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SMELL BASED MEMORY OF PLACE AND PERSON-SPACE RELATION

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SMELL BASED MEMORY OF PLACE AND PERSON-SPACE RELATIONS

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by

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ABSTRACT

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The aim of this study is investigating the recalling process of smell-based memory of place and analyzing the relations between remembered smell perception, emotion, memory associations, place meaning and place bonding. For Smell Memory Diary phase 30 young adults (between age of 20-30) were recruited through snowball method and 15 of the participants volunteered for Online Interviews for the second phase. Instrument design involved Critical Incident Technique and sensory interview methods. By triangulation of two methods, recall process of smell-based memory of places, its relationship with emotions and the role of smell perception on place meaning and place bonding are researched. Thematic analysis of the results suggest that remembered experience of smell affects emotions and memory associations, which result in meaning making process of places and place bonding, depending on the social attributes and physical context of the place. In conclusion, it is possible to create meaningful and memorable places by integrating smell perception into design.

Key words: Emotion, Place-bonding, Place Meaning, Place Memory, Smell Perception

ÖZET

KOKU KAYNAKLI MEKANSAL HAFIZA VE İNSAN-MEKAN İLİŞKİLERİ

Zengin, Didem

MFA, İç Mimarlık ve Çevre Tasarımı Bölümü

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Bu çalışmanın amacı koku kaynaklı mekânsal hafızanın hatırlanma sürecini ve koku hatıraları, duygular, bellek, mekanın anlamı, insan-mekan bağları arasındaki ilişkinin analiz edilmesidir. Veri toplarken kartopu örnekleme ile Koku Hafızası Günlüğü aşaması için 30 genç yetişkin seçilmiş ve içlerinden 15 kişi Çevrimiçi Röportaj aşamasına katılmak için gönüllü olmuştur. İki aşamanın da soru tasarımı kritik örnek tekniği ve duyuşal röportaj metotları kullanılarak yapılmıştır. İki farklı metodun triangölasyon ile koku kaynaklı mekânsal hafızada hatırlama süreci, koku duyusunun duygular, çağrışımlar, mekânın anlamı ve mekâna bağlılık/aidiyet arasındaki ilişkiler araştırılmıştır. Tematik analiz yöntemi ile, hatırlanan koku deneyiminin duygular ve çağrışımlar üzerinde etkili olduğu bulunmuştur. Bu durum mekânın sosyal özellikleri ve fiziksel bağlamına bağlı olarak, mekanların anlamlandırılmasında ve mekanlar-insanlar arasında bağ kurulmasında etkilidir. Sonuç olarak ziyaretçileri için anlamlı ve hatırdakalıcı mekanlar tasarlamak, koku duyusunun tasarıma katılmasıyla mümkündür.

Anahtar Kelimeler: Koku Algısı, Duygular, Mekânsal Hafıza, Mekanın Anlamı, İnsan-Mekan Bağları/Aidiyet

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LIST OF ABBREVIATIONS

C-Category

CIT-Critical Incident Technique

OI- Online Interview

P-Participant

R-Researcher

SMD- Smell Memory Diary

CHAPTER 1

INTRODUCTION

Smell is powerful on perception of living environment. The smells that we inhale, mostly unconsciously, have influence on our psychological state, social life and our relations with places (Classen et. al., 2002). Perception of smell is not only a chemical sense but also affective on emotions, associations and memories. Smells can evoke recollections of the past which create both positive and negative responses at individuals (Xiao et al., 2021). This strong sense has been undervalued in contemporary West and Classen et. al. (2002) express this situation as sense of “smell has been silenced in modernity” (p.4).

While sense of smell is largely ignored, sense of vision has become a dominant sense in perception of the world. Howes (2015) defines the sensory hierarchy in Western tradition, from “highest” to “lowest” as sight which is the “most informative, objective, rational, aesthetic, and civilized”, hearing, and “subjective, emotional, unaesthetic, animalistic/brute” senses of smell, tasting, touching (p.615). This sequence changes for different cultures. Architectural design was also affected by this disequilibrium and became an ocular-centric profession according to Pallasma (1996). Pallasma (1996) defends that architecture should integrate all the senses into experience of a space and meaning making process. Smells give specific identities to places, create relations between places and people based on emotions. Thus, the purpose of this study is to investigate the possible

relations between factors affecting smell-based memory of place, emotions and person-space relations.

With regards to the aim of the study, previous studies on smell perception (Xia et al., 2018), multisensory design (Altay, 2021; Spence, 2020), sensory anthropology (Howes, 2015; Beer, 2007), sociology (Stenslund, 2015; Low, 2013), environmental studies concerning smell regulation (Bull, 2017; Nicell, 2009), studies on smell use in retail (Malbasic & Choi, 2019; Doucé et al., 2014), urban smellscape studies (Xiao et al., 2021; Henshaw, 2013), studies on memory (Lewicka, 2008; Waskul et al., 2009; St. Jacques & Levine, 2007), emotions (Xiao et al., 2020; Li, 2019; Mclean et al., 2012), place attachment (Cheng & Kuo, 2015; Morgan, 2010; Shamsuddin & Ujang, 2008) and favorite place (Subiza-Pérez et al., 2021; Ratcliffe & Korpela, 2018; Korpela, 2001; K. Korpela & Hartig, 1996) were reviewed to guide this study based on literature. At the literature review, it was seen that there are smell studies in different disciplines and these studies supply in depth information on smell and emotions, memory, place perception at urban scale and person-space relations. Yet there are not any studies focused on the intersection of these notions. This study contributes to literature by focusing on this gap at architectural design and environmental psychology studies. It investigates whether remembered smell perception is affective on emotional responses, place meaning and place bonding regarding both public and residential spaces.

The study arose out of an interest in the impact of smells on recalling childhood memories, signature scents of brands, cultural smells belonging to activities of people and smells of streets in different cities. With the face masks of Covid-19 pandemic it was not possible to sense the smell of cities and this awareness on smell perception catalyzed the idea of researching person-space relations involving smell experience. Since smell perception is very powerful on evoking long term memories, this study dwelled into remembered smell experiences and place memories in order to search for influence of

smell on place meaning and place bonding. Within this study, it was not possible to remake specific smell mixtures from the memories of participants. Therefore, instead of providing mnemonic smells for evoking memories, the study focused on “remembered” smells at autobiographical memories which are investigated through Critical Incident Technique (CIT). Since smells may be used as powerful design tools in interior architecture and this study aims to increase the awareness of designers on sensory design, especially regarding sense of smell.

1.1. Aim of the Study

The purposes of this study can be categorized into three. The first aim of the study is investigating the factors which are important in smell-based memory of place. Second aim is to analyze the relation between smell-based memory of place and the emotions. The third aim of the research is exploring the role of sense of smell on person-space relations considering the notions of place meaning and place-bonding. The influence of smell perception on person-space relations under the scope of memory and emotions were not studied as within an integral framework. This study contributes to this literature gap by asking research questions with reference to the three aims and presenting perceptual patterns on smell memories, emotions and person-space relations.

The definition of place was not restricted in this study in order to gather varied number of different contextual places. Both interior and exterior spaces were accepted as a part of incidents. The participants of this study were young adults (20-30 years old) from Turkish nationality for preventing mixed effects of culture and age. Their emotions, associations and details of place memory regarding their remembered smell experiences were asked through Smell Memory Diaries (SMD) and Online Interviews (OI). The data was analyzed via qualitative thematic analysis method, where themes emerged from the data themselves.

1.2. Structure of the Thesis

The structure of the thesis study is as follows. The first chapter includes introduction of the research topic by presenting general content, aim and structure of the thesis. Chapter 2 covers the literature review on smell perception, emotion, memory relations, properties of smells, smellscape research, person-space relations under the scope of place meaning and place bonding. Chapter 3 presents research questions of the study, participants, setting, data collection methodology and data analysis methodology. Chapter 4 analyzes the results of the study by thematic analysis method and Chapter 5 includes discussion on the collected data, comparing two different data gathering methods. As the last chapter, chapter 6 concludes with limitations and suggests future research topics.

CHAPTER 2

LITERATURE REVIEW

It is not possible to experience and perceive a place totally without the involvement of all senses. In Western modern cultures visual cues are more dominant at the design and this situation is defined as hegemony of the vision by Pallasma (2012, p19). Yet Pallasma criticizes this by suggesting architects to recognize and integrate all senses into their designs. He emphasizes the significance of smell perception in design by asking “How can we articulate and specify the odors of the spaces we are designing?” (Pallasma, 2019, p. 25).

The definition of place is made by E. V. Walter as:

A place is a location of experience. It evokes and organizes memories, images, feelings, sentiments, meanings, and the work of imagination. The feelings of a place are indeed the mental projections of individuals but they come from collective experience and they do not happen anywhere else. They belong to the place. (Cited in Malnar & Vodvarka, 2004, p.xi)

Understanding a place as a whole is dependent on sensation and perception (Malnar and Vodvarka, 2004). Previous studies prove that senses function together and several parts of the brain process the sensory cues simultaneously in a multimodal nature (Howes, 2006). Sensation is the process of receiving sensory data from sense organs and sensory perception means the interpretation of data (Malnar & Vodvarka, 2004). Sensory perception and responses to any stimulus are classified into three: (1) direct physical

reaction, (2) a reaction regarding the previous experience with the source, (3) reaction to stimulus as it is defined at the memory along with a specific time and place (Malnar & Vodvarka, 2004). The first reaction type is involuntary while the second is dependent on the type and our comprehension of the source of stimuli. As an example to second type, familiar smells may be soothing while unfamiliar smells may cause annoyance or excitement. Finally, third is remembered sensations which are familiar and can remind other sensations and memories (Malnar & Vodvarka, 2004). Therefore, they are called as mnemonic sensations and they are produced by sensory imprinting. All the remembered sensations together form the place memory.

Places are archives of recollections and emotional attributes of a place give familiar aspects to the place (Malnar & Vodvarka, 2004). Moreover the action in a space as staying or moving away are determined by pleasantness level of the previous experience within the space (E. V. Walter, cited in Malnar & Vodvarka, 2004). Even though person-space relations are studied in literature frequently, studies regarding the impact of smell memory on these relations are limited.

Place meaning is formed through different range of positive/negative emotions and experiences of people at a place (Manzo, 2005). Emotions as responses to smell are researched and used at consumer behavior studies (Doucé et al., 2014; Doucé & Janssens, 2013). The ambience of a store including different sensory cues may affect “emotional responses” of consumers which may result in “approach” or “avoidance” responses. While approach response is positive, avoidance response stands for negative reaction to the place (Doucé et al., 2014).

Beer (2007) states that smells, perception of places by olfaction and impact of smells on spatial memory are undervalued study areas, while visual, acoustic and kinesthetic spatial perceptions were topics of research at anthropological studies. He

criticizes this situation since it is not possible to have a “smell neutral space” in natural conditions where people and environment constantly produce smells. According to psychological research results of cultural anthropologists, the presence or absence of smells have strong impact on emotions, memory, relationship with the environment within the notion of “smellscape”, as well as place meaning and place bonding (Beer, 2007).

2.1. Smell Perception and Emotions

Xiao et al. (2020) support that, smells are significantly effective on identities and meanings of places, they can manage to create bonds between people and places by emotions. They present smell experience as an intermediary that connects place, emotions (with memories and meanings involved) and society. In their study, Xiao et al. (2020) define “smellscape” as “a construct of relationship between human experiences of smells, the physical space and the context of place” (p.2) Emotions within the experience of spaces are notions that convey meaning to places (Tuan,1977) and they can be felt within spaces through senses of different degrees in different contexts (Davidson & Milligan, 2004). Emotional reactions are results of sensory stimuli within a place (Mehrabian and Russell, 1974), where perception is regarded as the core element of this relation. As Lefebvre (1991) states, understanding the environment around us is possible through moving within the environment with reactions of our sensory body and mind.

People can make sense of their social/physical environment by smell perception which makes the individuals assign meaning by memory associations. Rodaway (1994) explains sensory perception in two definitions. The first states that sensory perception is catching information from environmental stimuli by using senses. Sensory perception is the combination of sensory information, memory, associations, expectations according to the second definition by Rodaway (1994) which is a definition closer to mental process of

“cognition”. The detection process, in which the smell is defined, generally occurs unconsciously.

Beer (2007) defines reactions on smell perception as highly quick and emotional. The reason of this is explained by Verbeek and van Campen (2013) as the areas that are responsible for smell and taste within the brain are closer to the emotion centers (the amygdalae) of brain. The area that smells stimuli has direct route in brain is called as limbic region, it is where the emotions and memories are processed (Gilbert, 1995). The amygdalae are located close to the hippocampus which is responsible for collecting information from tracks of memory (Verbeek & van Campen, 2013). In an fMRI study by Herz (2004), it is found that personally meaningful smells activate amygdala more than personally insignificant smells, which proves the neurobiological relation between emotion in the course of an episodic recall and smell cue. Also, autobiographical memory research by Herz and Cupchik (1992) which use self-report of participants as an instrument prove the emotional power of smell-evoked memories which is discussed in the next section in detail (Chapter 2.2).

Mehrabian and Russell (1974) present that, sensory stimuli from environment cause emotional changes and these emotions create a reaction of either *approach* or *avoid* (Henshaw, 2013). In the book “Urban Smellscapes”, Victoria Henshaw (2013) summarizes the studies which research the impact of different smells that are introduced to a place, on individuals. The results of the studies show that in the scenario of adding a scent to an environment (Henshaw, 2013), smell experiences can cause physiological reactions (Herz, 2006), mood changing (Baron, 1997; Fox, 2006), relaxation at meditation as a part of aromatherapy (Buckle, 2014). Smells can also influence decision making process on people (Baron, 1983), on brands (Linstrom, 2005), on place/ environments (Wrzesniewski et. al, 1999), can cause behavioral changes as increase in working performance (Damian &

Damian, 2006, p. 152–153), cognitive performance (Moss & Oliver, 2012) and buying behavior by creating pleasant environments through scenting at marketing (Spangenberg et al., 1996).

Smells are powerful stimuli at the production of emotion in places (Xiao et al., 2020). A particular smell experience within a specific place may cause emotional reactions due to remembering a specific moment from past memories (Xiao et al., 2020). Memories which are recalled due to smell stimuli and thinking are effective on emotional reactions triggered by smell (Xiao et al., 2020). Engen and Engen (1997) express this phenomenon as an emotion about a smell becomes bonded to a specific stimulus or case.

The recollective attribute of sense of smell can generate “emotional attachments and associations”, negative recollections or positive and nostalgic associations (Henshaw, 2013, p.31). Davis (1979) defines nostalgia as a positive recollection of experienced past. Smell memories that evoke nostalgic feelings from childhood differ depending on the location and time of where childhood of an individual took place (Henshaw, 2013, p.31). In their research Waskul et al. (2009) ascertain that in most of the incidents favorite smells are connected to significant others (people), places and nostalgic emotions. Drobnick (2006) summarizes this phenomenon as smells are incomparable in triggering recall of distant memories and spaces and Xiao et al. (2020) emphasize the uniqueness of this emotion-memory link of smell experiences according to self/environmental perception of individuals.

The smell perception mechanism detects and categorizes smells as familiar or unfamiliar which may be evaluated as unpleasant (Porteous, 1990, p.24). This process works in two ways: as a protector from dangers and as a “hedonic agent” (Engen,1991). In short expression, any smell that is dangerous/toxic to health is unpleasant and positive/neutral smells are categorized depending on “idiosyncratic” nature of individual’s

memory (Engen,1991). In this detection process familiarity of a smell is analyzed regarding previous smell experiences and associations on danger level of the smell (Engen,1991).

Research by Schleidt et al. (1988) proves that familiar smells from memories with family/friends are defined with positive expressions while unfamiliar smells are narrated with negative expressions. This differentiation of familiarity varies in each individual and there are studies which analyze varying factors of “themed preferences” (Henshaw, 2013) such as: age (Hirsch 2006), nationality (Schleidt *et al.*1988, Damhuis 2006), gender (Wysocki &Pelchat 1993) and familiarity of the place. Familiarity of place in terms of smellscape is defined by Henshaw (2013) as “smell genetics of place” or a “unique olfactory pattern” that involve a mixture of smells at a place (p.33). The familiar smellscape may be unnoticed by people who experience it every day or frequently (Henshaw, 2013). Awareness of smell perception is high when smells are unfamiliar and unexpected (Beer,2007). Other factors that influence themed preferences are “context” which may change the properties of smell at different places and “expectations” of individuals (Henshaw, 2013).

Anderson and Smith (2001) state that emotions and feelings are not only produced by visuals or linguistics. In the experience of a place, feedbacks of emotions intervene the social interactions between people and space, thus reflect how people respond to their living environment (Davidson & Milligan, 2004). As Xiao et al. (2020) express positive or negative emotions and resulting behaviors are becoming research topics increasingly for designing more meaningful spaces. Somatic aspects of emotions which are sensory experiences, are significant in recognizing how someone feels within a space (Trnka, 2012). There are studies (Hemsworth, 2016; Logan, 2016) which experiment emotional-spatial relations regarding other sensory cues such as sound but very few on smell-emotion-space explorations are realized (Mclean et al., 2012).

In their study Xiao et al. (2020) realize a smell-walk activity at a railway station in which data on smell perception of participants are collected by “walk-along interviews” with the purpose of researching emotions triggered by smell in real-life environment. In the study, modifiers used by participants to express their emotions are “happy, familiar, relaxing, annoying, good, calming, soothing, pleasant, unpleasant, appropriate, inappropriate, nice, strange, pleasing, bothered, free, negative, unhealthy, artificial, normal, clean, fresh, stale and neutral” (p.4). The authors emphasize the multimodality of language and emotions at the expression of a smell experience. As a result of the study, they define patterns and at the end of analysis they define smell as a “spatial-emotional intermediary, bridging interpersonal experiences of smells and social-spatial structure of place” (p.8).

