laird's silk stocking study in 1932, but one should also consider the amounts of stimulus information a consumer would be exposed to in the years 1932 and 2017. Sensitive individuals also get irritated when the smell is not congruent. One smell-sensitive participant interviewed by the author of this dissertation stated that he avoids buying promoted books as being specifically scented even though he likes smelling old books with no apparent reason. The key point here is the intensity and congruency of the product smell. The product smell is important for purchase decision among sensitive people even though they declare themselves as not being sensitive. But they can also show a greater response to smell, even physical reaction due to a higher sensitivity.

One other challenge relating to product scent is the way to promote it. Since there is no technology that transmits odor molecules through interfaces or televisions, marketers will have to find a way to overcome this challenge (Krishna, 2013).

CHAPTER 2: SCALE DEVELOPMENT

The review on sensory marketing and scent marketing literature indicates that empirical research on the subject is scattered and limited. Additionally there is need for more research on the individual preferences for obtaining product information through senses, and as Krishna (2011) states "we know very little about individual differences in the need for sensory perception or ability".

To date, a few attempts were made to measure the individual differences in the need for sensory information. The most robust one is the Need-for-Touch (NFT) Scale by Peck and Childers in 2003. The scale measures "individual differences in preference for haptic (touch) information". It is consisted of 12-items with two sub-scales; autotelic and instrumental. Autotelic need for touch represents a more compulsive way of touching as touch is defined as fun by individuals. However Instrumental need for touch represents a more focused, problem-solver way of touching. While senses of touch or the need for touch can be measured with the NFT Scale, other sensory scales are yet to be studied.

The above mentioned studies indicate that even though there is an increased level of attention for sensory marketing there is still much research to be done. This study concentrates on studying the concept of obtaining information through olfactory system and aims to produce a valid scale and fill a gap in this research stream.

The Need for Smell scale development study follows the guidelines proposed by Churchill (1979), and Anderson and Gerbing (1988). Churchill (1979) suggests an eight-step procedure for the development of measurement scales that includes item generation, measure purification and assessment of reliability and validity. To begin with, the domain of the construct is stated through an extensive literature research as stated by Churchill. As for the next step, semi-structured in-depths were held and surveys were conducted. Then, items derived from literature research were added to the results of qualitive and quantitive studies. Finally, the scale was purified in three stages. Firstly, a pre-test is conducted to purify the items and current available scales in the literature in order to check scale reliability. Then, the larger data is

collected and the scale is validated through a confirmatory factor analysis. Lastly, based on the results of the confirmatory factor analysis a revised version of the scale is developed and distributed to a new sample for revalidation. The details of the process is explained elaborately below.

2.1. Generation of Items

For generation of items, this study has used several techniques including explatory research. Firstly, the research covered an extensive search of the relevant literature, surveys, and scales. Then we looked through magazines, newspapers, web sites, books, TV programs and documentaries. The items collected were generally in English, but since our target group was Turkish, we carefully translated items into Turkish. The main problem in this step was that both sensory marketing and scent marketing topics are relatively novel and all the information that we were able to gather around was a bit scattered. We also conducted 9 in-depth interviews and 8 open-ended surveys. The participants consisted of 8 males and 9 females. The age of participants ranged from 16 to 75. Three of the participants were selected as foreigners (Dutch and German) while the rest 14 was Turkish. The participants were selected from various nations to assess whether there are any cultural differences in sensory perception. In-depth interviews started with open-ended questions. Participants were given information that they will be asked questions to understand their shopping behavior and odor preferences. We first asked generalized questions on shopping preferences to distract people from being too much focused on odor-

related subjects. After a while, smell related questions were directed to understand both smell-sensitivity and smell related shopping behavior of consumers. Sample interview questions included;

1- What is your primarily sense and why? / If you had to lose one sense which one would you choose to be lost?

2- What does smelling means to you in your daily life?

3- Do you have any obsessions about odors?

4 - How important is the sense of smell for your social relationships?

5- How important is the smell of products to you?

6- Which products do you purchase by considering their smell?

In some instances respondents were given scenarios to find out their real behaviors. These scenarios read as "You are going to a job interview. The room that you have been kept has a nasty smell and you had to wait there for a long time. Describe your mood when you are called for the interview.", "You hesitate to buy a product at the store and you seek for further information. The seller who has a nasty smell approaches you. How does the scent of the seller affects your shopping?", "You are on a public bus. Suddenly a man with a heavy smell appears and sits next to you. What would you do?"

Interviews lasted approximately 45 minutes on average. All the discussions are tape-recorded and then transcripted. The interviews were ended when the discussions started to generate similar results.

Because producing hand-written answers to survey questions may be a rather tiresome task for respondents, no questions regarding respondents' general

Table 2.1

Participants of Semi-Structured Interview

No	Age	Gender	Nationality	Self-sensitivity-declaration
1	59	Male	Turkish	Not sensitive at all
2	18	Male	Turkish	Highly sensitive
3	33	Male	Turkish	Sensitive
4	32	Male	Turkish	Highly sensitive
5	27	Male	Turkish	Not so sensitive
6	55	Female	Turkish	Highly sensitive
7	22	Female	Turkish	Highly sensitive
8	58	Female	Turkish	Highly sensitive
9	75	Female	Turkish	Sensitive

shopping tendencies were asked on open-ended questionnaires. All of the interviews and were conducted between 15 January- 10 March 2017. Out of 17 participants, females made up %52.04 and males %47.06. Out of 17 participants foreigners made up %17.65 and Turks %82.35. %5.9 of the 17 participants rated themselves as being “not-sensitive at all”, %17,7 “not so sensitive”, %29,4 “sensitive” and %47 “highly sensitive”.