2.2. Smell Perception and Memory

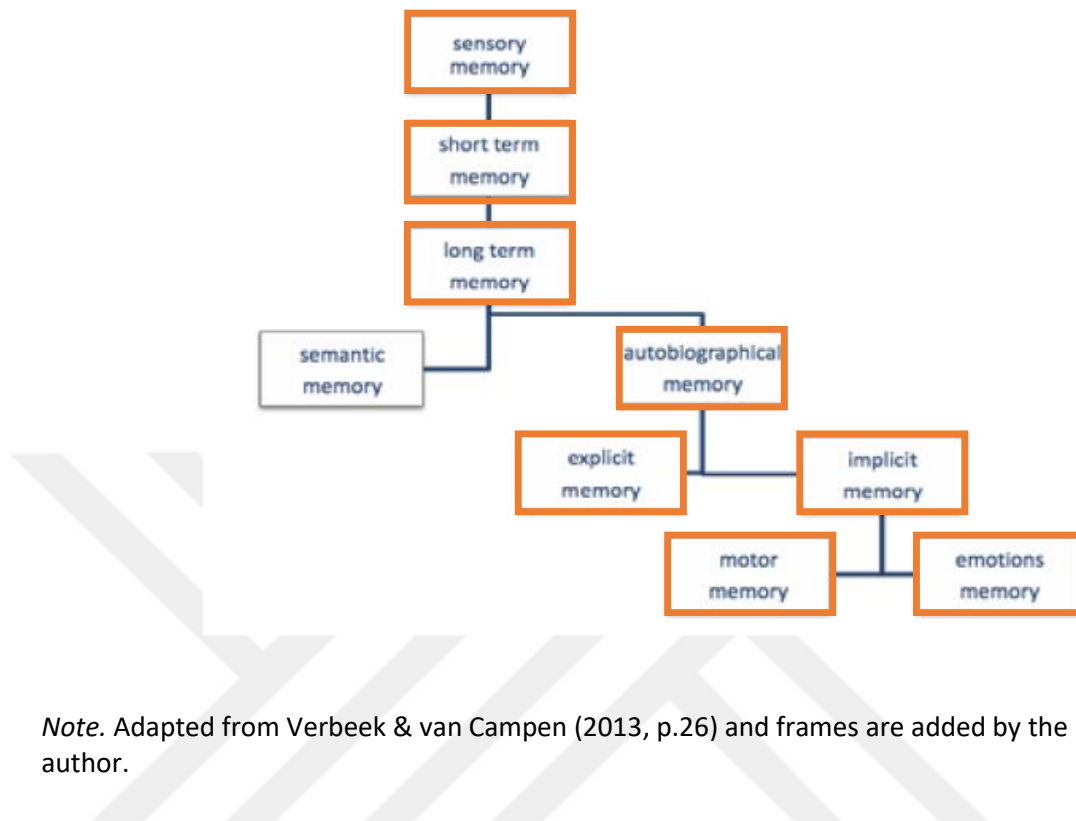
Perception of smell is highly evocative on autobiographical and collective memories. In his book *“A la Recherche du Temps Perdu”* Marcel Proust (1917) explains the experience of the main character who tastes a madeleine cake dipped in a lime tea. The aroma of this taste brings him back in time to his memories forgotten for a long time which helps to recall also emotions and colors from his childhood. Proust further defines this sense memory as a part of involuntary memory (Verbeek & van Campen, 2013). He claims that visual cues or verbal expression of a recollection cannot have the same impact of chemical senses: smell and taste. Referencing the Proust Phenomenon, this chapter will further explain the relation between smell perception and memory.

Verbeek and van Campen (2013) present the categorization of human memory types in a scheme (Figure 1) and explain by referencing to Proust Phenomenon. The sensory input of aroma is stored as sensory memory for a limited time to be transferred to short term memory. At short term memory, the information is placed into a context and

transferred into long term memory. Long term memory involves two parts as semantic memory and autobiographical memory. Semantic memory stores general information such as date of the day or location of an individual (Verbeek & van Campen, 2013). On the other hand, autobiographical memory which is also called as episodic memory retains memories of different episodes from an individual's life (Verbeek & van Campen, 2013). Episodic memory is separated into two parts: explicit and implicit memory where explicit memory involves "conscious, factual information" on previous events. The implicit memory includes recollections that are difficult to express verbally such as "feelings and gestures" (Verbeek & van Campen, 2013, p.136). Implicit memory also has two branches of emotional and motor memory. As emotional part contains "physical feelings, moods and other emotions", motor memory part includes "actions that we are barely aware of". When a smell stimulus is taken the orange-framed-path encompassing motor and emotional memory is activated (Figure 1).

Figure 1

Categorization of memory types



Note. Adapted from Verbeek & van Campen (2013, p.26) and frames are added by the author.

There are two modes of understanding the world for people: experiencing and thinking mode which are also grounded on dual process theories in cognitive psychology (Evans, 2008, p.256). Kahneman (2011) defines this as two selves of people: experiencing self that lives in the moment through perception of the world directly by five senses which are vision, hearing, touching, taste and smell. There are also “senses of direction and balance, kinesthetic proprioception, pain, and internal body functions including feelings and emotions” (Stock & Kolb, 2021, p.5). The second self is remembering/thinking self (Kahneman, 2011) which is composed of recalled memories of previous experiences. These experiences are interpreted with specific meanings by cognitive interpretation process and more permanent in nature compared to experiencing self (Stock & Kolb, 2021).

Beer (2007) summarizes psychological studies that investigate smell-memory relation in literature into four groups of research. First group is recognition tests in which smells are given to participants and names/sources of the smells are asked. In these studies, participant suddenly has a familiar emotion due to recognition but cannot recall the name/source which is a situation named as “tip-of-the-nose effect”. In the second group of studies, participants are exposed to certain smell stimuli, then for a long period they are exposed to visual/aural stimuli in cross-modal laboratory experiments. These experiments show that recollections associated to smell are more emotional than other sensory cues (Herz & Chupchik, 1995), yet due to intertwined nature, it is not possible to resolve whether the memory or the smell cue causes the emotion (Herz, 2004). At the third group of studies, participants are asked to recall, express their smell memories without presenting any real stimuli and connected associations are asked. The last group of studies involve asking participants to think of a smell without imagining the source visually, in which the challenge of verifying mental images born. Therefore, there is no valid information on the possibility of nonvisual imagination of smell in memory or possibility of dreaming smells (Beer, 2007).

The results of previously presented psychological studies suggest that long term recognition of some smell memories is generally very good, because smell experiences are mostly undivided and distinct events such as scenes, people or places. (Beer, 2007). Effect of verbal encoding and practice on smell memory storage are highly limited (Beer, 2007). Therefore, first reactions to smell are generally non-verbal at first. Smell memories are not easily affected by subsequent experiences of learning which is called as “retroactive interferences” by Richardson and Zucco (1989, p.356). That means first associations created about a smell type is learnt and it is powerful enough that no other associations are easily made to the same smell (Herz, 2004). Behavioral, emotional, memory-based reactions to certain smell types are learnt at early childhood and they are mostly not open to change

(Beer, 2007). Referring to this, most of the smell evaluations are learnt at initial periods of social life and encounter of a culture (Beer, 2007). These learnt sensuous experiences form the identity of a person (Low, 2013) and results in expectances regarding recollections on smell (Rodaway, 1994).

Negative reactions due to smell are generally direct and uninterrupted by any other knowledge (Engen, 1991, p.8). These memories are persistent. Also, if the smell experience is associated with a positive phenomenon at the first encounter with the specific smell type, the emotional reactions to the smell are positive (Beer, 2007). Independent of being positive or negative, both reactions to smell and related associations of smell memory are highly rapid than expected and unavoidable. As Classen et al. (1994, p.2) claim “A scent associated with a good experience can bring a rush of joy. A foul odor or once associated with a bad memory may make us grimace with disgust.” At this point, familiarity to smell is another evaluation factor, in experiments familiar smells are classified as positive by participants (Engen, 1991, p.13).

The names of the smells are stored in explicit memory which works for conscious memories and the smell experiences which involves unperceived incidences are stored in implicit memory (Beer, 2007). Semantic, procedural and episodic memory types also work at the smell storage. The language and information related to smell perception are stored in semantic memory. Episodic memory stores some autobiographically significant perception of smells as full “episodes” which refers to “Proustian phenomena” (Chu & Downes, 2000). Episodic memory creates link between emotionally meaningful incidents and smell experiences without the awareness of the person, then transfer these links to implicit memory which render them up when the person is exposed to the same smell memory (Köster, 2002, p.33). As Beer (2007) states referring to the book of Proust (1913) “À la Recherche du Temps Perdu”, those autobiographically significant emotional memories

are individual based but some of them have collective practices with “shared cultural meaning” at base, such as visiting a hospital, visiting a school or attending to cultural rituals.

Most of the smell perceptions occur unconsciously (Köster, 2002). Even though the smell stimuli are removed from the environment or perceived without awareness, its reactions on behavior and mood changing still occurs (Köster, 2002). Beer (2007) exemplifies this by incense smells of churches which creates emotions and memory associations of previous rituals, or the pleasant smells used by brands for increasing consumption. The perception of a place physically or in terms of social attributes is highly affected by sense of smell, yet the cognition and reactions to smells are dependent on context which is a situation creates doubt on the validity of laboratory research results considering real life situations (Beer,2007).

Autobiographical place memories are categorized into two by Knez (2006) in terms of temporal scales: a sequence of events in a summarized version and single, particular events. Further Knez (2006) suggest that experiences that are expressed as summarized versions are mostly significant and favorite places.

2.3. Properties of Smell and Smellscape Research

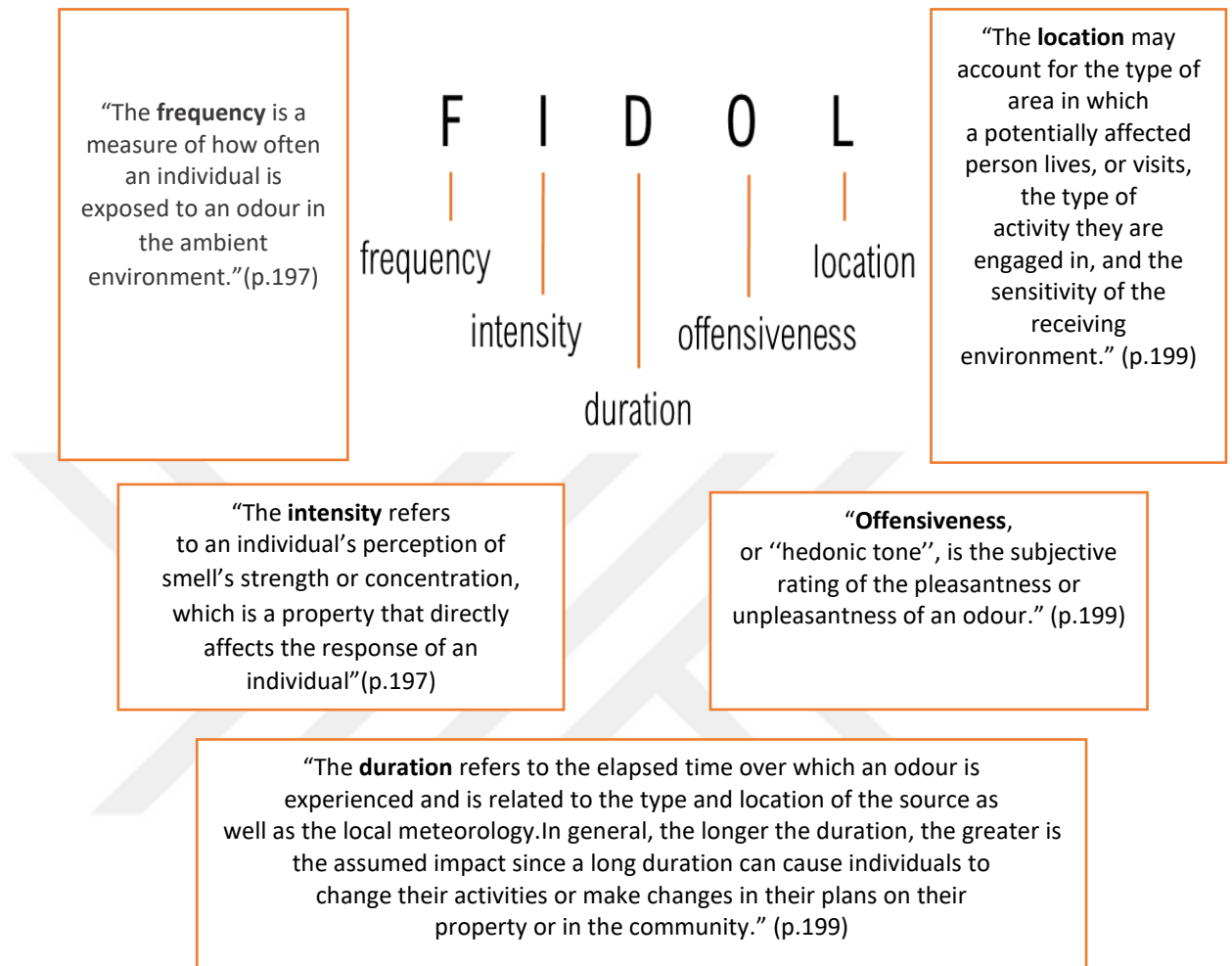
Smellscape concept is first identified by Porteous (1985). Henshaw (2013) adding on the smellscape studies, develops her own definition of smellscape as “referring to the overall smell environment, but with the acknowledgment that as human beings, we are only capable of detecting this partially at any one point of time, although we may carry a mental image or memory of the smellscape in its totality.” (p.5). Xiao et al. (2020) identify smellscape as “spatially structured from materials that construct the space” while defining smell as “invisible and temporary” (p.1). The smellscape are formed of smell perception of

individuals at a specific time and specific place, physically the space itself and the context of the space.

In urban environmental studies, the responses of individuals to negative impacts of unpleasant smells are defined as odor nuisance. Henshaw (2013) summarizes the factors influencing odor annoyance as “perceived health status, anxiety, coping strategy, economic dependence, personality, age, residential satisfaction, history of exposure/ annoyance” (p.39) and she further explains the annoyance level of an individual (odor nuisance) is dependent on “physiological and psychological “reactions of her which may be “positive, negative of neutral” (Henshaw, 2013, p.40). In his study, Bull (2017) developed a method to calculate odor nuisance considering the environmental regulations and standards which define unacceptable odors. He used community questionnaires for measuring annoyance. Figure 2 involves the definitions of FIDOL factors. Those assessment standards are accepted as FIDOL Approach.

Figure 2

Definitions of FIDOL factors



Note. The figure is created by the author with direct quotations of FIDOL definitions from Nicell (2009, p. 197-199)

FIDOL approach is based on both objective and subjective foundations yet influences of smell are highly dependent on subjective evaluation which includes sensitivity, past experiences, memory associations of individuals, sociocultural and physical context of places (Diaconu, 2019). Therefore, there are increasing number of smellscape studies from diverse disciplines, adopting user-centered approach within the last decade (Xiao et al., 2021). There are smell mapping studies in urban scale which use smell walks (Henshaw, 2015), interviews, surveys on perception as methods (McLean, 2019). In these studies, the

specific smells belonging to specific places temporarily are depicted with the help of participants interactively and visualized as smell maps or reports. Considering the multisensorial aspect of environmental perception, there are studies which analyze cross-modal perception of smell (Ndichu, 2020; Spence, 2020), cultural heritage (Davis & Thyşenocak, 2017) and historical sites are investigated in terms of smellscape in studies of Kiechle (2017), Dugan (2018) and Tullet (2019).

In environmental studies, negative smells are regarded as something to be controlled and improvements on government policies are discussed at such studies. Xiao et al. (2020) comments on this issue as "odorless public spaces are iconic in western modern urban planning and city management practice – clean, impersonal and ordered." which is a situation born from "deodorization" of Western cities (Classen et al., 1994, p. 78). At some cases deodorization and odor control is so high that it causes losing sense of place for visitors (Meighan, 2008). Designing pleasant smellscape of shopping environments for increasing sales by changing shopping behaviors of customers (Grewal et al., 2014) is another study area in smellscape research. The scenting is a widely used marketing strategy, it is also used at tourism environments such as hotels for attracting customers' attentions and change their visiting behaviors (Berry et al., 2006).

There are studies in smellscape literature which focus on the influence of nature-based smells on well-being and aesthetic values (Pálsdóttir et al., 2021) which are defined as restorative use of smells (Henshaw, 2013). Similar in purpose, there are studies on use of smells in aromatherapy with clinical purposes, which also prove the mood changing and relaxing effect of scents (Buckle, 2014; Diego et al., 1998). Some artists use sense of smell as a source of artworks (Xiao et al., 2021) such as Sissel Tolaas and Kate McLean, to be displayed in art galleries and museums (Shiner, 2020, p. 278–281). Also scenting is used in museology for integrating smell perception into visually-dominant historical museums (Verbeek, 2020).

In most of these studies, expressing embodied spatial perception through smell is a “methodological challenge” since bonds between smell perception and languages are weak within most of the cultures (Beer, 2007). Especially English-speaking participants find naming smells as a difficult activity because talking about smells is infrequent. The European languages are limited in smell vocabulary which is a situation that reflects the unimportance of sense of smell in West (Classen et. al., 1994). Yet Majid (2021) reviews studies regarding smell -language bond in different cultures and reaches that these challenges are at diverse levels in different cultures and geographies. In Turkish, there are not any smellscape-language centered studies reached by the author, but the challenges met by the participants will be discussed in the results.

2.4. Person-space relations

2.4.1. Place Meaning

The cognition of primary units of knowledge on embodied, experienced events is realized through sensory-motor coordination (Deprez et. al, 2003) where the first-person perspective works as a base for the formation of meaning (Stelter, 2010). Meaning conveys the relation between individual to environment and how the individual interprets the situation (Stelter, 2010). After giving a meaning to any perceived situation, the individual forms his/her personal reality by the help of his/her past experiences and history that is shaped by people’s responses to environment. Stelter (2010) defines this process as “embodying” or “interiorizing” the environment. Thus, meaning making process can be realized in two ways: one is created with actual experiences of individuals and the other one results from social interaction with the interviewer which serves to describe their perceived reality.

Tuan (1977) proposes that emotions are effective on giving meaning to places, emotional bonds for a setting are affected by individual’s interaction with the place and the

people in the place (Eisenhauer et. al., 2000). The meanings given by individuals to places are influenced by activities realized in the places and social interactions during the activities (Kyle et al., 2004). When meaningful social bonds are created in a particular environment through relationships with others, the setting that these relations take place also shares this meaning (Kyle et al., 2004). By gathering experiences, one over another, at a specific place, the location gains a meaning for the individual (Tuan, 1977). In their study Mesch and Manor (1998) reveal that, residents who have more close friends in an environment are feeling more attachment to their neighborhood. Kyle et al. (2004) support that expecting positive results in scope of social relations attracts individuals to particular places and in time place attachment to these places occur.