As a next step, content analysis was held for in-depth interview transcripts and open-ended surveys. The results of the analysis is presented in Table 3.

Since the study was in the early stages of item development, we have tried to include all possible items, even the ones that have slightly different meanings, derived from the in-depths, surveys, literature and currently available scales. The final item pool consisted of 799 items. Finally the item pool was carefully edited to eliminate the

Table 2.2

Participants of Open-Ended Survey

No	Age	Gender	Nationality	Self-sensitivity-declaration
1	28	Male	Turkish	Not so sensitive
2	44	Male	Turkish	Sensitive
3	42	Male	Turkish	Sensitive
4	28	Female	Turkish	Not so sensitive
5	38	Female	Turkish	Highly sensitive
6	23	Female	Dutch	Highly sensitive
7	27	Female	German	Highly sensitive
8	27	Female	German	Sensitive

items with similar meanings or with no relevant connections to the topic. The final scale had 16 items derived from currently available scales, 40 items that were generated at the end of the content analysis. As a result a 56 item pre-scale was developed. The full scale, including each item with its respective source is presented in the Appendix A.

2.2 Data Collection

After defining the 56-item pre-scale, data was collected for a pretest in two steps. First; 56 item scale was distributed to a convenience sample of 104 participants. Each item was measured with 5-point Likert scale. All participants were students of the Advertising Department at Istanbul Bilgi Universtiy. The participants answered the questionnaires via face-to-face interviews. There are number of

reasons why this data collection mode is selected. First, it allows researchers to clarify the meaning of the individual items included in the scale if respondents find them ambiguous. Second, this method gives the chance of obtaining feedback from the research participants concerning both the content and format of the questionnaires. Third and last, it ensures %100 completion of the surveys.

Secondly, another research was conducted simultaneously with this research. The same 56 item scale was distributed to a convenience sample of 17 more participants. Again, each item was measured with 5-point Likert scales. The participants answered the questions similar to an in-depth interview. They were asked if the meanings were clear or what they thought about each item. This method provided some additional benefits as well as the benefits of the previous method. First, it gives a deeper understanding of how each item or the general view of the scale is perceived by participants. Second, it enables to exchange ideas about items. The results of the two research are combined after the collection of the data is completed.

Conducting two research simultaneously provided some benefits. The data collection period is shortened by two times, while obtaining better qualified insights on how the scale is perceived by the participants.

The data was collected in April, 2016. 119 people amongst 121 participants answered the question about gender. Of these 119 people, %46.2 was female, % 52.1 was male, and %1.7 was reported their gender as “other”. Average age of the respondents were 22.49.

2.3 Scale Purification

In order to assess the internal consistency and dimensionality/undimensionality of the items in this study, both a reliability test and an exploratory factor analysis (EFA) were conducted (Gerbing & Anderson, 1988). The 56 items measuring the need for smell construct have a high internal consistency, reflected by a Cronbach's alpha estimate of .945 No items were deleted at this stage.

Gerbing and Anderson (1988) mention the importance of EFA to purify multiple indicators of a construct for a manageable set of items. Therefore, EFA was conducted using a Principal Component Analysis (PCA) with Varimax rotation procedure in order to identify the factor structure of the scale. The Barlett's Test of Sphericity was found to be significant, and the Kaiser-Meyer-Olkin (MSA) estimate for the set was .823, indicating that the use of factor analysis is appropriate. Varimax rotation could not be completed in 25 iterations. The analysis generated 13 significant factors based on the criterion of eigenvalues greater than one, in total account for 72% of the total variance explained in the data.

Table 2.3
EFA Results for the 56 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13
Bence bir ürünün kokusu o ürün için oldukça önemlidir.	.835												
Ürünlerin kokıları benim için önemlidir.	.794												
Bir ürünün kokusu o ürün için oldukça önemlidir.	.788												

Table 2.3 – Cont.
EFA Results for the 56 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13
Ürünleri kokuları ile birlikte haturlarım.	.714												
Bir ürünün kokusu o ürünü kullanmaktan aldığım hazzı etkiler.	.695												
Kendi seçimimle gittiğim yerlerin güzel kokan mekanlar olmasına özen gösteriyorum.	.688												
Koku günlük hayatımda önemlidir.	.672												
Bir çok şeyi (ürünü, mekanı, kişiyi vb...) ayıranın koku olduğunu düşünüyorum.	.669												
Günlük hayatımda koku benim için olmazsa olmazdır.	.667												
Diğer insanlara nazaran kokulara daha fazla dikkat ederim.	.665												
Bir ürünü kokladıktan sonra verdiğim satın alma kararına daha çok güvenirim.	.665												
Yeni aldığım bir ürünü ilk defa kullanırken duyumsadığım bir koku benim için önemlidir.	.664												
Zaman zaman sırf güzel bir kokuyu duyacağımı bildiğim için belirli mekanlara gidebilirim.	.653			.473									
Koku benim için anıları çağıran güçlü bir unsurdur.	.647			.400									
Kişisel bakım ürünlerinde koku benim için çok önemlidir.	.642												
Ürünleri koklayarak alırım.	.638	-.446											
Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider.	.638												
Bir mağazadayken karşılaştığım ürünleri koklamak isterim.	.632	-.467											
Kokulu ürünlerin kişiye hitap etmesi gerektiğini düşünürüm.	.629												
Kokular bir süredir bulunmadığım yerlere dair anıları yeniden hatırlatabilir.	.628												