Places gain their meanings for individuals as people accumulate experiences in them (Tuan, 1974). When a place is used repeatedly, different experiences occur within the place. Layers of memories within a place turns into layers of meanings associated to the place (Manzo, 2005). The experiences may not be in repetitive nature but one single *flashpoint moment* may occur in a place which has great impact on individual's emotions, thoughts and memory. These moments of important experiences are defined as *milestone moments* which attain meaning to places (Manzo, 2005).

Research studies are focused on positive relations and positive sides of place bonding such as feeling secure, familiar etc. (Moore, 2000; Manzo, 2003). However, Relph (1985) states that person-space relationships are not always positive and strong. As an example, being connected to a place may generate positive feelings in some individuals while others feel restricted (Relph, 1976). Chawla (1992) defines this as *shadow side* of person-place relationships.

2.4.2. Place-Bonding

Place bonding is defined by Cheng and Kuo (2015) as “the particular identity and emotional attachment that a user associates with an environment as a result of long-term interactions” (p.546). This attachment is a composition of emotional bonding, meanings, past experiences associated with the place (Cheng & Kuo, 2015), perceptions, feelings on function and value of the place (Stokols & Shumaker, 1981). Cheng and Kuo (2015) claim that the most significant component of place attachment is not the place itself but the emotional bonds due to recollections and previous experiences within the place which makes the place important for the individual. Place attachment may occur in different ways. Low and Altman (1992) categorize the components of place attachment into three: affect, cognition and practice. Affective factor refers to emotional attachment, cognitive factor refers to thoughts and information about the place, finally practice factor involves activities, actions and behaviors in place.

Several studies (Hay, 1998; Milligan, 1998, 2003) state that place attachment occurs by the interaction of an individual with environment (physical setting and social environment) over a period of time. Riger and Lavrakas (1981) define two dimensions of place attachment as physical attachment and social attachment. Adding to this view, past experiences, recollections on these experiences (Vorkinn & Riese, 2001), social bonds and memories of loved ones (Hidalgo & Herná´ndez, 2001; Uzzell, Pol, & Badenas, 2002) support person-place interaction for place bonding.

There are two different views regarding place bonding and duration of visit at a place. In the first view it is supported that place bonding occurs as a result of time periods of interaction with space (Hay, 1998; Low & Altman, 1992; Stedman, 2006). Confronting this view, some scholars support that emotional bonding is not always a result of long duration of stay or frequent visits (Bolan, 1997; Stedman, 2002; Stokols & Shumaker, 1981).

Physical settings of an environment are a significant factor on emotional bonding (Dale et. al, 2008); which may be factors related to senses such as smell or more tangible senses such as sense of vision and sense of touch. When those characteristic elements of old location are transferred to the new environment “place-congruent continuity” occurs (Twigger-Ross & Uzzell, 1996) which makes the individuals feel the continuation of the old place. When experiencing a new place, an individual searches his/her memory for finding familiar sensory cues which would remind them of familiar experiences of similar settings. The memory transfers familiar emotions and sense of familiarity to the new place as an initial step of place-bonding (Rishbeth & Powell, 2013; Cheng & Kuo, 2015).

Hammitt et. al. (2004, 2006) proposed scale for place-bonding which is composed of five parts: place familiarity, place belongingness, place identity, place dependence and place rootedness. Familiarity of place is the first stage of place bonding which includes memories and sensory data regarding the place. Place belongingness refers to feeling connected to the place or feeling as a part of the place. As a next stage, place identity is feeling a place as a continuation of self-identity. Place dependence refers to functionality of the space that the individual requires. Place rootedness stands for a strong bond with sense of security and comfort as is feeling oneself at home (Tuan, 1980).

In the literature review process, it was realized that there were no studies investigating the intersection of place, emotions and sense of smell as a remembered experience. Smell walks studies were focusing on perception of smell on site and the responses of participants to place experiences in real life (McLean, 2019). In real life studies, walk along interviews (Xiao, 2020), observations, scale-rating surveys for sensory perception (Xiao, 2021), and laboratory experiments with virtual reality (Jiang et al., 2016) methods were used. Methodological challenge of smell studies was the intangibility (Xiao, 2021) and ephemeral nature of smell. Therefore, this study did not focus on in situ smell

experience but instead investigates the memory-based smell experience. Considering the deficiency of smell language (Majid, 2021), this study proposed a combined methodology of Smell Memory Diar (SMD) and Online Interviews (OIs) for triangulation of data, to overcome the constraints of language.



CHAPTER 3

METHODOLOGY

In this chapter methodology of this study is explained. At the first part research questions are stated. At the second part method of the study is presented which includes participants, setting, sampling process. At the third part Critical Incident Technique, instruments and procedure of the pilot study, first phase of the study which includes Smell Memory Diary and the second phase of the study which includes Online Interview are presented.

In Chapter 1, the three aims of this research study are given as investigating the important factors in recall of smell-based memory of place, researching its relationship with emotions and finally analyzing the role of sense of smell on person-space relations under the scope of place meaning and place bonding notions. In reference to literature review and aims of the study, research questions are stated in the following section.

3.1. Research Questions

Regarding the three aims of the study, the research questions are presented below.

RQ 1: Which factors are important to remind people smell-based memory of place?

RQ 2: What is the relation between the smell-based memory of place and emotions?

RQ 3: What is the role of sense of smell on person-space relations considering the notions of,

- a. Place meaning
- b. Place bonding

The study includes two phases. At Phase 1, a SMD is designed for data gathering, within the scope of aims of the study which is revised according to evaluations of the pilot study. The second phase of the study consists of an OI which is used for triangulation of data gathered from Phase 1.

3.2. Participants and Setting

The participants of the study were recruited considering several criteria. In this research, 30 people were recruited for the first phase of the project which involved SMD as a qualitative survey. The participants were all from Turkish nationality, for minimizing the cultural differences regarding smell perception, but they were living geographically dispersed area in Türkiye and Europe. Young adults between the ages of 20-30 were selected.

In autobiographical memory research, it is found that recalling past experiences involve reconstruction (Singer & Salovey, 1993). This reconstruction process is found more positive for older adults (Field, 1997) which means older adults are more motivated to recall their past experiences as “emotionally satisfying” by regulating their remembered emotions (Kennedy, et. al, 2004). Also, memory studies show that episodic character of autobiographical memory is highly connected to emotions since involvement of emotions result in more vivid, detailed memories (including sensory details) in young adults but there is a memory decline on episodic properties in older adults (st. Jacques & Levine, 2007). Considering the positivity bias and episodic memory decline, young adults were chosen as age range for sampling.

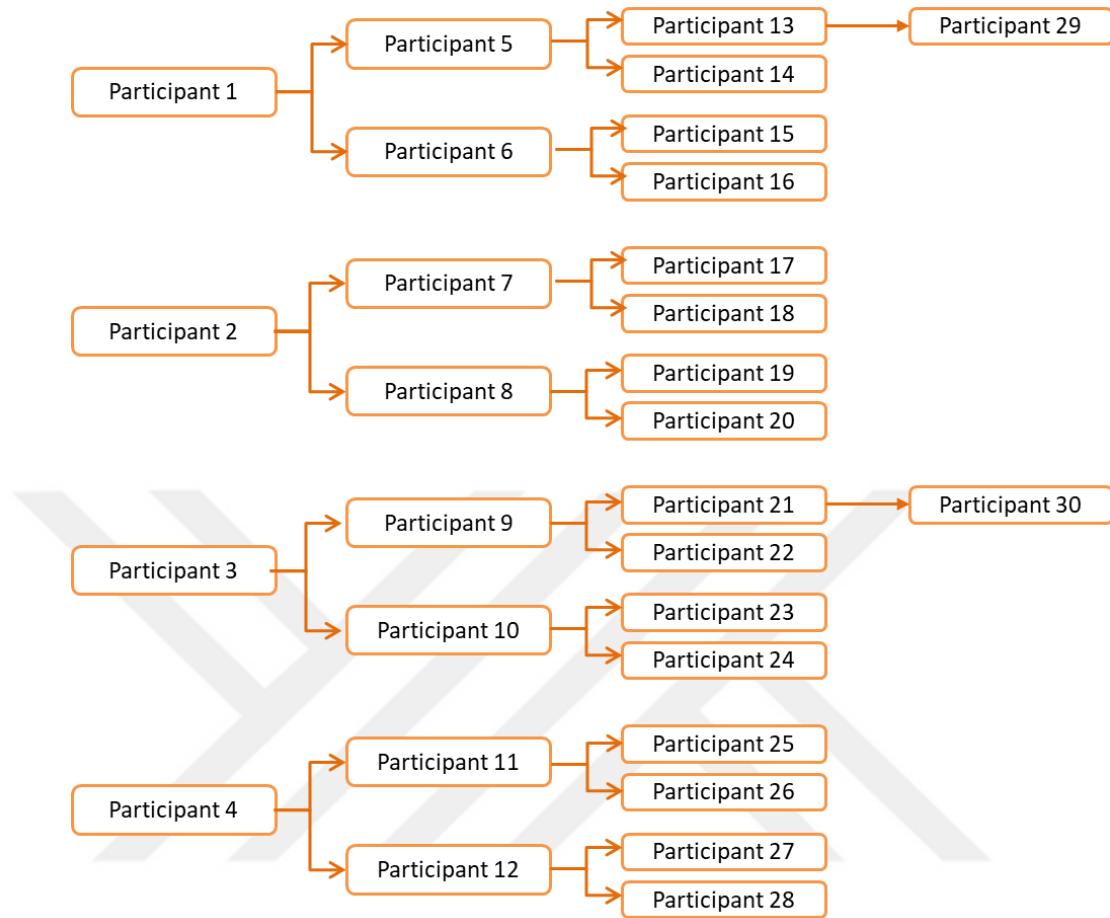
Snowball sampling method is a non-random sampling method which is mostly used in qualitative studies by scholars (Pultar, N.D.). Although this method is problematic in representing the universe and producing generalized results, in this study, there is no such

concern of representing a whole universe or draw conclusions regarding all young adults since this is an exploratory study. The main purpose is gathering phenomenological data on individual's autobiographical memories of smell perception and understanding person-space relations which depends on a highly subjective base, changing from person to person and culture to culture.

Snowball sampling technique was used in the sampling process. The first four participants were recruited according to convenience sampling method. During the process the participants were asked to give names and e-mail addresses of one male and one female possible participant that they found appropriate for the study. Then the researcher sent e-mails to those candidates explaining the study. By quota sampling method female and male participant numbers were kept equal and 15 participants per gender were included for the first phase of the study. In the snowball sampling diagram at Figure 3, all the participants were matched with numbers in an increasing order from 1 to 30. Participant 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29 (15 participants) are female. Participant number 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 (15 participants) are male.

Figure 3

The snowball sampling diagram



Note. Designed by the author.

The Pilot study was carried out via convenience sampling with 6 people before the main study. It was realized in two phases, the first phase included a smell diary and it was sent to participants via WhatsApp application. Then, at the second phase of the pilot study interviews were conducted as phone calls and they were audio-recorded by the personal computer of the author. The pilot study participants were different from the main study participants. The main study also consists of two phases. At phase 1 of the main study, SMD was sent to the participants using e-mail. Then they were reached again via e-mail for

Phase 2. Phase 2 includes OI, which were maintained on Zoom application and they were also audio-recorded by the personal computer of the author.

3.3. Data Collection Methodology

The focus of this study is remembered experience of sense of smell, however sensory awareness within an environment cannot be limited to senses separately due to their intertwined nature (Ingold, 2021). To differentiate the perception of different senses, Harris and Guillemin (2012) suggest various strategies in sensory research. Considering sense of sight, visual materials are successful tools that evoke memory and details on participant's experiences. Photo elicitation (Packard, 2008; Punch, 2002, Clark, 1999), drawings (Driessnack, 2006; Guillemin, 2004) and videos (Iedema et al., 2006) are some of the tools that are used to increase sensory awareness in interviews. Sound recordings, parts of music/songs, soundscapes of places may work as a trigger to recall memories by using sense of sound (Harris & Guillemin, 2012). For recalling absent memories by sense of touch, Harris and Guillemin (2012) suggest using prompts, and the objects around the interview setting. Regarding the sense of taste, there are studies in which food and drinks are presented in the interview setting for sharing with the participants and talking about the memories along with cultural differences (Warin & Dennis, 2005). The scope of this study involves personal memories on smell experiences, yet specific settings or smells were not provided to the participants for catalyzing the recalling processes since creating the original smellscapes wouldn't be possible in this study. Instead of using different techniques as prompts for recalling, CIT and its special type of questioning were used as a method of inquiry.

3.3.1. Critical Incident Technique and Instrument Design

Denzin and Lincoln (1998) define qualitative research as a method of interpretation of a phenomenon at its natural environment, focusing on the meanings that people bring to an

experience. With the purpose of gathering data on these personal meanings of smell experiences, CIT was used in this study while designing the questions of both SMD and OI.

CIT was introduced by Flanagan for aviation psychology program in military for selection of pilots and searching the reasons of their success/failures in their learning processes (Douglas et al., 2009; Smith, 1994). The technique is used widely in service industries for measuring satisfaction levels of customers with staff (Douglas et al., 2009) such as hotel tourism (Edvardsson & Strandvik, 2000), banks (Johnston, 1995), airline sector, retail (Lockshin & McDougall, 1998) and healthcare (Gabbot & Hogg, 1996; Kempainen, 2000).

Davis (2006) defines critical incident as an action or a verbal expression that can be observed and that is accomplished in itself for interpretations. The participant is expected to narrate a positive or negative experience (Douglas et al., 2009). Kempainen (2000) defines the technique as a flexible qualitative research method. As Douglas et al. (2009) state, the technique “simply asks respondents to recall and retell a story about something they have experienced” (p.310).

CIT enables the researchers to gather rich qualitative data (Gremier, 2004; Johnston, 1995) while examining an unknown phenomenon which is not understandable through a traditional questionnaire. It provides in-depth data and records of individuals’ experiences by presenting their perceptions (Gremier, 2004). It is practical when trying to examine complicated factors (Kempainen, 2000) and helps the researcher to analyze the phenomenon more deeply (Burns et al., 2000).

According to Oppenheim (2000) traditional questionnaire method involves problems about recalling past experiences and memories in general. Unlike the questionnaires which has limited number of questions with defined answers, the CIT method allows the participants to express their experiences, emotions and perceptions

freely in a detailed manner (Douglas et al., 2009). Data gathering can be conducted with several instruments: focus groups, one-to-one or group interviews and observation (Edvardsson & Roos, 2001). Data analysis can be done by drawing inferences from content analysis and coding of the expressions of interviewees (Gabbott & Hogg, 1996).

In this study, the critical incidents are the smell experience memories of participants that allow the author to draw inferences on place memory and socio-spatial relations through sensory questions. In this study, one-to-one OIs were conducted as a second data gathering method for triangulation of collected data by the SMD. The question design was done after conducting a detailed literature review on CIT and sensory interviews. The literature review on the CIT method was used for designing the questions of SMD and OI. By evaluations of the pilot study by participants and the author, several changes were made in the question designs of SMD and OI.

3.3.2. Pilot Study

A pilot study was conducted before the main data gathering phases, for testing the procedure and instruments of designed methodology. The six Turkish participants were chosen through convenience method due to limited time. While recruiting the participants for the pilot study there were no restrictions on gender, profession and other demographic information.

A smell diary was formed of a 5x9 matrix table which included four different smell experiences (two recent and two past) in four columns (Appendix B). The form was designed in English, to test the difficulty of using foreign language instead of mother language for describing smells. At the rows; there were corresponding questions of date, place, definition of smell, emotions, associations, memories, frequency of visit, reason of visit, the change in smell and the change in emotions, associations, memories along with

smell change. The questions were developed based on previous studies on favorite places (Korpela, 1989, 1992; Korpela et. al., 2001; Ratcliffe & Korpela, 2018).

The diaries were sent to six people between the ages of 20 and 30, by using Whatsapp application. All 6 of them were asked to answer the questions of a Smell Diary form. One week was given for the submission of the diaries. They were collected through Whatsapp in pdf format. Then three of the participants were invited to interviews which were conducted in Turkish. The semi-structured interviews included open-ended questions for collecting in depth data (Charmaz, 2014). This method was providing data triangulation by allowing a comparison between the two data gathering techniques in terms of their efficiency on collecting in-depth data. The three participants were called by phone and whole interviews were recorded by the voice recorder of the researcher's laptop. The interviews had a semi-structured format and took 30 minutes each. The main questions were asked to all participants yet secondary questions were modified according to the direction of participant's narrative (Appendix C).

At the beginning of the study design, the title of the thesis was "The Sense of Smell in the Experience of Public Interiors" and it was aimed to restrict the research questions to "public interiors" rather than "place" in general. Yet, the questions in the diary were not restricted to public interiors only but they were asking to remember any place while the semi-structured interview questions were specifically asking for public interiors. It was found that when the researcher did not give any restrictions on the place choice during the interviews, the participants responded with a broader range of space types and more in-depth data. Therefore, this caused a direction change at the space types from public interiors to any space and the title of the thesis changed into "Smell Based Memory of Place and Person-Space Relations".

At the end of the completion of the diaries and the interviews, the participants were asked to evaluate the comprehensibility of the questions and to share their opinions about the catalyzing effect of two different methods on recalling process of their smell experiences. As a result of their evaluations, it was concluded that asking minimum number of defined questions to each participant through smell diary forms was not efficient for recalling personal memories for each participant. Yet conducting the interviews in discussion format allowed them to remember more details on their sensory memories and it was easier for them to explain their experiences by speaking rather than writing down in the limited space of the form.

Some participants found the questions difficult to answer, especially giving the exact date was not easy for them. Also, they thought the definition of a space was confusing, for example they specifically asked whether it should be a general “space type” as any bakery or a specific one. One of the participants said “I don’t know how to define a smell, especially in English, can you give some criteria?”, which is a situation regarding the verbal attributes of smell experience. Majid (2021) defines this difficulty as there are limited number of terms for smells and talking on smells is very rare especially in English.

For the interview phase of the pilot study, one participant commented that it was easier to define the smells in Turkish. She also added that the friendly discussion manner of the author made her feel more comfortable and valued compared to the diary. Another participant stated that he was not bored and he was pleased to remember his childhood. The last participant commented that the short and quick questions of the researcher made her easily remember and narrate her memories. She said it was better than asking long answer questions and waiting for her to talk which could make her feel uncomfortable.