Table 2.3 – Cont.
EFA Results for the 56 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13
Eğer satın almadan önce ürünü koklayabilirsem, satın alma esnasında kendimi daha güvenli hissederim.	.628												
Bazı kararlarımı kokulara göre veririm.	.627												
Ürün satın alırken kokularına dikkat ederim.	.626												
Bir ürünü aklıma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim	.619												
Bir mağazada satın alacağım ürünü koklayamazsam ürünü alma konusunda isteksiz davranırım.	.603												
Günlük hayatımda kokulu ürünler kullanmayı tercih ederim.	.600					.459							
O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.	.588			-.425									
Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim.	.587												
Ürünlerin kokuları kişiseldir.	.584												
Daha güzel kokan bir mağazada satılan kıyafetler bana daha kaliteli gelir.	.584												
Bazı markaların mağazalarının güzel koktuğunu bilirim, bu yüzden alışveriş amacım olmadan da o mağazalara girebilirim.	.576												
Zaman zaman bir objeyi sadece kokusunu merak ettiğim için koklarım.	.570										.442		
Satın almadan önce mutlaka koklamam gereken ürünler vardır.	.567												

Table 2.3 – Cont.
EFA Results for the 56 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13
Zaman zaman bir objeyi sadece kokusunu merak ettiğim için koklarım.	.570										.442		
Satın almadan önce mutlaka koklamam gereken ürünler vardır.	.567												
Ambalaj içerisine konulan ekmek gibi bazı doğal ürünlerin kokularını alamamak bende yapaylık hissi doğurur.	.566						.425						
Daha güzel kokan bir ürün için daha fazla para ödeyebilirim	.564												
Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.	.563												
Yeni bir ürünü sevdiğimde muhtemelen kokusu sebebiyledir.	.561					.430							
İleride birliktelik kurmak isteyeceğim kişinin hoş bir kokusunun olması benim için önemlidir.	.551												
Bir mağazadayken her tip ürünü koklayabilmek benim için önemlidir.	.534												
Ürünleri koklamak eğlencelidir.	.525		.407										
Ürünün kokusu satın almamda bir etken değildir.	.521	.508											
Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.	.515	.509											
Satın almadan evvel istediğim gibi kokanı bulana kadar bütün ürünleri koklarım.	.509												
Satın alırken gıda ürünlerinin kokusuna dikkat etmem.													
Yeni bir kozmetik ve ya sağlık ürününü sevdiğimde muhtemelen kokusu sebebiyledir.	.475												
Ambalajı, fiyatı gibi özellikleri çok iyi olsa bile sevmediğim kokuya sahip ürünü satın almam.													

Table 2.3 – Cont.
EFA Results for the 56 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13
Ambalajı, fiyatı gibi özellikleri çok iyi olsa bile sevmediğim kokuya sahip ürünü satın almam.													
Parfümlü ürünleri tek tek koklamaktan rahatsız olduğum için aklımda bir seçenek ile mağazaya giderim.													
Bir çok objeyi sadece koklayasım geldiği için koklarım.			.447		-.431								
Sebze ve meyvelerin doğal olup olmadığını koklayarak anlarım.	.417		-.420										
Sevmediğim tip kokuları barındıran ürünleri asla satın almam.			-.415										
Yeni kitapları koklarım.													
Satın alma esnasında kokunun benim için tek önemi gıdaların bozuk olup olmadığını anlamaktır.					.423								
Ihtiyacım olmadığı halde sadece o anda kokusunu duyumsadığım için ekmek alabilirim.							.444						
Kitap gibi bazı ürünleri koklayabilsem internetten alışverişe daha sıcak yaklaşırdım.							.466		.508				
Aynı kategoriye ait ürünlerin (örn; temizlik ürünleri) kokularının benzer olmasını önemserim.													

6 of the items that did not correlate with any factors were removed from the scale, remining 50 items with a Cronbach's alpha of .953. Another EFA using a PCA with Varimax rotation procedure was conducted on the 50 item scale. The Barlett's Test of Sphericity was found to be significant and the MSA estimate for the data set was .881, indicating that the use of factor analysis is appropriate. The analysis generated

11 significant factors based on criterion of eigenvalue greater than one, in total account for 72, 5% of the total variance explained in the data.

Table 2.4
EFA Results for the 50 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11
Koku günlük hayatımda önemlidir.	.775										
Günlük hayatımda koku benim için önemlidir.	.762										
Kişisel bakım ürünlerinde koku benim için çok önemlidir.	.707										
İleride birliktelik kurmak isteyeceğim kişinin hoş bir kokusunun olması benim için önemlidir.	.650					.513					
Bence bir ürünün kokusu o ürün için oldukça önemlidir.	580										
Bir ürünün kokusu o ürün için oldukça önemlidir.	.547										
Günlük hayatımda kokulu ürünler kullanmayı tercih ederim.	.523										
Bir ürünün kokusu o ürünü kullanmaktan aldığım hazzı etkiler.	.487				.423						
Diğer insanlara nazaran kokulara daha fazla dikkat ederim	.463										
Ürünlerin kokuları benim için çok önemlidir.	.433										
Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.		.703									
Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.		.687									
Ürün satın alırken kokularına dikkat ederim.		.661									
Ürünün kokusu satın almamda bir etken değildir.		.635									
Satın almadan evvel istediğim gibi kokanı bulana kadar bütün ürünleri koklarım.		.618									
Ürünleri koklayarak alırım.		.607	.405								
Bir mağazada satın alacağım ürünü koklayamazsam ürünü alma konusunda isteksiz davranırım.		.528	.439								
Satın almadan önce mutlaka koklamam gereken ürünler vardır.	.416	.503									
Daha güzel kokan bir ürün için daha fazla para ödeyebilirim											
Ürünleri koklamak eğlencelidir.			.793								

Table 2.4 –Cont.
EFA Results for the 50 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11
Bir mağazadayken karşılaştığım ürünleri koklamak isterim.			.710								
Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider.			.675								
Zaman zaman bir objeyi sadece kokusunu merak ettiğim için koklarım.			.546								
Eğer satın almadan önce ürünü koklayabilirsem, satın alma esnasında kendimi daha güvenli hissederim.		.450	.523								
Bir çok objeyi sadece koklayasım geldiği için koklarım.			.520								
Bir mağazadayken her tip ürünü koklayabilmek benim için önemlidir.			.482								
Bazı markaların mağazalarının güzel koktuğunu bilirim, bu yüzden alışveriş amacım olmadan da o mağazalara girebilirim.				.863							
O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.				.849							
Zaman zaman surf güzel bir kokuyu duyacağını bildiğim için belirli mekanlara gidebilirim.				.835							
Daha güzel kokan bir mağazada satılan kıyafetler bana daha kaliteli gelir.				.474							
Kendi seçimimle gittiğim yerlerin güzel kokan mekanlar olmasına özen gösteriyorum.				.463							
Ürünlerin kokuları kişiseldir.				.427							
Koku benim için anıları çağıran güçlü bir unsurdur.					.799						
Kokular bir süredir bulunmadığım yerelere dair anıları yeniden hatırlatabilir.					.767						
Bir ürünü akluma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim			.407		.685						
Ürünleri kokuları ile birlikte hatırlarım.			.401		.487						
Yeni aldığım bir ürünü ilk defa kullanırken duyumsadığım koku benim için önemlidir.					.444						
Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim.	.429					.662					
Bir çok şeyi (ürünü, mekanı, kişiyi..vb) ayıranın koku olduğunu düşünüyorum.						.611					
Kokulu ürünlerin kişiye hitap etmesi gerektiğini düşünürüm.						.533					

Table 2.4 –Cont.
EFA Results for the 50 Item the Need For Smell Scale

	1	2	3	4	5	6	7	8	9	10	11
Bazı kararlarımı kokulara göre veririm.						.506					
Sevmediğim tip kokuları barındıran ürünleri asla satın almam.							.742				
Sebze ve meyvelerin doğal olup olmadığını koklayarak anlarım.							.527				
Bir ürünü kokladıktan sonra verdiğim satın alma kararına daha çok güvenirim.		.408	.439				.498				
Yeni bir kozmetik ve ya sağlık ürününü sevdiğimde muhtemelen kokusu sebebiyledir.								.679			
Yeni bir ürünü sevdiğimde muhtemelen kokusu sebebiyledir.								.669			
Ambalaj içerisine konulan ekmek gibi bazı doğal ürünlerin kokularını alamamak bende yapaylık hissi doğurur.								.444			
İhtiyacım olmadığı halde sadece o anda kokusunu duyumsadığım için ekmek alabilirim.									.767		
Satın alma esnasında kokunun benim için tek önemi gıdaların bozuk olup olmadığını anlamaktır.										.783	
Kitap gibi bazı ürünleri koklayabilsem, internetten alışverişe daha sıcak yaklaşırdım.											.755

Items that had low cross- loadings or/and loading on multiple dimensions were eliminated from the scale. But for further purification results of in-depth reviews were taken into account. Items that seemed to confuse participants were eliminated from the scale if they had low/medium cross-loadings. The items that had lower loadings with close meanings were eliminated. Single items with low/medium cross-loadings were eliminated too. The reaming items were carefully edited based on answers collected from the in-depth interviews.

The remaining 18-item scale had a Cronbach's alpha estimate of .851. The analysis generated 5 significant factors based on the criterion of eigenvalue greater than one,

and in total account for 72,2% of the total variance explained in the data. See table 5 for the results of EFA of 18-item-pretest.

Table 2.5
EFA Results for the 18 Item-pretest of Need For Smell Scale

	1	2	3	4	5
Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.	.843				
Ürünün kokusu satın almamda bir etken değildir.	.785				
Satın almadan evvel istediğim gibi kokanı bulana kadar bütün ürünleri koklarım.	.632				
Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.	.616				
Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim		.741			
Kişisel bakım ürünlerinde koku benim için çok önemlidir.		.725			
Günlük hayatımda koku benim için olmazsa olmazdır.		.708			
Günlük hayatımda kokulu ürünler kullanmayı tercih ederim		.688			
Bir çok objeyi sadece koklayasım geldiği için koklarım			.767		
Bir mağazadayken karşılaştığım ürünleri koklamak isterim	.435		.731		
Ürünleri koklamak eğlencelidir.			.728		
Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider.	.408		.606		
Bir ürünü akluma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim.				.787	
Koku benim için anıları çağıran güçlü bir unsurdur.				.762	
Ürünleri kokuları ile birlikte hatırlarım.				.673	
Zaman zaman sırf güzel bir kokuyu duyacağımı bildiğim için belirli mekanlara gidebilirim.					.862
O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.					.856
Bir çok şeyi (ürünü, mekanı, kişiyi..vb) ayıranın koku olduğunu düşünüyorum.		.472			.510