From the author’s perspective, it was easier to guide the participants with sub-questions which encouraged the participants to talk more in detail. The duration given

between the questions were sufficient to get full answers and it did not make the participants get tired or bored. Also, the interview allowed the researcher to interpret their use of language and changes in voice of the respondents along with their verbal explanations.

In the pilot study, smell experiences at single and stationary places were asked. Yet this did not provide sufficient information on participant's perception and familiarity of the places. Integrating both Stelter (2010) and Ingold (2021)'s views on qualitative research, the limited version of interview context was revised. Both at Phase 1 and Phase 2, they were asked to elaborate on their feelings about the place, their sensations within the memories, their perception of physical environment, and social interactions within the place as they move around within the place while recalling their memories.

All the literature review on CIT and sensory interviewing, then the evaluations on pilot study resulted in a revision at the question design. The references to literature corresponding each question of SMD can be found in Table 1, and Table 2 includes question-reference correspondences for OI. The questions at the rows of the SMD were revised into more comprehensible questions by adding details. For SMD, different survey formats from Google forms were considered, but this table format was found more appropriate since it allowed to see every sub-question for two smell experiences in one page. The OI questions were also formed according to the CIT and sensory interview literature. The SMD (11 questions) and OI questions (19 questions) included parallel questions in terms of content, yet due to the limited format of SMD, its questions were simpler and less in number.

Table 1*Instrument design for Smell Memory Diary*

Smell Memory Diary		
Question Number	Theme	Reference
Q1	Date of experience	
Q2	Place of experience	
Q3	Definition of smell	(Harris&Guillemin, 2012; Bull,2017)
Q4	Sensory perception of place, emotions, memories, social and physical properties of place	(Mason&Davies, 2009; Stelter, 2010; Ingold, 2021)
Q5	Meaning of place, emotions and thoughts on the place	(Kyle et. al, 2004; Korpela et. al., 2008; Stelter, 2010)
Q6	Frequency of visit (at past)	(Korpela, 2003; Kyle et. al. 2004)
Q7	Reason/ motivation of visit (at past)	(Korpela et. al., 2008)
Q8	Frequency of visit (in last one month)	(Korpela, 2003; Kyle et. al. 2004)
Q9	Reason/ motivation of visit (in last one month)	(Korpela et. al., 2008)
Q10	Change in smell	(Harris& Guillemin, 2012)
Q11	Change in emotions,thoughts, memories, meaning of place	(Stelter, 2010)

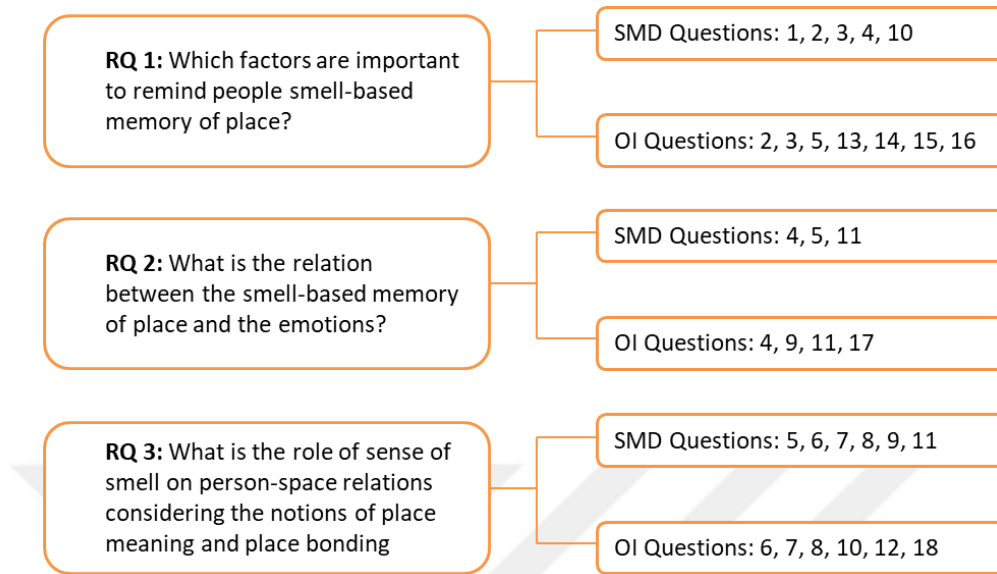
Table 2*Instrument design for Online Interview*

Semi-structured Online Interview		
Question Number	Theme	Reference
Q1	Definition of place	
Q2	Definition of smell (FIDOL based)	(Mason& Davies, 2009; Harris& Guillemin, 2012; Bull, 2017)
Q3	Any metaphor for embodied experience (Handle question from mindfulness meditation)	(Stelter, 2010; Harris&Guillemin, 2012)
Q4	Emotions about the smell	(Ihde, 1986; Spinelli, 2007; Stelter, 2010; Harris&Guillemin, 2012)
Q5	Sensory perception of place, memory associations, social bonds	(Mason& Davies, 2009; Stelter, 2010)
Q6	Meaning of the smell	(Stelter, 2010)
Q7	Frequency of visit, visiting duration, smell change	(Korpela, 2003; Kyle et. al. 2004)
Q8	Reason/ motivation of visit	(Korpela et. al., 2008)
Q9	Emotions about the place	(Kyle et. al. 2004; Korpela et. al., 2008; Stelter, 2010)
Q10	Meaning of the place	(Kyle et. al. 2004; Korpela et. al., 2008; Stelter, 2010)
Q11	Influence of smell on the emotions about the place	(Stelter, 2010; Harris& Guillemin, 2012)
Q12	Influence of smell on visiting behavior, smell preferences	
Q13	Perception of place, social and physical attributes of place	(Ingold, 2021)
Q14	Sensory perception as moving around the place	(Harris&Guillemin, 2012)
Q15	Familiarity of smell in a different location	(Harris& Guillemin, 2012; Ingold, 2021)
Q16	Change of smell in same place (expectancy)	(Korpela, 2003; Kyle et. al. 2004; Ingold, 2021)
Q17	Emotions on smell change (expectancy)	(Stelter, 2010; Harris& Guillemin, 2012)
Q18	Meaning of place and smell as a remembered experience	(Stelter, 2010)
Q19	General reiterations for questions	(Smith, 1994)

As it is explained in this chapter, some questions were formed referencing to several different studies. Therefore, the researcher made some categorizations and combinations within the questions according to research questions of the study which can be seen in Figure 4. The main framework of questions in both SMD and OI were designed as common, then the interview questions were elaborated with extra questions to collect more in-depth data. The question framework of OI involved more detailed questions to encourage the participants to explain their remembered smell experiences elaborately. Also, the OI had a semi-structured format which allowed the researcher to ask different questions according to the direction of the discussion. By the format of the interviews, it was aimed to create a relaxed, friendly environment for the participant to feel comfortable while recalling and retelling. The design of this research study, including the data collection methods, was approved by Ethics Committee of I.D. Bilkent University at 21st February 2022 (see Appendix A).

Figure 4

Categorization of SMD and OI questions according to Research Questions of the study



Note. The figure is designed by the author

3.3.3. Phase 1-Smell Memory Diary

The first phase of main data collection process includes a SMD which was revised both in format and content according to the evaluations from the pilot study along with the extended literature review. Considering the difficulties experienced by native Turkish speakers in terms of expressing themselves in English at the pilot study, all the questions of SMD and OI were translated into Turkish by the author (see Appendix E)

The Smell Diary form included a consent form on the first page and it was asked whether the participants were voluntary to fill the form. On the second page, demographic information form was presented which included the questions on age, gender, educational status, occupation/job status, city/country that they were currently living and whether they had smell or memory problems.

The SMD includes two tables. The first table involves two smell experiences in the columns as smell 1 and smell 2 which were asked to be recent smell experiences. Recent experiences involved the experiences within the last six months. The second table has the same format, yet smell 3 and smell 4 have to involve smell experiences before last six months which were called as past experiences. Both of the tables included questions on date of the experience, place, definition of smells, multisensory properties of the space, participant's emotions, meaning of the place, frequency of visit, reason of visit, change in the experience and change in the meaning of place. Limited space was provided due to the chosen format which was designed to avoid participants getting bored of long question forms. The final page of SMD included an invitation for the second phase of the study by explaining it and it asked the participants to write their names if they wish to continue with the interviews.

One week was given to the participants for completing the form after receiving it. Participants did not receive the form at the same time due to the nature of snowball sampling technique. Reaching all the participants and gathering the forms back took almost three weeks in total. The forms were sent and received back via e-mail.

3.3.4. Phase 2- Online Interview

Interviews are widely preferred research methods to reach information on beliefs and experiences of participants (Silverman, 1998). In qualitative research there is an increasing number of studies focusing on senses particularly in anthropology, sociology, architecture, history and geography (Paterson, 2009). Warin and Dennis (2005) define the senses as one of the strongest vessels of memory and intertwined within the memory. Adding to this view, Harris and Guillemin (2012) support that sensory awareness needs to be integrated into interview method for reaching the untouched parts of memory and sensory perception with the benefit of collecting in-depth data and conducting complex analysis. Being guided by these views, within this research it was aimed to use CIT as a special form of interview technique in qualitative research for gathering in-depth data on the sensual experiences of the participants regarding their place memories.

At the last page of the SMD forms, the participants were invited to the second phase of the study which involved the Zoom interviews. For the second phase 15 people volunteered to participate. Since the participants were selected according to their voluntariness, the number of females and males were not equal in this phase. Five males and ten females volunteered to continue. The main structure of the interview questions was formed at the end of a literature survey on methodologies of previous CIT and sensory studies (Harris & Guillemin, 2012; Stelter, 2010) as explained in Table 6. The interviews included semi-structured questions in natural discussion format in order to provide a relaxed atmosphere for the participants to recall their memories on smell experiences.

Instruments of CIT were used during the interviews. Considering the richness of data that interview technique can provide, approximately 30-minutes-long OIs were conducted separately with each participant. Some of the participants were more excited to share their memories, so the interview duration was longer with them, and some of them

were answering with short, to-the-point answers which resulted in shorter duration of interviews. The interviews were conducted online through Zoom and WhatsApp applications as audio recorded interviews. At the end of each interview the audio-recordings were written as transcriptions for making them ready for the thematic analysis.

Sensory awareness is the first step to understand the relationship between self and environment, therefore (Stelter, 2010) suggest experience-based and body-anchored interviewing for participants to articulate daily experiences that they cannot easily express because of experiences' implicit features. This method helps the interviewees to recall embodied experiences on specific cases (Stelter, 2010). Mason and Davies (2009) put an emphasis on the need of sharing sensations of interviewees while researching their experiences. Asking the participants to elaborate on their senses enables them to recall and narrate more detailed experiences or perceptions regarding their past. This helps to capture the fleeting sensory experiences of participants before they forget them without awareness (Mason & Davies, 2009).

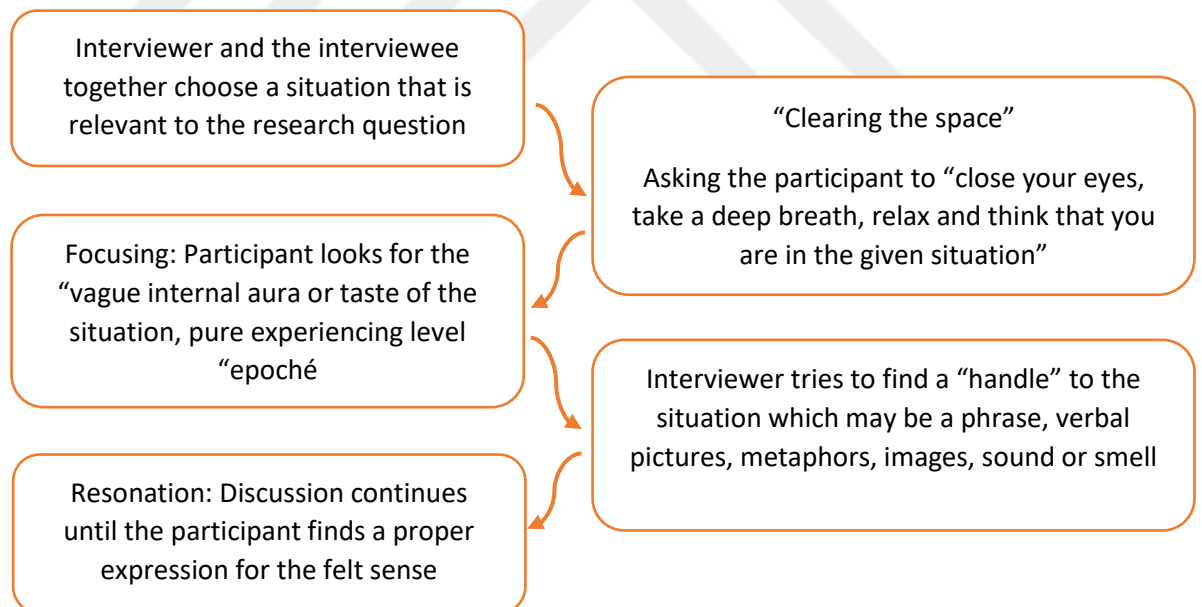
Gendlin (1981) explains "felt sense" as a phenomenon that does not come to mind as different units of thoughts or expressions yet as a unique, obscure and complicated bodily feeling. In order to research on the felt sense, Gendlin (1996) proposes a method of psychotherapy called *focusing*. When the felt sense is verbalized "*resonating*" occurs which refers to the changing of the felt sense at each phrase until it is clearly defined. Resonating helps the participant to get an explicit version of the sense or the experience. Stelter (2010) advises to modify this method to be used in qualitative research interviews and help the participants to explain their experiential, "body anchored" senses without the mission of changing their thoughts.

For verbalizing a felt sense in qualitative research interview Stelter (2010, p.863) forms the following framework (Figure 5) inspired by Gendlin (1981). The interviewer

should not enter in the focus of the participant by commenting on his/her behavior and must adopt a non-judgmental approach, thus the participant can focus on the purely subjective felt sense at “a pure level of experiencing” which is defined as epoché (Stelter, 2010, p.863). Epoché, in other words “phenomenological reduction” (Stelter, 2010, p.863), is defined by Edmund Husserl (1985) as “basic method to a pure psychology” (p.201) and “genuine inner experience” (p.202). In Figure 5, the bubble including the phrase “clearing the space” is referred to the beginning of the OI (Stelter, 2010; Gendlin, 1981). The participants were asked to take a deep breath, close their eyes, take their time to relax and try to focus on the chosen smell experience when they were ready (Appendix F).

Figure 5

Framework for verbalizing a felt sense



Note. The scheme is derived from Stelter (2010)

Meaning contains past, present and future through integration of past experiences to actions and decisions on current situations. Therefore Stelter (2010), suggests blending temporal context into interviews by helping to create some kind of a storyline. On the other hand, Ingold (2021) states that human perception and experience of individuals need to be researched with a focus on the comprehension of sensation during movement of whole body in a space. Therefore, referring to Ingold (2021) in questions 13 and 14 of OI, the participants were asked to imagine that they are walking within different locations of the place and they were asked to describe the social and physical environment as they were moving around the place. This question was not included in the diary as a corresponding question and this resulted in more limited data since the question allowed the participants to remember the places with all senses during their movement.

In the pilot study, the smells within the remembered experiences were highly unique and complex in nature such as the smell of a grandparent's house. Adding to these techniques, Harris and Guillemin (2012) propose some sensory questions, as presented in Table 3, that can be asked in interviews to enhance sensory awareness.

Table 3

Sensory questions to enhance sensory awareness, suggested by Harris and Guillemin (2012)

Sight*	Can you describe the features of X? What did you notice was visibly different about Y?"
Sound*	What did that sound like? What are some of the sounds that you particularly remember from (that time, that place)?
Smell*	What did that smell like? Is there a smell that particularly reminds you of that time?
Touch	How did you feel when you touch x object/z person? How did you feel when you moved around y place and did w movement?
Taste	Entangled with sense of smell: What did that taste like? Is there a taste that particularly reminds you of that time?

Note. The sight, sound and smell questions are directly taken from the text, while touch and taste questions are modified by the author according to the text.

Stelter (2010) combines the ideas of Ihde (1986) and Spinelli (2007) as a guide to research interview. The interviewer supports the participant through descriptive questioning which leads to the use of a metaphorical and visual language. "What" and "how" questions are valuable rather than looking for explanations through "why" questions. The interviewer may ask descriptive or explorative questions as "How does that feel?" to gain more explorative and embodied data, if the participant gives implicit answers (Stelter, 2010). Embodied experiences can create emotions and thoughts, also they may be related to past and future actions. Therefore, the questions related to bodily experience, thoughts, emotions and actions on a specific situation should be balanced (Stelter, 2010).

3.4. Data Analysis Methodology

Thematic analysis is a qualitative method which provides transition between qualitative data and quantitative data by encoding process of themes (Boyatzis, 1998). Themes are patterns that are encountered within the data. Themes may be explicitly seen in the data or may be latent and need researcher's interpretation (Boyatzis, 1998). In this study, the author focuses on the explicit meanings conveyed by the respondents' words. The themes may be produced inductively from raw data or may be produced deductively from previous research theories (Boyatzis, 1998). During the analysis period of this study, themes were generated inductively from the collected data.

For the analysis of data gathered within this qualitative research study, Big Q approach of thematic analysis method was chosen. As explained by Clark et. al. (2015), this method does not have the claim of finding a universal meaning but it supports the idea that meaning is always connected to a context from which it is produced. Realist/essentialist theoretical framework was adopted in which the reality is accessible through participants' own words (Clark et. al., 2015). This method of thematic analysis was chosen since the smell experience, its possible memory associations and the meanings derived out of these relations were dependent on the individuals experiencing the phenomenon along with the context of their experiences.

This method also provides an active role to the researcher rather than avoiding her subjective involvement (Clark et. al., 2015). This approach allows the researcher to engage with the data gathering process and creates a flexible coding process that can be organically formed by the researcher's viewpoint (Clark et. al., 2015). Yet for the interpretation of data, semantic form of thematic analysis was used which helps to focus on participant's own meanings that they explicitly state by embracing the subjectivity of the

responses rather than focusing on latent meanings and deeper interpretations of participant's words (Clark et. al., 2015).