2.4. Data Collection

After purification of items, new data was collected from a larger sample of 443 participants in accordance with Churchill's notions. The data collection was conducted on a digital platform called surveymonkey. There are several reasons

why this platform was used to distribute the questionnaire. First, the digital platforms give a change to reach to a wider sample of participants in a short time. Second, compared to data input manually, digital platforms automatically transform the data for softwares in no time. The data collection lasted for a week during May 2017. 440 participants out of 443 who answered the age question provided a mean age of 31,4 with the maximum age being 70. Of the 443 participants, 37.7% were male, 60.7% were female and 1.7% reported their gender as "other".

2.5. Assessing Reliability and Validity

Similar to the procedure followed in scale purification, reliability was first checked via Cronbah's alpha estimate and found to be .819. Then EFA was conducted using a PCA with Varimax rotation procedure in order to identify the factor structure of the scale with a larger sample of items. The Barlett's Test of Sphericity was significant and the MSA estimate for the data set was .891, indicating that the use of factor analysis is appropriate. The analysis generated 4 significant factors based on the criterion of eigenvalue greater than one. Two items were dropped out of the study due to their low loadings.

A new EFA using a PCA with Varimax rotation procedure with the remaining 16 item was conducted. The Barlett's Test of Sphericity was found to be significant and the MSA estimate for the data set was .884, indicating that the use of factor analysis is appropriate. The analysis generated 4 significant factors based on the criterion of eigenvalue greater than one. These factors were named as; *hedonic*

preferences, personal preferences, memories, purchasing preferences. In total, they account for 63, 6% of the total variance explained in the data.

Table 2.6
EFA Results for the 16 Item of Need For Smell Scale using the data with 443 sample

	1	2	3	4	5
Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider	.839				
Bir mağazadayken karşılaştığım ürünleri koklamak isterim.	.776				
Bir çok objeyi sadece koklayasım geldiği için koklarım.	.770				
Ürünleri koklamak eğlencelidir	.709				
Kişisel bakım ürünlerinde koku benim için çok önemlidir		.737			
Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim.		.735			
Günlük hayatımda kokula ürünler kullanmaya tercih ederim		.669			
O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim		.606			
Zaman zaman sırf güzel bir kokuyu duyacağımı bildiğim için belirli mekanlara gidebilirim		.542			
Günlük hayatımda koku benim için olmazsa olmazdır	.419	.535			
Bir ürünü aklıma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim			.867		
Ürünleri kokuları ile birlikte hatırlarım			.779		
Koku benim için anıları çağıran güçlü bir unsurdur			.641		
Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir				.863	
Ürünün kokusu satın almamda bir etken değildir				.817	
Tüm ürün kategorilerinde ürünlerin kokularına dikkat ederek satın alırım				.558	

As the next step, a confirmatory factor analysis (CFA) was conducted to further assess the dimensionality, reliability and validity of the purified measures. 16 item measuring the need for smell are hypothesized to load on four dimensions that emerged as a result of EFA. The GOF Indices are at acceptable limits (comparative fit index (CFI): .939; normal fit index (NFI):910; root mean square error of approximation (RMSEA); .064).

Table 2.7
Standardized Item Loadings for Measures of Need for Smell

Item No	Item	Dimension	Standardized Loadings
Item 1	Urünleri koklamak eğlencelidir.	Hedonic preferences	.709
Item 2	Bir çok objeyi sadece koklayasım geldiği için koklarım.	Hedonic preferences	.770
Item 3	Zaman zaman bir objeyi sadece kokusunu merak ettiğim için koklarım.		Deleted in EFA
Item 4	Bir mağazadayken karşılaştığım ürünleri koklamak isterim.	Hedonic preferences	.776
Item 5	Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider.	Hedonic preferences	.839
Item 6	Yeni kitapları koklarım.		Deleted in EFA
Item 7	Urünleri koklayarak alırım.		Deleted in EFA
Item 8	Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.	Purchasing preferences	.538
Item 9	Urün satın alırken kokularına dikkat ederim.		Deleted in EFA
Item 10	Satın alırken gıda ürünlerinin kokusuna dikkat etmem.		Deleted in EFA
Item 11	Urünün kokusu satın almamda bir etken değildir.	Purchasing preferences	.817
Item 12	Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.	Purchasing preferences	.863
Item 13	Daha güzel kokan bir ürün için daha fazla para ödeyebilirim.		Deleted in EFA
Item 14	Ihtiyacım olmadığı halde sadece o anda kokusunu duyumsadığım için ekmek alabilirim.		Deleted in EFA
Item 15	Sevmediğim tip kokuları barındıran ürünleri asla satın almam.		Deleted in EFA
Item 16	Ambalajı, fiyatı gibi özellikleri çok iyi olsa bile sevmediğim kokuya sahip ürünü satın almam.		Deleted in EFA
Item 17	Eğer satın almadan önce ürünü koklayabilirsem, satın alma esnasında kendimi daha güvenli hissederim.		Deleted in EFA
Item 18	Bir ürünü kokladıktan sonra verdiğim satın alma kararına daha çok güvenirim.		Deleted in EFA
Item 19	Bir mağazada satın alacağım ürünü koklayamazsam ürünü alma konusunda isteksiz davranırım.		Deleted in EFA
Item 20	Kitap gibi bazı ürünleri koklayabilsem, internetten alışverişe daha sıcak yaklaşırdım.		Deleted in EFA
Item 21	Satın almadan önce mutlaka koklamam gereken ürünler vardır.		Deleted in EFA
Item 22	Bir mağazadayken her tip ürünü koklayabilmek benim için önemlidir.		Deleted in EFA