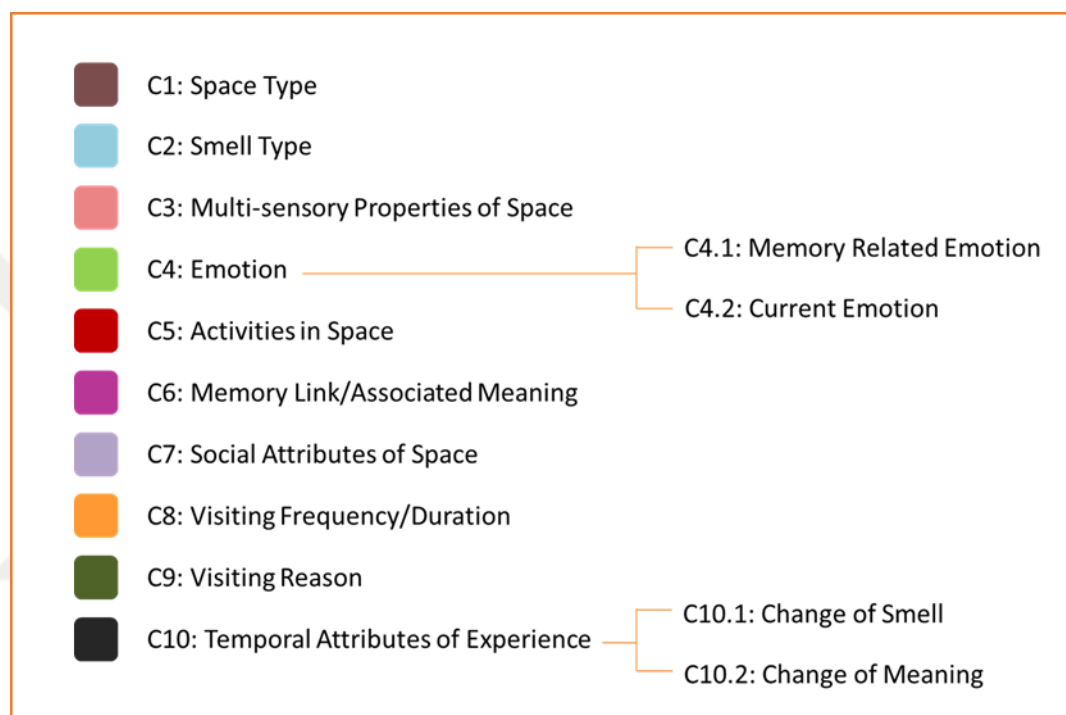
Thematic analysis of the collected data was realized in accordance with the six steps of thematic analysis defined by Braun and Clark (2006): (1) Familiarization, (2) coding, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, (6) writing the report. The first step of familiarization involves reading the data for multiple times and taking initial notes in order to familiarize with the data set. Coding process includes labeling of related properties of data according to research question, and it is the initial step of coding since it allows to find patterns in the data by grouping similar data. Then the researcher is expected to group the data into clusters and find key patterns at the "searching for themes" phase. As the next step the researcher needs to stop, check whether the themes are appropriately matching with the data set and do the necessary changes. After that step, theme definitions are expected to be made and theme names should be given. The final step includes writing the analysis report by drawing conclusions through the framework of the themes (Braun & Clark, 2006).

The diaries were collected through e-mails from the respondents. All 30 SMD files were printed for thematic analysis. Before the coding process, the collected data was read by the author for several times and notes were taken on the forms for initial analysis as the familiarization step of thematic analysis. During the coding process, most of the main codes were generated based on the content of the SMD questions such as C1, C2, C3, C4, C6, C7, C8, C9 codes, since they were parallel themes in terms of the contents of the responses. As an example, question 2 in SMD asks the place of the experience and the answers to this question directly gives the space types as C1. Categories 5 and 10 were generated with the help of a previous study by Altay (2021). Both numerical and color coding were used for

defining different categories for convenience while analyzing the complex results. The colors codes and verbal correspondences are defined in Figure 6.

Figure 6

Numerical coding and matching color codes used by the author during analysis



Note. The figure is designed by the author.

The 10 main categories can be classified into two sub categories as Attributes of Space and Attributes of People as presented in Table 4. Space type, smell type, multi-sensory properties, social attributes and change of smell as a temporal attribute are the categories that include the attributes of space itself. On the other side, emotional attributes, activities in space, memory link/associated meaning, visiting

frequency/duration, visiting reason and change of meaning as a temporal attribute, are the categories related to attributes of people.

Table 4

Categorization of 10 codes as attributes of space and attributes of people

Attributes of Space	Attributes of People
C1	C4
C2	C5
C3	C6
C7	C8
C10.1	C9
	C10.2

As the next step, the researcher began to search for themes. Themes were generated by searching for possible relations and patterns between the codes. Some of the codes were combined and presented together. In the fourth step, review and modification of the found themes were done by double-checking if their relations with the coded data were working well or not. At the end of theme review, thematic schemes were created by defining and naming the themes. In the last step of the process, the final version of the themes was organized in a report format.

SMD texts were translated from Turkish into English by the author. An example for coding process of a smell diary is presented below. The passage is composed of direct

quotations from SMD of Participant 1 (P1), the 10 categories in Figure 6. were found and underlined with color coding.

(SMD-P1)

Mephisto Book store, over the İstiklal Street with a special customer potential, is a

C1: Commercial spaces-Book store

C7: Social attributes of place

place that I visit frequently for resting and calming down. This 4-floors- place welcomes you

C8: Visiting frequency

C9: Visiting reason

with a silent ambience and smell of books. I even think that this book smell is permeated on the

C3: Multisensory p. of space **C2: Smell type**

walls of this historic Pera building. Mostly I find myself there not for buying books but just for

C6: Associated meaning

breathing this book smell and relax at the peaceful atmosphere of the place. I visit this place

C9: Visiting reason

C4.1: Memory related emotion

once in a month and at my last visit I was frustrated when I saw the coffee store within the book

C8: Visiting frequency

store which caused a change in the customer type and generation of coffee smell which

C10.1: Change of smell

suppressed the expected book smell. There were voices of talking people and sounds of coffee

C3: Multisensory properties of space

machines. I realized that I will not be able to experience the calm, silent atmosphere with only

C10.2: Change of meaning

the smell of books anymore. I am totally sad now. The place was associated with books in my

C4.2: Current emotion

C6: Associated meaning

mind but now it lost its meaning today.

C10.2: Change of meaning

3.5. Triangulation of Data by Phase 2

The second phase of the study includes OIs conducted with 15 participants. The reason of conducting the second phase with interview technique as an instrument was to maintain data triangulation for SMDs. The pilot study showed that SMD questions might not be clear and understandable by every participant even though the SMD questions were revised after the pilot study.

The data gathered by OI were collected as audio recordings then they were written down as transcripts for the thematic analysis. Same thematic analysis procedure was followed for OI's. There was no missing data or conflicting information, on the contrary additional questions and method of the OI provided more in-depth data. Only one interviewee changed one smell experience from food court of a shopping mall to a Kebap restaurant (P6) yet the responses were similar which have the content of emotional response due to cooking smell.

The additional information that the OI supplied was due to extra questions within this instrument. Question 3 was a handle question used in mindfulness meditations (Stelter, 2010; Harris & Guillemin, 2012), which enables the participant to focus on the felt sense and define it with a metaphor. Question 7 was an additional question asking for the duration of the visit. Along with frequency of visit this data revealed whether the participants wanted to stay at the place of incidents or they were obligated to do so. This question made it possible to see if there were any place bonds.

Question 9 asked the emotions regarding the place and Question 10 asked the meaning of the place. Question 11 asked whether sense of smell had an influence on the emotions and meaning of place. These questions provided more details within the data, yet the content and patterns were not different than SMD analysis.

Question 12 asked smell preferences as additional data. When the place and smell associations were positive and the time spent at the place were associated with good memories and pleasant emotions, the participants stated that they would not like any change in the smell. Question 13 asked the participants to imagine that they were entering the place and moving around it. It further asked to talk about the social and physical properties of the space. Question 14 asked if the smell experience was changing at different locations of the place. Q13 and Q14 enabled the participant to recall details on the physical attributes of space as a part of place memory. It was also revealed that subspaces of a place and total experience of the same place were different considering multisensory properties, emotions and associated meanings. This was a pattern (Pattern 2) also achieved in the SMD content analysis.

Question 15 asked if the participant perceived the same smell at a different location. This caused some participants to recall other place memories, yet no new pattern was created since most of the participants already included that information at their SMD. Finally, question 19 asked whether they would like to add anything else. At this point some participants wanted to add how valuable the smell perception was for them and had a small conversation with the author on this topic.

The audio recordings of OIs were written down as transcriptions in Microsoft Word before the coding process. “How the things were said with emphasizes and pauses” were also noted down for later interpretations (Clark et. al., 2013). All 15 files were printed and same method of coding for the SMD was applied to the interview transcripts. The analysis of phase 1 and phase 2 were conducted together. The comparison of the two methods as a result of the data triangulation will be presented in Chapter 4.

The associations, emotions and place memory data gathered through OI were much more in depth (P2, P3), yet the interviews did not supply any additional categories or

patterns between categories in the thematic analysis. The interview method was more effective for the participants while expressing their remembered smell perceptions. Since smell talk is infrequent and most smells are difficult to define with verbal expression, interview method provided them more space and time. Also, OI allowed the participants to ask questions when they were confused. In SMDs they probably left unanswered the questions that were difficult for them.

OI transcriptions were translated from Turkish into English by the author for including their analysis in this study. Below is a sample analysis of coding process. Mephisto Book Store was also chosen by Participant 1 (P1) to be shared in the OI. A passage from the interview transcript which includes additional information is presented below. (Researcher: R)

(OI-P1)

R: Do you have any metaphors to explain your smell perception experience at the place?

P1: Yes, when you asked, I am imagining myself there, my footsteps are getting slower

C5: Activity in space

when I enter the book store. Time gets slower for me. (She was smiling and was very excited)

R: Do you walk slowly for inhaling the smell slowly or do you have other memory associations, is that why the time gets slower?

P1: I think it is because the place gives me peace along with the smell. A book is something to be

C4.1: Memory related emotion

read slowly and in a calm attitude. You sit down and you read. It is a very static activity, only

C6: Memory link/Associated meaning

your eyes move. It is the influence of idea of “reading a book” that reflects upon my walking style.

I cannot walk fast in Mephisto no matter how busy I am, I always move around the book shelves slowly.

C5: Activity in space

CHAPTER 4

RESULTS

The thematic analysis of phase 1 and phase 2 were conducted simultaneously as the data gathering process continued. The main categories and sub categories were already revealed at phase 1. The OI provided a double check for the categorization of the themes. No new main or sub categories were generated at phase 2. The patterns, which are the repetitive relations between categories, were formed in phase 1 and data from phase 2 supported phase 1. Therefore, the results include both scripts from phase 1 and phase 2.

4.1. Categories of Thematic Analysis

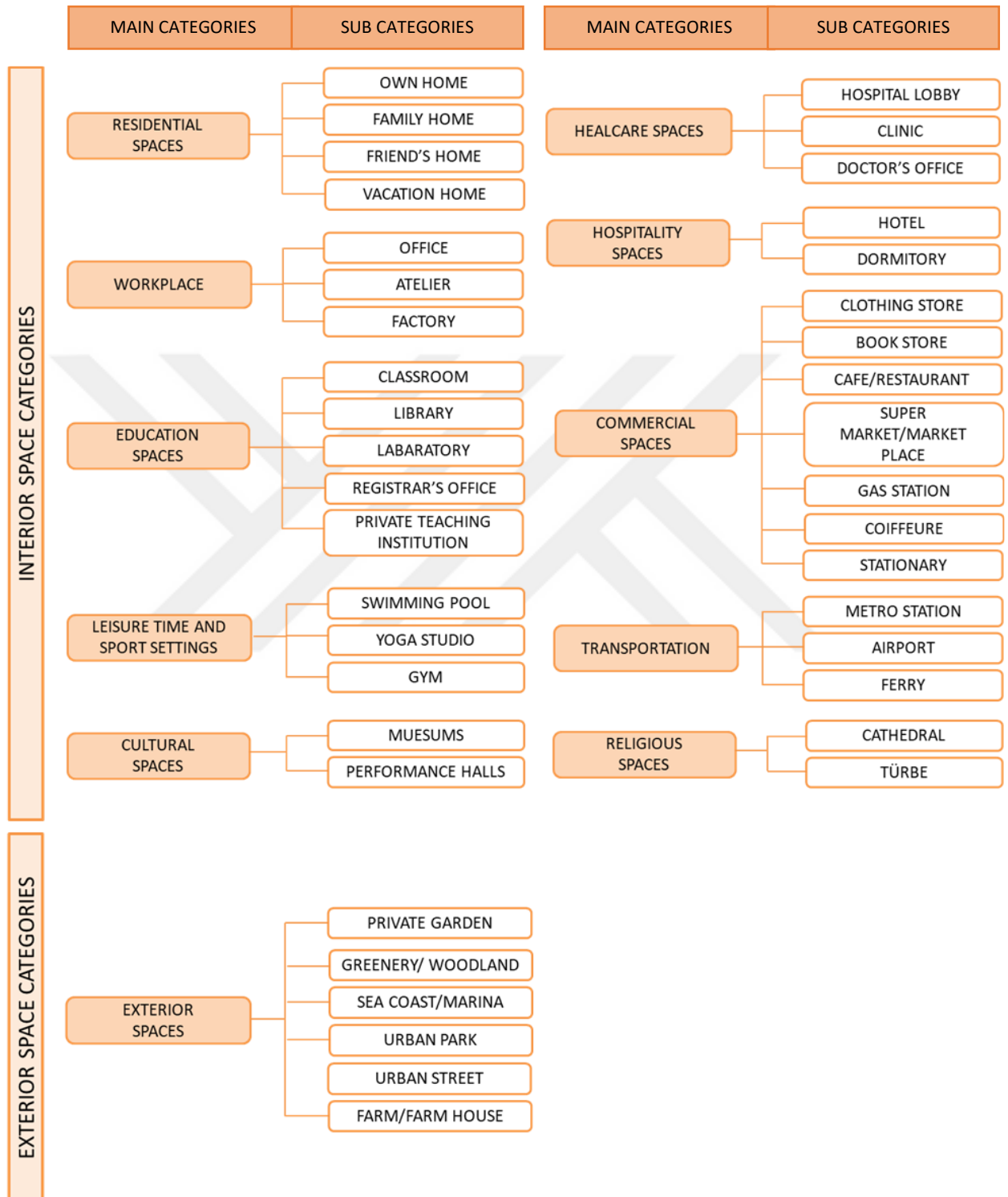
The responses from SMD were processed through thematic analysis for converting qualitative data into quantitative data. SMD included questions on four different smell experiences. Participants were asked to recall their smell memories within the last six months which were labelled as recent smell experiences and corresponded to Smell 1, Smell 2 in the SMD form. Smell 3 and Smell 4 referred to past experiences which include memories before last six months (See Appendix D). Turkish version of the SMD which was sent to participants can be found in Appendix E. As presented in 3.4. Data Analysis Methodology, the 10 main categories and their sub categories are explained in this chapter along with frequency tables, schemes and quotations from SMD. Collected data for C1, C2 and C4 were recorded into Microsoft Excel tables for further analysis as frequency tables.

4.1.1. Category 1: Space Type

Category 1 (C1) defines different space types of interior and exterior spaces. For the first phase of the study, the participants were free to choose any space type as interior or exterior spaces without any restrictions. As explained in the Pilot Study section, limiting the space type did not provide in-depth data for various contextual places and was highly restrictive for the participants to recall smell-based memories. Figure 7 involves each space type in which the respondents stated their smell experiences took place. Main interior space categories are clustered as residential, workplace, education, leisure time/sports, cultural, healthcare, hospitality, commercial, transportation and religious spaces. Each main category involves sub-categories as demonstrated in Figure 7.

Figure 7

Main and sub categories of space types from the analysis of SMD and OI



After categorizing the space types, frequencies on how many times a sub-theme was mentioned were recorded in the Table 5. The smell memories of participants took place mostly in residential spaces (33.0%) which is followed by commercial spaces (24.5%) (Table 5). The pie chart of frequencies can be seen at Appendix G1. Only 12.3% of the memories belonged to exterior spaces.



Table 5*Frequency table of themes and sub-themes regarding C1 Space Types*

Theme: C1 Space Type	Sub-theme	Frequency	Total	Percentages
Residential Spaces	Own Home	6	35	33,0
	Family Home	16		
	Friend's Home	6		
	Vacation Home	7		
Workplace	Office	3	6	5,7
	Atelier	2		
	Factory	1		
Education Spaces	Classroom	2	10	9,4
	Library	1		
	Laboratory	2		
	Registrar's Office	1		
	Stationary	1		
	Private Teaching Institution	3		
Leisure Time and Sports Settings	Swimming Pool	2	4	3,8
	Yoga Studio	1		
	Gym	1		
Cultural Spaces	Museums	1	2	1,9
	Performance Halls	1		
Healthcare Spaces	Hospital Lobby	2	4	3,8
	Clinic	1		
	Doctor's Office	1		
Hospitality Spaces	Hotel	1	1	0,9
	Dormitory	0		
Commercial Spaces	Clothing Store	3	26	24,5
	Book Store	1		
	Cafe/Restaurant	13		
	Supermarket/ Market place	7		
	Gas Station	1		
	Coiffeur	1		
Transportation	Metro Station	1	3	2,8
	Airport	1		
	Ferry	1		
Religious Spaces	Cathedral	1	2	1,9
	Türbe	1		
Exterior Spaces	Private Garden	2	13	12,3
	Greenery/Woodland	1		
	Sea Coast/Marina	3		
	Urban Park	1		
	Urban Street	3		
	Farm/Farmhouse	3		
TOTAL			106	100

Note. Most repeated themes are highlighted.

Family homes were chosen for the autobiographical memories in SMDs with the highest percentage (46.7%) within the residential spaces. Family homes included houses of parents, grandparents and relatives. In results, most of the family homes belonged to grandparents where childhood memories took place. Participants who recalled grandparent's homes were the children of working parents and therefore they used to stay in grandparent's houses during day times, therefore repetitive visits were realized with long visit durations (P28, P27, P23).

Historical Buildings had characteristic smells in respondents' minds. The smell intensities in these memories were dependent on the activity. The respondents who mentioned the smells of historical buildings defined their experience as a time travel. At the following two examples, both the architectural elements and historical value of the space were combined with the smell which enhanced the historical/cultural impact of the experience.

The smell belongs to a performance hall. It feels very rooted and historical. The long-lasting smell feels like a *representation of things that reach today from past*. (SMD-P27, emphasis added)

There was a very intense smell of incense at the Köln Cathedral, the smell gave the space a highly authentic and mysterious ambiance (...) I felt myself as if I was living in the 17th century, *like a time travel*. I was very impressed by the magnificence of the church and its culture. (SMD-P17, emphasis added)

There were distinct smell experiences which were matched with specific places at the place memories of participants. The distinction of smell was either due to high intensity of chemicals or long exposure to the smell. Healthcare facilities were examples of this outcome of SMD. P2 and P18 recalled hospital lobby, which smells medicine, disinfectant and alcohol. The same smell mixture was recalled by P29 as smell of a doctor's clinic. All three participants used the expression of "hospital smell" for this smell mixture which was

a distinct smell-place relation in their minds that caused anxiety and bothered them independent of their different backgrounds.

4.1.2. Category 2: Smell Type

Remembered smell experiences of the participants include a wide range of smell types. All the data was categorized in Table 7, regarding frequencies of each smell type from recent and past experiences. Smells of foods and drinks, smells of human activities, smells of human body, smells produced by nature, smells of synthetic chemicals, smells of new materials and old materials are the main themes of C2. The smell types were called with direct verbal expressions of the participants and the main themes were referring to the sources of smells. All themes include sub-themes as presented at Table 6.

The frequency percentages for each theme show that mostly remembered smell types by the participants were smells of foods and drinks (19,9 %), smells of synthetic chemicals (19,9%) and smells produced by nature (19,1%) as presented in Table 6. The reason of high frequencies was due to frequent exposure to smell type, high intensity and offensiveness level of smell. The pie chart of frequencies can be found in Appendix G2.

Table 6*Frequency table regarding C2 Smell types*

Theme: C2 Smell Type	Sub-theme	Frequency of Recent Experiences	Frequency of Past Experiences	Total	Percentages
Smells of Foods and Drinks	Bakery product	6	3	55	19,9
	Spices	7	4		
	Sweet	1	1		
	Butter	1	0		
	Chocolate	1	0		
	Fruits	7	2		
	Vegetables	0	6		
	Fish/Sea food	1	1		
	Rotten food	1	1		
	Tea	3	0		
	Coffee	4	4		
	Hot wine	1	0		
Smells of Human Activities	Cooking food	7	7	38	13,7
	Frying food	4	1		
	Mowing grass	1	1		
	Burning	3	5		
	Shaving	0	1		
	Harvesting	0	1		
	Cleaning	3	1		
	Smoking cigarette	1	2		
Smells of Human Body	Body odor	7	8	15	5,4
Smells of Animals	Animal body	2	0	3	1,1
	Animal product	0	1		
Smells Produced by Nature	Rain	0	2	53	19,1
	Soil	2	3		
	Damp	4	5		
	Wood	1	3		
	Flowers	7	3		
	Green plants	0	5		
	Trees	1	3		
	Dust	2	1		
	Straw	1	0		
	River	0	1		
	Sea	1	5		
	Moisture/ vapor	0	3		

Note. Most repeated themes are highlighted.

Table 6 (cont'd)

Theme: C2 Smell Type	Sub-theme	Frequency of Recent Experiences	Frequency of Past Experiences	Total	Percentages
Smells of Synthetic Chemicals	Air freshener	8	1	55	19,9
	Female Perfume	3	2		
	Shampoo	1	2		
	Baby powder	1	0		
	Soap	0	3		
	Disinfectant	1	2		
	Cologne	1	3		
	Alcohol	4	1		
	Book	1	1		
	New printed paper	0	1		
	Incense	2	3		
	Candle	1	0		
	Medicine	1	2		
	Naphthelene	1	3		
	Chlorine	0	2		
	Nail polish	0	1		
	Hair dye	0	1		
	Fuel	0	2		
Smells of New Materials	Furniture	1	1	13	4,7
	Objects	1	1		
	Paper	1	0		
	Construction materials	2	0		
	Plastics	1	0		
	Leather	1	0		
	Fabric/Cloth	1	1		
	Carpet	1	1		
Smells of Old Materials	Furniture	2	7	45	16,3
	Objects	3	6		
	Paper	0	1		
	Decayed wood	2	2		
	Construction materials	2	7		
	Leather	1	1		
	Fabric/Cloth	2	5		
	Carpet	1	3		
TOTAL				277	100

Grandparent's homes or homes visited repeatedly at childhood were mostly associated with pleasant feelings and childhood memories. The participants remembered the constant smell of those homes and this had an effect on the associations/emotions about the places. The remembered feelings were as happiness and memory related emotions were different such as longing (P28, P27, P19, P23). Oldness of objects, furniture and construction materials gave residential spaces a characteristic smell. Respondents who

chose family home as places of incidents, defined the smells of the houses with similar terms as “old furniture”, “old leather”, “old fabric”, “old wood”, “old objects” (P25). Also new furniture bought to a new house and their smell cleared the feeling of “emptiness” for P27.

It was the first time after the death of my uncle that I visited the mountain house (chalet) of him. When I climbed up the wooden stairs of the terrace, a smell of decayed wood welcomed me. The wooden terrace was covered with lichens and you could hear the smell of oldness. When I entered the house I felt the old leather smell of the sofas, and the smell of old wooden furniture. When I thought about our happy childhood memories at the place and my uncle, I felt melancholic and sad. (SMD-P25)

Our new vacation home used to give me a sense of emptiness since there was not much furniture at the beginning. As new furniture arrived to the house it began to smell more characteristic and intense. It now feels more like a home. (SMD-P27)

Some smell experiences were remembered not due to specific personal memories but due to their offensiveness level. Smells of chemicals such as chlorine (P6, P13), disinfectants, alcohol, naphthalene (P25, P28), smell of burnt objects (P1, P13, P22), hair dye (P7), nail polish(P7) etc. were distinctly remembered smells since they were dominant and offensive even at low intensities. Even though the perception of smell was not always conscious, those smell types were consciously perceived by the participants and even their absence was perceived due to expectancies from previous visits (P25).

I remember that there used to be a very distinct naphthalene smell in this home when I was a child. Now the smell of naphthalene was not there and it was replaced by the smell of old furniture. Realizing the absence of naphthalene smell surprised me. (OI-P25)

It was a smell of something burning outside my home. It made me wake up from my sleep. (SMD-P22)

I have not visited the place for a long time but I wanted to mention the chlorine smell of the swimming pool since it is one of my most distinctive smell memories. (OI-P22)

Same smell type results in different associations, emotions and behavioral responses at participants due to different context of place and personal background. For example, smell of damp at a friend's house reminds the oldness of a building to P1 and she connects this idea to a possible earthquake that may occur in İstanbul. This results in fear and anxiety and she has stopped visiting her friend's house, which is a behavior change due to smell. P15 also associates the damp smell at a metro station with fear of earthquake and she uses the metro only when it is unavoidable. For P11 smell of damp at the family home results in emotions of discomfort and reminds her of the grandparents whom she was not loved by. P14 smells damp at his bathroom and associates it to lack of hygiene and unhealthiness of the place, then causes him to replace the smell with cleaning materials after an intense cleaning activity. P22 wants to leave the museum when he perceives the smell of damp, but then he gets used to the smell and completes his museum tour. P24 smells damp in the laboratory where he finishes successfully his internship in the Netherlands. This smell reminds him his success and quality time he spent there, that is why he becomes excited, proud of himself and happy to sense that smell. Participant 17 also states positive feelings due to the smell of damp in the historic building of her university in Germany. Since it is a familiar smell from the first time she moved to Germany, this smell makes her feel at home and secure.

4.1.3. Category 3: Multisensory Properties of Space

Experience of an environment is dependent on multisensory perception of the place. Albeit, this study focuses on smell experience, other sensory attributes of place were also asked in data gathering process, in order to collect data on multimodal properties of smell memory. Since the multisensory properties of each memory were very complex and dependent on the context, frequency tables were not made for this category. The sub categories of C3 are presented in Table 7. Sense of vision and hearing were the mostly mentioned senses along

with smell while all the senses were affective on the ambience of the environment and responses of individuals to the incidents including sensory perception.

Table 7

Themes and sub-themes of C3 Multisensory Properties of Space

Theme: C3 Multisensory Properties of Space	Sub-theme
Sense of Vision	Lighting
	Material choices
	Colors
	Architectural design
	Crowd of people
	Furniture
	Objects
Sense of Hearing	Silence
	Human voices
	Animal voices
	Activity based sounds
	Sounds of machines
	Music
	Sounds of nature
Sense of smell	Foods and Drinks
	Human Activities
	Human Body
	Animals
	Smells Produced by Nature
	Synthetic Chemicals
	New Materials
	Old Materials
Sense of Taste	Taste of foods
	Taste of drinks
Sense of touch	Warmness
	Coldness
	Humidity
	Softness

Same smell along with similar multisensory properties at a previously visited place caused the participant to remember previous visits (R10). Different places with similar multisensory

properties and similar smell types caused the participants to remember memories of previous visits to familiar places with familiar social environment.

This is a woodland at a river side in Muğla. I previously visited the place in 2018 and liked it very much, that's why I visited the place again in 2020. The clean smell of the environment and breeze of the river *reminded me of my experiences at the place in 2018*. (SMD-P10, emphasis added)

The place is a bar in Germany where I go for meeting with my friends. *The smell and the design concept of the environment was very similar* to the cafes that I used to visit my friends at my hometown, Ankara. This *reminded me of my bachelor years and made me feel longing for the times that I spent with my friends*. I went to this bar with my Turkish friends and we were talking in Turkish. This made me think that I have traveled in time to home and feel as if I am at the city which I call as my home. (OI-P17, emphasis added)

Furniture, objects, construction materials, the building itself and people make up the multisensory properties of space. All these agents form the spatial memories together. For example, when one of these is missing or modified, emotional change such as sadness occurred in the visitors who were accustomed to previous versions of the places (P1 and P17). Participant 1 recalled her experience in her grandparent's old home which she currently experienced without furniture.

My grandparents left their 50-years home and moved to Silivri. When I went to the house for one last time to take a few objects left there, the house was totally empty. I realized that what makes a space a place was the smell of daily activities of the residents. The place was not smelling flowers of my grandma which she used to give water every day, smells of old furniture was not there. I could not see her cooking in the kitchen, and voices of their lovely conversations with my grandpa could not be heard anymore. The place stands with brick walls and window frames only. This was not the place that I have known for the past 27 years. **(SMD-P1)**

All the sensory stimuli within an environment work together to create the perception of the place. The social and physical attributes of the place were affective on the multisensory experience that a visitor was exposed to during the visit. All sensory cues were explained by the participants in the description of a hospital environment by P2 and P18

which influenced the perception of the place and negative emotions, associations at the experience of hospitals.

It was a *cold but luminous environment*. It was generally *very noisy* with *the sounds of people, machines and music*. There was a *very distinct smell* and an uncomfortable ambiance due to smell. Even though the place was spacious, still there were *details straining the eye such as crowd of people, furniture and lighting at cold light*. (OI-P2, emphasis added)

When I inhale the smell of hospitals, I remember my *emotions* during my stay at the hospital. I recall the *anxiety, desperateness and hope for healing soon for myself*. I am bothered of the *sounds of machines* which record the vital signs of patients. This reminds me of *how close we may be to death*. (SMD-P18, emphasis added)

4.1.4. Category 4: Emotion

The emotional responses to smell memory were separated into two: C4.1 Memory Related Emotion and C4.2 Current Emotion. This separation was due to different emotions of participants during the recalling process and at past when they have experienced the actual smell. The frequency table (Table 10) shows pleasant, neutral and unpleasant emotions and their sub themes.

According to Table 8, pleasant emotions were recalled the most with a percentage of 50,1. Unpleasant feelings are recalled at 32,4% of the smell memories and neutral emotions have the percentage of 17,1. This shows that respondents were inclined to focus on positive feelings at their autobiographical memories. Even the episodic memories that were experienced with negative feelings at past were remembered with positive or neutral current emotions. The pie chart for frequencies can be seen at Appendix G3.

Table 8*Frequency table regarding C4 Emotions*

Theme: C4 Emotion	Sub-theme	Frequency of Memory Related Emotions	Frequency of Current Emotions	Total of Sub-theme	Total of Main Theme	Percentages
Pleasant	Happy	36	5	41	168	51,0
	Relaxed	27	9	36		
	Peacefull	14	6	20		
	Feeling secure	11	7	18		
	Sense of belonging	3	2	5		
	Sense of familiarity	6	6	12		
	Motivated	2	1	3		
	Fresh	3	0	3		
	Excited	9	0	9		
	Dynamic	4	1	5		
	Impressed	3	0	3		
	Thankful	1	2	3		
	Sense of wonder	1	0	1		
	Feeling free	2	0	2		
	Sense of being loved	3	1	4		
	Proud of oneself	0	2	2		
	Feeling rooted	1	0	1		
Neutral	Nostalgia	6	21	27	57	17,0
	Focused	1	0	1		
	No emotion mentioned	10	18	28		
	Suprised	1	0	1		
Unpleasant	Sad	3	10	13	108	32,0
	Uncomfortable	18	7	8		
	Anxiety	10	6	16		
	Fatigue	4	3	7		
	Fear	4	1	5		
	Feeling hungry	3	0	3		
	Disgusted	6	3	9		
	Sense of not being loved	1	0	1		
	Longing	4	13	17		
	Unhealthy	2	0	2		
	Feeling unfamiliar	1	1	2		
	Feeling trapped	1	0	1		
	Unwilling	1	0	1		
	Frustrated	0	3	3		
	Hate	0	1	1		
	Suffer	0	1	1		
	Bored	1	1	2		
TOTAL					333	100,0

Note. Most repeated themes are highlighted.

First encounter with a smell and space type might cause a visitor to feel as a stranger, but by repeated visits and by spending quality time at the place, the feeling might

turn into a sense of wonder (P17) or familiarizing with the space and feeling cozy. When a familiar smell was perceived within a different place, different associations and emotions were experienced by P3, P16, P25 and P26. When a familiar smell was added to a different place, the ambiance of the environment might be perceived warmer and sincere/cozy (P13). Due to the sense of familiarity, similar pleasant feelings might occur as supported by the literature (Engen, 1991, p.13). The feelings were positive for P7, P9, P10, P13. Yet the opposite was also experienced by P30 with negative feelings.

I am doing my master's degree at Ege University and I began to study at the laboratory in this February. The laboratory smell (chemicals and cleaning materials) reminds me of hospital smell. This time it reminded me my laboratory in Ankara where I studied during my bachelor studies. I recalled the times that I have spent there with my university friends. This ambience was enjoyable and pleasant back then but now this new laboratory did not feel the same. It is a cold place. (OI-P3)

I recently perceived the smell of daffodils at a flower store on my way to my workplace. I first perceived that smell at the garden of our village house belonging to my grandparents. It is the smell of daffodils, the green plants and oxygen. When I recalled this memory, I could hear the voices of my grandparents talking in the background and I could feel the warmth of sunlight on my face. Whenever I smell daffodils, I remember this place and happy memories from my childhood, full of laughters of my family. (OI-P9)

I visited my friend's place and the house was heated by a stove. The place was familiar to me because of the smell of burning coal. This smell made me feel as if I was at my grandmother's place in which I have stayed for days during my childhood. I felt nostalgic and happy. The most distinct memory from this place was the smell of the stove. (SMD-P10)

The smell of my cousin's home was different in my last visit. It was smelling like baby shampoo, baby powder and dog. I felt cozier since this smell reminded me of my dog that I lost years ago. He was a baby when we adopted him. He was smelling like this and even the entrance of our house still smells the same. So, this familiar smell made me feel at home. (SMD-P13)

In contrast to above experiences, smells triggered negative emotions for P30:

This incident occurred at my university classroom in the Netherlands, where I was waiting for the lecture to begin. A friend of mine who sat next to me was smelling like the perfume of my mother which she used years ago. I suddenly felt a huge

longing to my mother and my house in Turkey. I could not cope with the feeling and I changed my place. Normally I would feel nostalgic to visit this classroom since I took my first classes here during my first year but this incident even changed the meaning of this place for me. (SMD-P30)

Smell perception enhanced the relaxing impact of an activity such as yoga, meditation (P11), shopping as a therapy (P19), going to the coiffeur for self-care (P7) or going to natural places for restorative impact (P12). Influence of smells on mood changing is used in aromatherapy (Karadag, 2017) and response of P11 supported this information.

The smell belongs to the candle that I burn at the times that I feel stressful in my room. It smells like vanilla, amber and patchouli. I got the habit of doing meditation by burning candles in this December, since I was highly stressful at work. I used to feel that the meditation I do in soft light in my room was increasing my psychological strength. I realized that the smell of this candle was very similar to the smell of soaps in my grandma's home when I was a little child. (SMD-P11)

4.1.5. Category 5: Activities in Space

Activities as a response to smell perception or remembered smell experiences were recorded. In Table 9, the activities in space category was divided into two as static and dynamic. Most of the participants did not mention their activities, actions and behaviors in space, but they focused on the smell experience in the SMD. The author asked further questions on this section in OIs to gather more detailed information.

Table 9*Themes and Sub-themes of C5 Activities in Space*

Theme C5: Activities in Space	Sub-theme
Static	Sitting
	Reading
	Resting
	Talking with people
	Studying
	Waiting
	Slowing down/stopping
	Waking up
	Doing meditation
	Eating/drinking
	Doing picnic
	Praying/worshipping
	Thinking
Dynamic	Exercising/ Doing sports
	Harvesting
	Cooking
	Walking
	Eating
	Doing experiments
	Working
	Leaving
	Shopping
	Cleaning
	Approaching
	Avoiding

The smell perception caused change in activities of the participants within the places that they recalled for SMD. For example, P30 could not cope with the smell of his mother's perfume which made him feel longing to his family and changed his place within the room to "avoid" this feeling due to the smell experience. The approach-avoidance behavior due to smell perception was also experienced in brand stores by P15, P20, P27 (it is explained in the next section as Pattern 7).

The combination of smell, place, social environment and function of the place caused a certain behavior change in the respondent. At the incident that P1 recalled, “Reading a book” was defined as a static activity only done by the movement of eyes. This was associated with smell, books and silence within the memory of the respondent. All these bonds were associated with the historical book store and caused her slowing down her steps in the book store as a matching behavior with the act of reading. Due to a functional addition of café to the book store, changes in the social environment, activities and smell occurred. The addition of coffee smell and social life of a café caused a cultural change within the book store and also caused a change in the behavior of P1 within the place.