Table 2.7 - Cont.
Standardized Item Loadings for Measures of Need for Smell

Item No	Item	Dimension	Standardized Loadings
Item 23	Satın almadan evvel istediğim gibi kokanı bulana kadar bütün ürünleri koklarım.		Deleted in EFA – using a larger sample
Item 24	Kokular bir süre bulunmadığım yerlere dair anıları yeniden hatırlatabilir.		Deleted in EFA
Item 25	Koku benim için anıları çağıran güçlü bir unsurdur.	Memories	.641
Item 26	Bir ürünü aklıma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim.	Memories	.867
Item 27	Ürünleri kokuları ile birlikte hatırlarım.	Memories	.779
Item 28	Koku günlük hayatımda önemlidir.		Deleted in EFA
Item 29	Günlük hayatımda koku benim için olmazsa olmazdır.	Personal preferences	.535
Item 30	Günlük hayatımda kokulu ürünler kullanmayı tercih ederim.	Personal preferences	.669
Item 31	Kişisel bakım ürünlerinde koku benim için çok önemlidir.	Personal preferences	.737
Item 32	Genel olarak kokulu kozmetik ve ya sağlık ürünlerini kokusuz olanlara tercih ederim.		Deleted in EFA
Item 33	Bence bir ürünün kokusu o ürün için oldukça önemlidir.		Deleted in EFA
Item 34	Bir ürünün kokusu o ürün için oldukça önemlidir.		Deleted in EFA
Item 35	Urünlerin kokuları benim için önemlidir.		Deleted in EFA
Item 36	Bir ürünün kokusu o ürünü kullanmakan aldığım hazzı etkiler.		Deleted in EFA
Item 37	Yeni bir ürünü sevdiğimde muhtemelen kokusu sebebiyledir.		Deleted in EFA
Item 38	Yeni bir kozmetik ve ya sağlık ürününü sevdiğimde muhtemelen kokusu sebebiyledir.		Deleted in EFA
Item 39	Yeni aldığım bir ürünü ilk defa kullanırken duyumsadığım koku benim için önemlidir.		Deleted in EFA
Item 40	Ambalaj içerisine konulan ekmek gibi bazı doğal ürünlerin kokularını alamamak bende yapaylık hissi doğurur.		Deleted in EFA
Item 41	Satın alma esnasında kokunun benim için tek önemi gıdaların bozuk olup olmadığını anlamaktır.		Deleted in EFA
Item 42	Sebze ve meyvelerin doğal olup olmadığını koklayarak anlarım.		Deleted in EFA
Item 43	Bazı markaların mağazalarının güzel koktuğunu bilirim, bu yüzden alışveriş amacım olmadan da o mağazalara girebilirim.		Deleted in EFA
Item 44	Zaman zaman sırf güzel bir kokuyu duyacağımı bildiğim için belirli mekanlara gidebilirim.	Personal preferences	.542
Item 45	O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.	Personal preferences	.606

Table 2.7 - Cont.
Standardized Item Loadings for Measures of Need for Smell

Item No	Item	Dimension	Standardized L.
Item 46	Daha güzel kokan bir mağazada satılan kıyafetler bana daha kaliteli gelir.		Deleted in EFA
Item 47	Kendi seçimimle gittiğim yerlerin güzel kokan mekanlar olmasına özen gösteriyorum.		Deleted in EFA
Item 48	Ileride birliktelik kurmak isteyeceğim kişinin hoş bir kokusunun olması benim için önemlidir.		Deleted in EFA
Item 49	Diğer insanlara nazaran kokulara daha fazla dikkat ederim.		Deleted in EFA
Item 50	Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim.	Personal preferences	.735
Item 51	Bazı kararlarımı kokulara göre veririm.		Deleted in EFA
Item 52	Bir çok şeyi (ürünü, mekanı, kişiyi vb..) ayıranın koku olduğunu düşünüyorum.		Deleted in EFA-using a larger sample
Item 53	Kokulu ürünlerin kişiye hitap etmesi gerektiğini düşünürüm.		Deleted in EFA
Item 54	Urünlerin kokuları kişiseldir.		Deleted in EFA
Item 55	Aynı kategoriye ait ürünlerin (örn; temizlik ürünleri) kokularının benzer olmasını önemserim.		Deleted in EFA
Item 56	Parfümlü ürünleri tek tek koklamaktan rahatsız olduğum için aklımda bir seçenek ile mağazaya giderim.		Deleted in EFA

2.6. Discussion, Conclusion and Further Research

The several set of studies have revealed the process behind the development of Need for Smell scale. The NFS scale was purified and a scale model was presented. The studies suggest that NFS has 4 dimensions, covering individual preferences and memory dimensions of smell with high levels of reliability.

A number of limitations should be taken into account while evaluating the findings and implications of this study. A larger data with more homogenous age distribution

might improve the validity of the scale developed. Such a study might be appropriate for future research.

Another topic for future research could involve construct validity of the scale. Construct validity is a risky issue for the study since the subject has not been deeply researched and the norms have not been put forward. But a hedonism scale can be used to test the scale's convergent validity. Even though it is not defined as such, our foresight is that a hedonism scale might overlap with NFS scale. For example, items relate to the hedonic dimension of NFS scale represents fun seeking extent to evaluate products. This might be consistent with hedonic consumer behavior scales and there might be a positive relationship. To construct the scale's discriminant validity, a Need for Cognition (NFC) scale which seems to be in contrast with NFS in the behavioral context can be used. NFS and NFC are predicted to be irrelevant since that NFS is more related to the unconscious behaviors whereas NFC is related to cognitive behaviors. Also nomological validity of NFS should be backed up through various predicted relationships. More research for constructing validity is need to be done. Such validity studies might give marketers a tool for a better product or customer segmentation. NFS scale when used with other sensory scales might uncover what the brands' priorities should be. For example a car manufacturer might use NFS together with Need for Touch (NFT) scale to discover if the "new car smell" or "the texture of a car seat" becomes first for consumers. But NFS scale can be used on its own for product and customer segmentation. Most of the sensory marketing applications are designed as if all of the consumers of the

brand are the same. NFS can enable marketers to design such different marketing applications.

Another tricky issue is that the scale is studied only for normal population who is defined as healthy grownups with no or temporary smell disorders. The scale is not properly confirmed to be working with the people who are not included in the definition. Unfortunately, these people are less studied and mostly neglected in marketing literature even though this group of people matters providing a call for research. These people are more in numbers than marketers think and there is a huge possibility of obtaining great insight from the studies on non-normal population. First, supersensitive individuals might experience physical response in the presence of smell. This notion is addressed in literature and found by our studies and is important to figure out how it happens. Considering even normal population might show physical responses if the olfactory stimuli is too much, the issue calls for more research. Second, people who are suffering from temporary alteration with their sensitivity to smell, such as pregrants, cigarette smokers or patience who are undergoing chemotherapy are not included in the target group of the research. The sensitivity of smell for the regarded group might differ due to their temporary situations. Also it is widely accepted that the sensitivity decreased due to aging. However even though the existence of an unstable sensitivity, the need for smell might still be there. How does the need for smell get affected from temporary alterations call for another study. This kind of a study might reveal great insights on the relationship between the variable sensitivity of individuals and their need for smell.

Another agenda future research might involve compensation for olfactory information, in other words, odor imagery. Odor imagery is one of the hot topics in scent marketing and it would be interesting to see how the scale works or if it provides a useful tool for odor imagery studies.

Also it might be useful to conduct research on how the scale works if multiple sensory stimuli exist, such as auditory and haptic stimuli. The interaction of different sensory stimuli might affect both behavior and the answers given to the questionnaire. Prior research has shown that behaviors aroused by smell might alter in the existence of another stimuli (Krishna, 2013). If the consumers need for smell changes under multiple sensory stimuli, it should be asked how and when the change happens. The behavioral outcome under multiple stimuli might be searched in both qualitative and quantitative studies. This issue is important due to increasing attention of brands in using multiple sensory stimulations. The results of such a study might provide insights for brands on how to create the right level of stimulation. Even though too much stimuli might create a negative effect and a pushback, brands generally believe that the more is better. Such a study on the subject might correct this kind of wrong attitudes of brands.

Overall, the findings of the thesis provide insight on smell preferences and individual differences for the sense of smell. In this respect, it contributes to the sensory marketing literature. Results indicate clear evidence that some people give priority to the sense of smell during information processing. The thesis provides a tool for marketers who want to use smell implications in their promotions.