I am imagining myself there, my footsteps are getting slower when I enter the book store... I think it's because the place gives me peace along with the smell. Book is something to be read slowly and in a calm manner. You sit down and you read. It is a very static activity, only your eyes move. It is the influence of idea of “reading book” that reflected upon my walking style... My foot steps are not getting slower as I walk through the book store anymore because I cannot feel the book smell anymore. (OI-P1)

4.1.6. Category 6: Memory Link/Associated Meaning

The answers to memory links and associated meanings were in a varying range. Therefore, frequency tables would not be beneficial in thematic analysis. Instead of tables, quotations from SMD's were used for deriving patterns.

When negative conditions of the memory were not present anymore within a place, the meaning of the place and memory associations became positive for the participants. Yet this did not cause a change in the place-smell relation. With this change in meaning, a sense of belonging due to the familiarity of the place, and a feeling of longing as the current emotion occurred (P16, P17, P19, P25). The following two extracts reveal this phenomenon:

My work place was a private education institution in Beşiktaş. This place used to smell lavender air freshener which was used for masking the smell of cigarettes, sweat, coffee and carbon dioxide... One day, I remember I was very tired and the smell was not bringing me pleasant feelings it used give due to my mental and physical fatigue... Today as I recall my memories at the workplace, I do not remember any of the fatigue or bad memories, but I remember the beautiful recollections. My happy days at the place and nice friendships are what I remember. The meaning of the place is just a beautiful memory now. (OI-P16)

I was a medical student and I used to go to a private education institution every weekend for getting prepared for the TUS exam. The place was not ventilated properly and it was smelling sweat and carbon dioxide. The place was where I suffer for studying for the TUS exam, I was sacrificing my weekends there. I used to feel trapped within the crowd in this place but I was not able to escape because of my responsibilities... Now when I think about the place, I do not feel the same distress. I realized that bad memories left their places to good ones. (SMD-P25)

Different smell types were associated with different religions in respondents' memories. Smell of rose water from a Türbe experience was associated with Islam by P21. The smell of a specific incense from a cathedral visit was associated with Christianity by P17, and smell of old fabric with frying oil within a house, which was used as a private teaching institution of Koran, was associated with the religion of Islam by P5.

The everyday experiences of familiar smells such frying oil or the air fresheners used for masking these smells, caused different memory associations and meanings depending on the context of the smell (P26) or depending on different backgrounds of people (P12). Air freshener smell at an office environment was associated with work experience for P26. Cheap/poor quality air freshener smell was associated with non-satisfactory work experience and loss of motivation at old office. High quality, floral air freshener smell was associated with a happy working environment and working with motivation in the recent office which had a totally different context. In the incident by P12, even if the smell type would be considered as negative by customers (frying oil), the respondent associated the smell with his father and childhood memories. These positive

associations resulted in positive emotions due to familiarity of the smell and the place (Engen, 1991, p.13).

Our fast-food restaurant has a very familiar smell for me since we are doing the same job since I was born. All the food that is cooked and fried in the place are mixed. It is a very intense and bothering smell for customers, but I got used to the smell and its familiarity makes me feel secure. I grew up there and the place keeps lots of memory for me. Also, this smell used to permeate on to my father's cloths, that is why the smell reminds me my father. (OI-P12)

Independent of the place, when an activity-based smell from previous daily routines/habits was perceived, the memories on the place and time period of the habit were recalled (P3, P5, P13). Even though the smell source was a negative event like fire, the associations in participant's memory were highly positive since she remembered happy memories and family dinners which they made barbecues (P13).

I bought a new bottle of Mandarin cologne at my new house in İzmir. This reminded me of the first days of Covid-19 pandemic when I bought lots of mandarin cologne from the internet. I used them for a long time. Now this cologne reminds me of the quarantine days and my old home in Ankara where I was very happy with my friends even though those days were very difficult for the whole world. (SMD-P3)

Whenever I perceive this smell which I call "religion smell". I first experienced the smell at the house that I used to go for learning Koran. When I sense it again, I remember that place. When I enter a mosque or a house after a funeral for listening to Koran, I perceive the same smell and remember that place in my childhood. (SMD-P5)

Even though the source was a tragic fire, the smell was carried 15 km with the wind to us and this smell reminded me of the times that we used to make barbecue during my teenage years. We were together with friends and this smell was a proof for me that I had quality time in my teenage years. (SMD-P13)

Some smells were associated with hygiene and cleanness level of the environment (P5, 14, 25). Participant 5 was a dietician and was working at a hospital. When some

patients took off their shoes, she perceived a smell of foot which made her think that the hospital and her room were unclean. P25 associated the unfamiliar cooking smell at a vacation house that they rented in Madrid, and she expressed the hygienic condition of the kitchen as “traumatic”. For P14, the smell of damp at the house that he rented, was associated with hygiene level of the bathroom. When he cleaned the bathroom with heavy cleaning material the smell was masked and he began to feel the place as home since it was clean and healthy.

Participants who have experienced earthquake (P15) or who had fear of a possible earthquake (P1), made associations between damp smell and oldness of buildings such as apartment floors, and metro stations. This feeling caused them to avoid visiting those places as much as possible.

Smell experiences from childhood which involved first encounter with an activity based specific smell, created more associations in respondents’ minds considering spatial memory and social attributes of the place (P5, P6, P11, P13). Most of these experiences from childhood, such as grandparent’s house memories, involved positive emotions like feeling secure, relaxed and peaceful (P28, P15).

My uncle has an atelier at Ankara Siteler. I visit this place since my childhood. There are machines for furniture making and workers. I was helping them when I was a child. We used to start working early morning. Around 10 am they used to give tea-bagel (simit) break. The radio was open always and Bozlak songs were playing. It was my first experience of work. I remember the smell of wood chips and I still love that smell; it reminds me of this place. (SMD-P6)

Along with the tv series that we were watching after dinner, my grandma used to make popcorn for us. Still whenever I hear that smell at the cinema for example, I remember my grandma’s place and the beautiful time we spend there during my childhood. (SMD-P11)

My uncle was a shipmaster at Istanbul City line. Once, when I was 6, he invited us to his ship and showed us his captain room. There I smelled fuel and the sea. I was very excited and I had nausea. Years later I heard the same smell mix at Marmaris Marina, I remembered him and this made me happy. (SMD-P13)

4.1.7. Category 7: Social Attributes of Space

Social attributes of place were effective factors on the smell type and visiting behaviors of the participants. At Table 10, themes and sub-themes of C7 social attributes of space are presented. At the incidents participants were either with their family, friends, strangers or they were alone.

Table 10
Themes and Sub-themes of C7 Social Attributes of Space

Theme: C7 Social Attributes of Space	Sub-theme
Being with Family	Parents
	Grandparent
	Relatives
Being with Friends	Girl/boy friend
	Colleagues
	University friends
	Childhood friends
	Animals
Being with Strangers	Patients
	Customers
	Staff/workers
	Passengers
	Students/Instructors
	Tourists
Being Alone	No one

Strong social bonds increased visiting frequency/duration. Most of the recollections involving grandparents and children were mentioned with positive associations and pleasant feelings. The social bond was highly effective on the smell-place association, as also stated by Kyle et al. (2004). For example, P9 remembered the old user, her

grandmother, of the room even when her smell has already disappeared. The opposite was also valid, the homes of grandparents who had weak social bonds with their grandchildren and the smell of their homes were associated with negative feelings and memories. The social bonds between parents of their mother and the twins (**P11 and P25**) were very strong as it was mentioned previously. Participant 11 also stated her smell memory on her father's parents whom they had weak social bonds. Her definitions of smell and place were based on negative attributes comparing to other grandmother's home.

Since we grew up away from them, we were never as close as we were with my other grandma. I think the smell of damp and the cool air of the home that welcomed us are like the symbolic representations of our relationship with grandma and grandpa. What I remember other than the damp smell, is the mean face expression of my grandpa. (SMD- R11)

Regarding smell experiences, food related places caused different associations due to social and physical attributes of place. Some respondents commented positively on their feelings as "happiness" and defining smell of food as "appetizing". Different associations were made for restaurant environments such as they were associated with "learning different cultures" for a Persian Restaurant, "art, fame and luxury" for the restaurant inside the AKM building in Taksim (P28), "family" when it was perceived in a residential place (P2, P19).

Some of the smell experiences were totally independent of place and were only related to people's (P14, P30) routine activities. Their characteristic smells were the notions what made a place "a living place" (P1). Those smells did not belong to spaces and could be transferred to other spaces with people which might cause "place-congruent continuity" (Twigger-Ross & Uzzell, 1996). The spatial memories and memories related to social life within the places could not be moved to other spaces (P1, P7).

4.1.8. Category 8: Visiting Frequency/Duration

Visiting frequency and duration are influencing factors in person-space relations. The results from SMD and OI, were confirming each other. The responses for visiting frequency and durations highly varied in expression such as *each weekend, twice in a month, at summers, or once in a year*. Therefore, table including themes/sub-themes was not generated for this section.

Positive associations and emotions at the experience of a place resulted in an increase in visiting frequency and duration (P4). The opposite was also valid(P6). Higher frequencies of visit and longer durations of visit created bonds between people and places. This result was also supported by previous studies (Hay, 1998; Low & Altman, 1992; Stedman, 2006). When the respondent stopped visiting a place without previous repeated visits at past, which caused familiarity, the smell memory faded away along with the meaning of smell and the place (P11).

Analysis of the diaries and OIs result in that spatial memories of respondents were more elaborate in their responses when the visiting frequency and visiting duration in the past were high. Their definition on smell experience, sensory attributes of physical environment and social properties of space were explained in more detail compared to their experiences of spaces with limited visits at past (P1 and P13). Respondent 1 said *"I can explain this place down to the last detail of it"* for the house where her grandparents lived for fifty years and which had a significant place in her childhood memories.

As more time was spent at the new environment, those smells became more permanent, familiar and this increases the sense of belonging to the space. The sense of belonging was experienced by P7, as she practiced her own routine in the newly constructed home.

I was the first resident of this newly built apartment flat. When I moved here it used to smell paint and cleaning materials. Now smell of my coffee that I make each day took the place of this smell. With the coffee smell the place became more familiar to me. The change from an unknown smell to a familiar smell increased my sense of belonging to the place. **(SMD-P7)**

4.1.9. Category 9: Visiting Reason

Visiting reasons stated at the study were categorized into 2 sub-themes: obligatory visits and voluntary visits. Each theme was branched into sub-themes as it is presented at Table 11. The obligatorily visited places were associated with negative emotions except the places that were visited for shopping. Voluntarily visited places were mostly the meaningful places in which place bonding or social bonds were formed. Other reasons were including cultural activities, touristic activities and activities realized for personal well-being (sports, meditation, vacation, worshipping or just escaping).

Table 11

Themes and Sub-themes of C9 Visiting reason

Theme: C9 Visiting Reason	Sub-themes
Obligatory	Shopping
	Education
	Work
	Transportation
	Doctor appointment
Voluntarily	Family visits
	Friend meetings
	Exercising/doing sports
	Worshipping
	Vacation
	Escaping/staying alone
	Emotion regulation
	Touristic tour
	Cultural activity

At favorite place studies, restorative effects of natural environments are stated (Korpela et. al., 2001). In this study, natural environments and smells of nature were associated with peace, resting, and breathing deeply. These positive associations were reasons of visit for P12, P24 and P30. These environments were used for mood-changing, staying alone and relaxation by the participants.

It is the smell of newly harvested melons. It makes me feel happy and peaceful. The place is the farm where our house is located. (...) This is where I can stay alone and escape from the city. All this greenery makes me feel calm. (OI-P12)

There is an urban park with a little forest in Delft. I go there for jogging. I love the sound of the wind and the trees. It smells wood, mud, and green plants. This place is like a revival area that makes me feel relaxed. (SMD-P24)

At the end of a very challenging year of my master degree during which I was away from my family, we went to holiday by our friend's boat. In the mornings I used to swim to the shore and walk at the sea coast. As my steps touched the mountain thymes, they used to release their smells. The wind was bringing the smell of the sea which together made me feel impressed by the nature. I was lost and found myself there, I was thankful to feel this way. Now I want to visit this place way more than before. (SMD-P30)

4.1.10. Category 10: Temporal Attributes of Space

Altay (2021) defines the changing attributes of a space experience as "Temporality of Experience" and categorizes the three features of temporality of an experience as "activity change of the participant", "changing sensitivity level of the participant" and "change in external stimuli" (p.303). Activity change of the participant refers to changing comfort level of the participant in different activities at the same space. Changing sensitivity level of the participant defines the experiences in which the external stimuli doesn't change but due to long period of exposure to same stimuli causes discomfort. The final feature is explained by Altay (2021) as change in external stimuli that may affect all senses, thus may cause a change in "sensed crowding" and "sensed privacy".

In this study, the changing attributes of smell experience are named as “Temporal Attributes of Experience” and they refer to all three features defined by Altay (2021). Category 10 was divided into two: 10.1. Change of smell and 10.2 Change of meaning. Change of smell refers to temporality of smells which are ephemeral. Change of meaning refers to the reactions of participants when the smell is changed, it inquires whether the meaning of the place change or not.

Several respondents explained that when a familiar place was considered they expected a familiar smell experience within that place. Yet change of smell due to change in social life and activities of people within the place, caused a change in the meaning of this place for respondents. As a result of it, in different cases, emotional change in a negative way had occurred and this triggered change in frequency of visit or change in behavior within the space (P25). Participant 1, stated that situation as follows:

I understood that what makes a place meaningful was the smell of daily activities that were realized by the residents of the place. When I left the house of my grandparents empty, I realized that the space doesn't have the same meaning for me. It was not “family” anymore. (...) I was too sad to see it as an empty space which was only left with brick walls and wooden window frames but without the familiar smell of the house. (OI- P1)

Familiarization to a smell type due to repeated experience caused a decrease at realization of smell even though the odor intensity was the same. This caused lower focus on the smell and less memory associations (P3). Köster and de Wijk (1991) defines this phenomenon as ““Being accustomed to smell, scientifically this is called olfactory adaptation”. This may happen not only due to repetitive exposure but also due to long exposure to smell.

The smell experience may be highly temporal especially at the outdoor environment and frequently ventilated indoor environments (P14, P16). For keeping the memory and the pleasant feeling when recalling the memory by influence of smell, the

participant wanted to stay in the moment for a longer time (P15). Just as ephemerality of smell as an attribute of the space, the pleasantness level of a smell, which is an attribute of the people, may temporarily change to unpleasant due to mood of the person. For example, the reason of this change maybe fatigue (P16, P30) Yet temporary changes in smell or mood of the person due to non-repetitive activities, did not create new smell-place associations, expectances or a change in meaning of the place for the participant (P3).

There was a fig tree at the garden of my grandparent' house. The house is not there anymore. As I was walking in my hometown, I perceived that smell of the fig tree and it was like a time travel back to my happy childhood. I felt very peaceful and wanted to stay at that moment to keep the memories and the smell with me. (SMD-P15)

Different design by changing the layout of the furniture caused no change in smell experience. It caused no change in the meaning of place and respondent continued to feel sense of familiarity within the space. Thus place-smell association was not changed (P10).

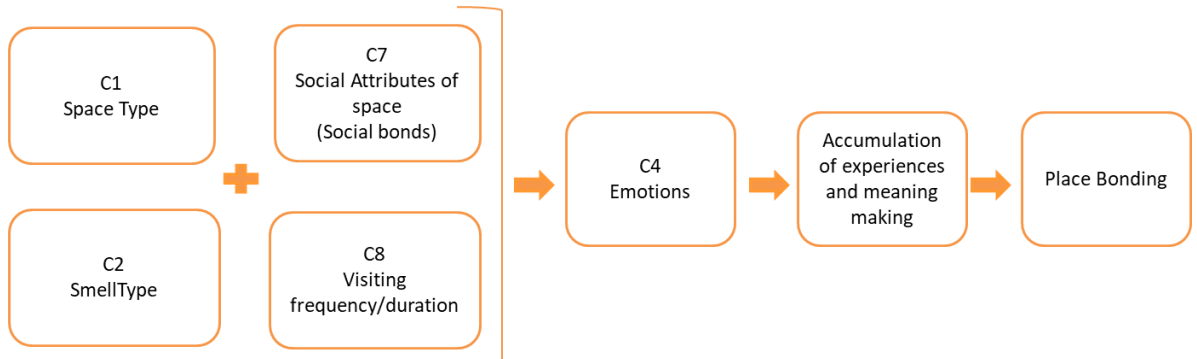
Almost four years later I turned back to my family home. The furniture layout and design of the place was changed, but when I entered the home, the smell was same and still very familiar to me. The smell that I know for years, made me think of my memories. (SMD-P10)

4.2. Patterns of Thematic Analysis

At this section of the thesis, relationships between categories were analyzed as a part of thematic analysis and these relations were named as pattern. As Manzo (2005) and Tuan (1974) state when places are used repeatedly, meanings through layers of different experiences are given to the places. Not only physical attributes of place but also social and emotional memories get involved in the “multi-faceted” relationship with the place (Manzo, 2005). This relationship may result in place bonding and it was defined as Pattern 1 by the author at Figure 8.

Figure 8

Pattern 1 Multi-faceted relationship with the place



Two participants were twins (**P11 and P25**) and they both recalled their grandmother's home independently at the SMD. Both were remembering happy moments from their childhood and expressing similar memories regarding their activities, social and physical attributes of place such as visits of their cousins, their playing times together, old furniture of the place. Both of the twins defined same distinct smell of Turkish Manti cooked by their grandparent and smell of garlic which reminded them of happy family dinners at the dining room of the home.