APPENDIX

A. 56-Item Pretest NFS Scale

Ürünleri koklamak eğlencelidir.	Peck & Childers, 2003
Bir çok objeyi sadece koklayasım geldiği için koklarım.	Current study
Zaman zaman bir objeyi sadece kokusunu merak ettiğim için koklarım.	Current study
Bir mağazadayken karşılaştığım ürünleri koklamak isterim.	Peck & Childers, 2003
Satın alma amacım olmasa bile ürünleri koklamak hoşuma gider.	Peck & Childers, 2003
Yeni kitapları koklarım.	Current study
Ürünleri koklayarak alırım.	Current study
Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.	Current study
Ürün satın alırken kokularına dikkat ederim.	Current study
Satın alırken gıda ürünlerinin kokusuna dikkat etmem.	Current study
Ürünün kokusu satın almamda bir etken değildir.	Current study
Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.	Current study
Daha güzel kokan bir ürün için daha fazla para ödeyebilirim.	Current study
İhtiyacım olmadığı halde sadece o anda kokusunu duyumsadığım için ekmek alabilirim.	Current study
Sevmediğim tip kokuları barındıran ürünleri asla satın almam.	Current study
Ambalajı, fiyatı gibi özellikleri çok iyi olsa bile sevmediğim kokuya sahip ürünü satın almam.	Current study
Eğer satın almadan önce ürünü koklayabilirsem, satın alma esnasında kendimi daha güvenli hissederim.	Peck & Childers, 2003
Bir ürünü kokladıktan sonra verdiğim satın alma kararına daha çok güvenirim.	Peck & Childers, 2003
Bir mağazada satın alacağım ürünü koklayamazsam ürünü alma konusunda isteksiz davranırım.	Current study
Kitap gibi bazı ürünleri koklayabilsem, internetten alışverişe daha sıcak yaklaşırdım.	Current study
Satın almadan önce mutlaka koklamam gereken ürünler vardır.	Current study
Bir mağazadayken her tip ürünü koklayabilmek benim için önemlidir.	Peck & Childers, 2003
Satın almadan evvel istediğim gibi kokanı bulana kadar bütün ürünleri koklarım.	Current study
Kokular bir süredir bulunmadığım yerlere dair anıları yeniden hatırlatabilir.	Cupchik et al. 2005
Koku benim için anıları çağıran güçlü bir unsurdur.	Current study
Bir ürünü aklıma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim.	Current study
Ürünleri kokuları ile birlikte hatırlarım.	Current study
Koku günlük hayatımda önemlidir.	Smeets et al. 2008
Günlük hayatımda koku benim için olmazsa olmazdır.	Smeets et al. 2008
Günlük hayatımda kokulu ürünler kullanmayı tercih ederim.	Current study
Kişisel bakım ürünlerinde koku benim için çok önemlidir.	Current study
Genel olarak kokulu kozmetik ve ya sağlık ürünlerini kokusuz olanlara tercih ederim.	Cupchik et al. 2005

Bence bir ürünün kokusu o ürün için oldukça önemlidir.	Current study
Bir ürünün kokusu o ürün için oldukça önemlidir.	Current study
Ürünlerin kokuları benim için çok önemlidir.	Current study
Bir ürünün kokusu o ürünü kullanmaktan aldığım hazzı etkiler.	Current study
Yeni bir ürünü sevdiğimde muhtemelen kokusu sebebiyledir.	Current study
Yeni bir kozmetik ve ya sağlık ürününü sevdiğimde muhtemelen kokusu sebebiyledir.	Cupchik et al. 2005
Yeni aldığım bir ürünü ilk defa kullanırken duyumsadığım koku benim için önemlidir.	Current study
Ambalaj içerisine konulan ekmek gibi bazı doğal ürünlerin kokularını alamamak bende yapaylık hissi doğurur.	Current study
Satın alma esnasında kokunun benim için tek önemi gıdaların bozuk olup olmadığını anlamaktır.	Current study
Sebze ve meyvelerin doğal olup olmadığını koklayarak anlarım.	Current study
Bazı markaların mağazalarının güzel koktuğunu bilirim, bu yüzden alışveriş amacım olmadan da o mağazalara girebilirim.	Current study
O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.	Current study
Daha güzel kokan bir mağazada satılan kıyafetler bana daha kaliteli gelir.	Current study
Kendi seçimimle gittiğim yerlerin güzel kokan mekanlar olmasına özen gösteriyorum.	Current study
İleride birliktelik kurmak isteyeceğim kişinin hoş bir kokusunun olması benim için önemlidir.	Current study
Diğer insanlara nazaran kokulara daha fazla dikkat ederim.	Webb et al. 2014
Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu bilmeliyim.	Current study
Bazı kararlarımı kokulara göre veririm.	Current study
Bir çok şeyi (ürünü, mekanı, kişiyi..vb) ayıranın koku olduğunu düşünüyorum.	Current study
Kokulu ürünlerin kişiye hitap etmesi gerektiğini düşünürüm.	Current study
Ürünlerin kokuları kişiseldir.	Current study
Aynı kategoriye ait ürünlerin (örn; temizlik ürünleri) kokularının benzer olmasını önemserim.	Current study
Parfümlü ürünleri tek tek koklamaktan rahatsız olduğum için aklımda bir seçenek ile mağazaya giderim.	Current study

APPENDIX B.

B. 18-Item NFS Scale

Sayfa Başlığı Ekle

Ürünleri koklamak eğlencelidir.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Bir çok objeyi sadece koklayasım geldiği için koklarım.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Bir mağazadayken karşılaştığım ürünleri koklamak isterim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

Tüm ürün kategorilerinde, ürünlerin kokularına dikkat ederek satın alırım.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Ürünün kokusu ürünü satın almamda bir etken değildir.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Benim için ürünlerin nasıl koktuğu satın alma sırasında önemli değildir.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Satın almadan evvel istediğim gibi kokan ürünü bulana kadar bütün alternatifleri klarım.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

Koku benim için anıları çağıran güçlü bir unsurdur.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Bir ürünü aklıma getirdiğimde onun kokusunu da kolaylıkla duyumsayabilirim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Ürünleri kokuları ile birlikte hatırlarım.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Günlük hayatımda koku benim için olmazsa olmazdır.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Günlük hayatımda kokulu ürünler kullanmayı tercih ederim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Kişisel bakım ürünlerinde koku benim için çok önemlidir.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Zaman zaman sırf güzel bir koku duyacağımı bildiğim için belirli mekanlara debilirim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. O gün alışveriş modumda olmasam bile güzel kokan bir mağazaya girebilirim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

. Yeni girdiğim bir ortamda kendime güvenimin yüksek olması için iyi koktuğumu meliyim.

kesinlikle katılıyorum

katılıyorum

ne katılıyorum ne katılmıyorum

katılmıyorum

kesinlikle katılmıyorum

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