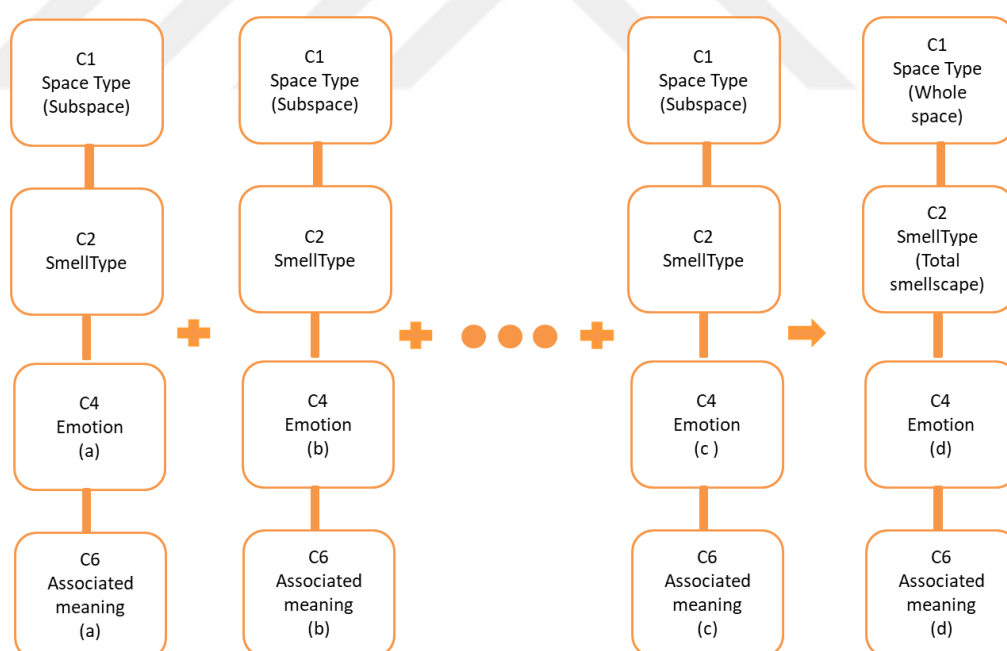
It was my comfort zone, *no one was limiting us* or getting angry at our mistakes. She was always cooking our favorite foods and *allowed us to eat chocolates*. Sometimes she used to sit with us and create games for us step by step. We were taking the pillows of the sofa and *create our own play ground*." (SMD-R25, emphasis added)

Grandma's home meant '*freedom*' to me. Unlike our parents, she was never angry at us, she used to leave even *chocolate and milk* as we were playing. We used to bring together the chairs of dining room and form *our own Luna Park* at the dining room." (SMD-R11, emphasis added)

Subspaces within a whole space were experienced with different smell experiences and the total smellscape of these spaces caused different associations and emotions than the subspaces (R1, R17, R19, R29). The presented relation was called as Pattern 2 by the author and it can be seen at Figure 9. This may be called as multiplicity of smell experience. These different smell experiences caused different memory associations and different feelings. P29 recalled a smell memory within the registrars' office of her university while P19 recalled the stationary area of her university, both were smelling different, causing different associations and emotions.

Figure 9

Pattern 2 Multiplicity of smell experience



The place was a registrar's office of my university. This is a small area where both the staff do their office work and students meet there at the sofas with the instructors or with friends. I used to visit this place 2-3 times in a week for socializing with my friends or doing my work at the office. There is an area where

you can take tea and coffee. There is always this smell of tea, coffee and spices. And the smell of photocopy machine... This smell mixture makes *me feel relaxed and feel secure* as if I am at home. (OI-P29, emphasis added)

This place is the stationary within the building of Faculty of Architecture in my university. There is the smell of newly printed paper from the photocopy machine. When I used to visit the place, I was always in rush of a deadline and there was always a long queue. Therefore, this smell used to give me *anxiety*. I remember the crowd within this small place. Even though the place used to give me anxiety, it was one of the places I visited the most, that's why it also gave me *sense of belonging and reminds me accepting challenges*. (SMD-P19, emphasis added)

Other than university subspaces, residential subspaces were also defined by participants regarding their different smell synthesis and related associations. Participant 1 and Participant 17 shared smell recollections at their grandparent's homes in Rize and İstanbul. Two houses belonged to different cities of Turkey with different cultures. The geographical dispersion of respondents and their memories resulted in cultural differences at smells of food.

My grandparents used to live in an apartment floor for 50 years with the same neighbors. The apartment even has a specific smell for years. It was a gathering place for our family. The house used to smell the food cooked by my grandma, stuffed green pepper with sweet basil, and flowers that she took care of. The balcony was used as a storage and it used to smell onion, garlic, potatoes. The bathroom used to smell naphthalene and the grandpa-cologne that he used after shaving. The whole house used to smell the lives of my grandparents and the happiness of the whole family which is left at the past. (SMD-P1)

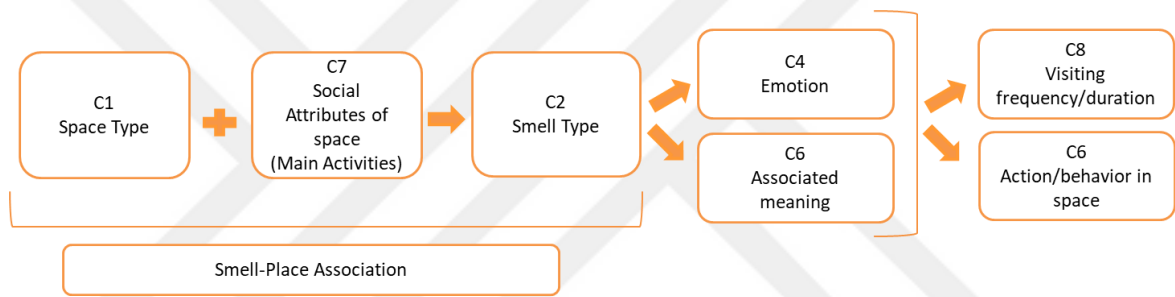
When I enter the home of my grandparents suddenly, I start to feel secure and relaxed cause I know that I am safe here. Those people always love me and protect me. (...) The kitchen smells black cabbage. The living room where my grandpa always spend time, smells cologne and old furniture. The old room of my mother smells "unused room" because no one uses this room. (SMD-P17)

Main activity types that were realized within a specific place caused the main, dominant smell type that was associated with the place for the visitor. This was defined as Pattern 3 of thematic analysis as presented in Figure 10. Also, the product type that are

sold at the market places determined the dominant smell of the environment (spice bazaar **OI-R23**, fish market **OI-R19**, flower bazaar **S-R9**, **SMD-R30**, coffee store **OI-R2**, **SMD-R15**, **OI-R28**). According to the answers of the participants, the dominant smells were generally constant for public spaces such as cafés, bakeries, hospitals, retail spaces. They claimed that smells of these places did not change at each visit, therefore these were characteristic smells of these places.

Figure 10

Pattern 3 Reactions to dominant, activity-based smells



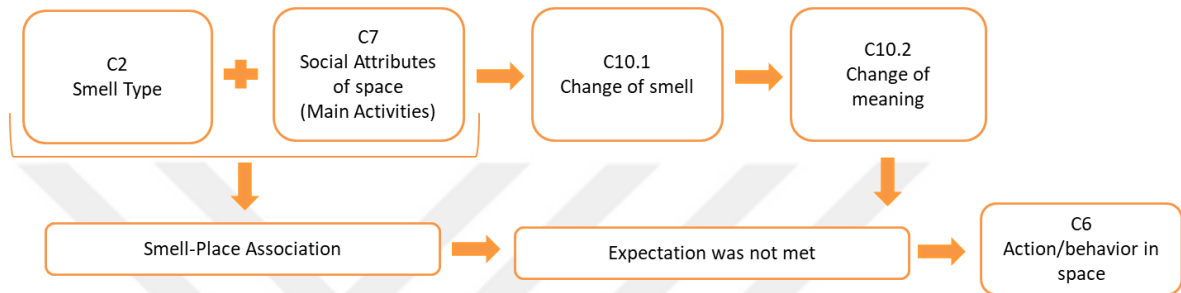
The spice, incense and human odors at the historical Spice Bazaar of Eminönü are totally matched with the place in my mind. People who walk within the historical building, food and spice stores are containing familiar smells, since I perceive this smell combination only in this place it was a very different experience for me. (OI-P23)

When those retail stores, market places stopped selling or producing a specific, characteristic product, the expected smell environment for the respondents changed. For instance, in the memory of **P20**, a local old coffee store which used to roast Turkish coffee beans within the place, stopped roasting activity after a while. The place was not smelling roasted coffee beans anymore. This caused a change at the character of this place according to P20 and old customers of the store. This change also caused a change at the

visiting behavior of old customers. This relation was called as Pattern 4 by the author and it is depicted at Figure 11.

Figure 11

Pattern 4 Impact of main activity change on smellscape and visiting behavior

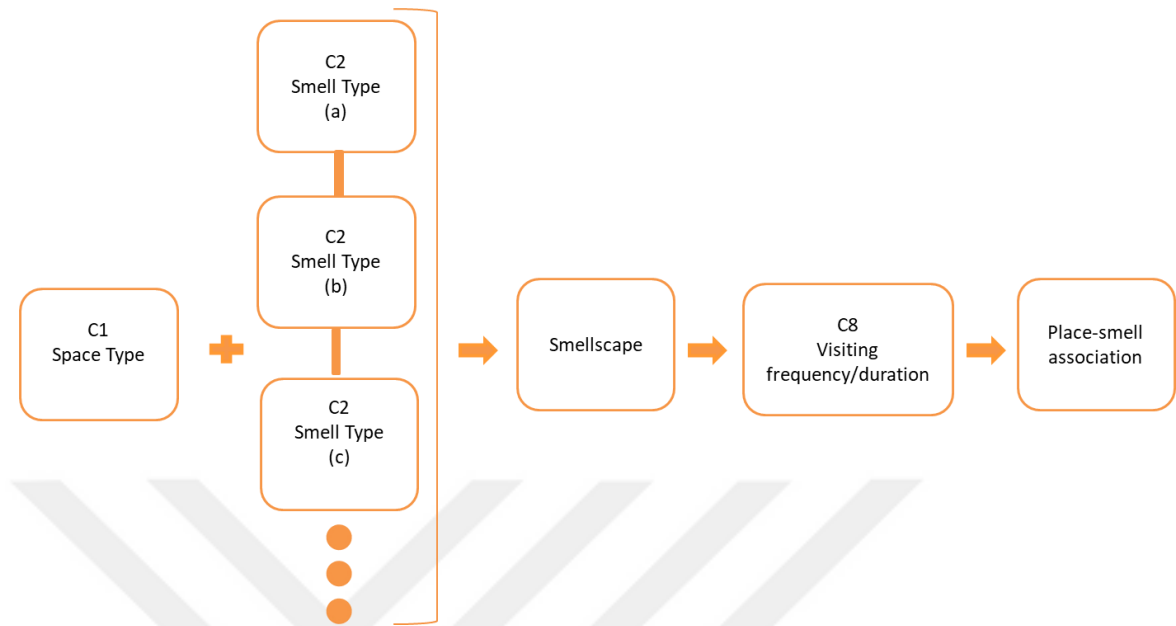


In this study, the sub-themes of smell type were recorded as single smell types for detailed analysis yet most of the smell memories in SMD and OIs include mixtures of smells which they associated with specific places. In literature, these smell mixtures experienced at specific place and time are defined as “smellscape” (Henshaw, 2013).

At spatial memories of respondents, mixture of several different smells created a characteristic smell of the place which is defined as smellscape of the environment. This created place- smell associations along with high visiting frequency/duration. The presented relation was defined as Pattern 5 by the author at Figure 12. The Spice Bazaar experience of Participant 23 and her Beşiktaş-Üsküdar Ferry experience were examples of this case. She defined the ferry smell as a mixture of sea, tea, bagel(simit) and human odors which their intensities change each day as she uses the vehicle for transportation, but this smell synthesis always made her remember the ferry as a place. She also mentioned that her hometown was not Istanbul but these two smellscape of contextual places were directly associated with city culture in her thoughts.

Figure 12

Pattern 5 Place-smell association of contextual places



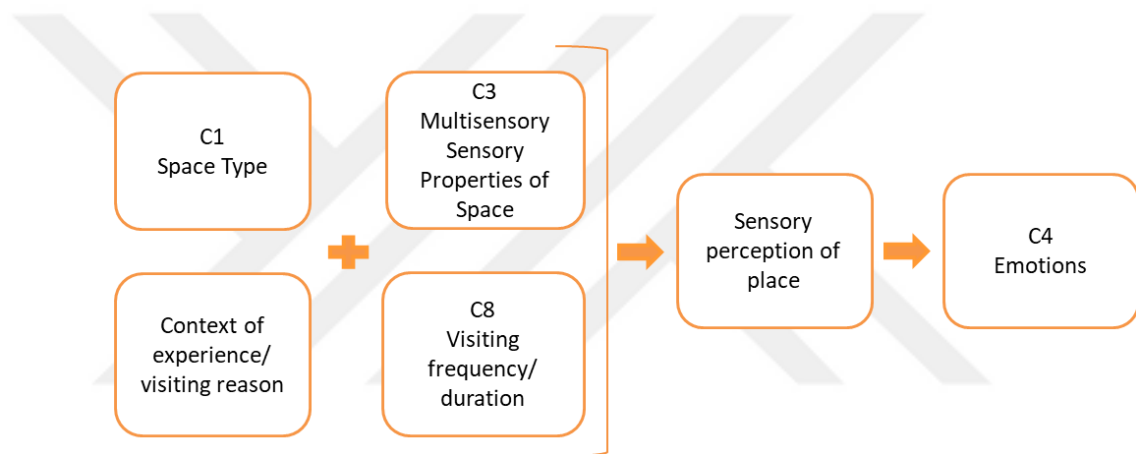
There were two other examples for smell synthesis and place associations is by R2, which caused totally different emotions at the participant. He narrated a smell experience belonging to a patisserie in Germany which included a constant smell of coffee, sweet, baked dough and fruits. He generalized this familiar smell as “You know the smell of patisseries, all of them smells similar”. This smell was coming from the muffins and croissants baked regularly at the oven of the patisserie each day. The respondent was visiting the place for breakfast, several times at a week and did not experience any smell change, so patisserie smell and this place were matched in his mind. This created a relaxed environment and happiness for the respondent. Another smell experience of him belonging to a hospital; created anxiety, discomfort and fatigue for him. The respondent defined the smell as “hospital smell” which included a mixture of chemicals, medicine, disinfectant and alcohol which are caused by the main activities that took place at any health care facility.

Independent of the positiveness of context and visiting reason, place memories were including details on the multisensory attributes of place (P4, P16). The reason in recall

of these incidents might be being exposed to a high number of different sensory stimuli for a long duration of time which caused a very intense experience of environmental perception. This caused a sense of chaos and resulted in anxiety and fatigue depending the context of incidents (P16, P7). This relationship formed Pattern 6 as it is presented in Figure 13.

Figure 13

Pattern 6 Influence of multisensory stimuli on emotions



There was a very intense smell of cigarette smoke and ash in the whole house. Even though I smoke too, the smell crated a feeling of disgust at me and it was hard to breath. (...) the places which didn't receive much sunlight which made me feel highly uncomfortable. The place was very unventilated. (...) felt sorry for my friend who lives there. (SMD-P16)

I recall a smell mixture of citrus fruit, carnation, hot wine, alcohol and food at the place of my friend form my new workplace. It was a two-stored villa with a garden. The spaciousness made me feel relaxed. My friend made us hot wine within a large cooking pot. (...) I liked the warm colors of the walls but the floor was covered with ceramic tiles which bothered me. Also, there was a smell coming from the oven, which was creating a micro-socializing environment in front of it. (OI-P16)

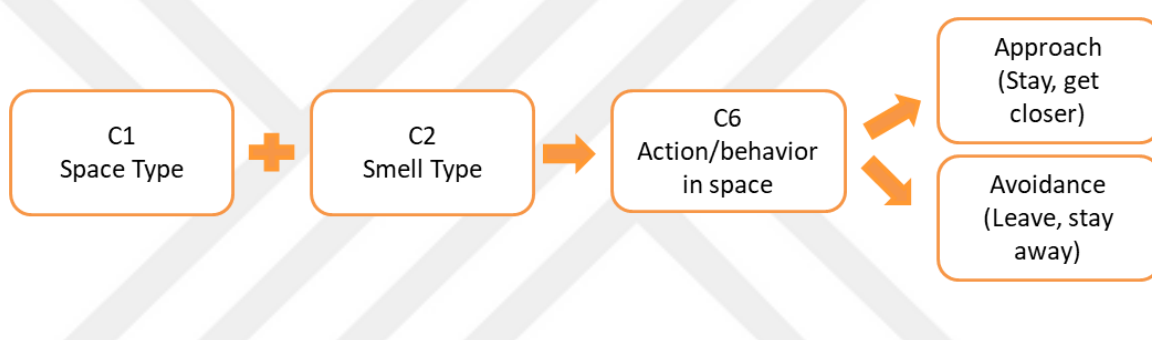
The place is my coiffeur in Turkey, which didn't visit after I moved to London. The place was smelling shampoo, hair, moisture, hair dye and nail polish. (...) There was also too much noise coming from the hair dryers and people who shout at each other to cover the sound of the machines. Feeling this much of different smell cues

and noises at the same time, made me realize the chaos in the environment. This thought and the sensory cues made me feel tired and caused anxiety. (OI-P7)

Customers wanted to do shopping or stay at the places for a longer time (P15, P27, P28) if they have sensed a pleasant smell at the stores. If the smell experience was not positive, the opposite of this scenario occurred and the participant wanted to leave the space (P20). This relationship was defined as Pattern 7 and represented in Figure 14.

Figure 14

Pattern 7 Influence of smell type on activities in space



All the stores of this clothing brand smell the same air freshener which is a mixture of mango and peach. It gives the store a very soft and clean ambiance. I think it's a brilliant sale strategy, it creates bonding between me and the store. Even if I am not going to buy anything, I love to enter the store and look for some cloths just to spend time there. (OI-P15)

The smell of the brand makes me feel young and dynamic. I feel that I can find myself trend and free-spirited cloths there. The colorful cloths at the store takes my attention the most with the effect of the smell. Those cloths are far away from being usual, they are special designs. The smell never changes and you can take this smell even before entering the store. It is very characteristic. (SMD-P27)

There is an air freshener which this clothing store uses at the changing rooms. I don't know why they are using it insistently. It makes me breath hard and it gives an impression that this brand is a poor quality/cheap brand. (...) at my last visit it made me feel highly uncomfortable. I don't think that I will visit the stores of this brand again. (SMD-P20)

As seen above, all the data from SMD and OI yielded in rich memory associations and emotions. The emotion caused either approach or avoidance behavior, in which pleasant emotions resulted in approach/stay response and mostly resulted in a higher

frequency/duration of visit. Considering the results of the study, when pleasant feelings and higher frequency/duration of visit were combined, place meaning was formed with positive associations and place bonding might occur.



CHAPTER 5

DISCUSSION

At the end of thematic analysis of collected data, in this chapter, data gathering methodology of this study are discussed in terms of triangulation of data by the two methods SMD and OI. Then study design in terms of providing smells as mnemonic cues are discussed. As next topic of discussion, language challenge of smell is considered. Furthermore, freedom of choosing incidents for participants is explained. Finally, results are discussed in the light of the literature review and original findings of this study are explained.

The literature on the perception of smell, included studies in qualitative approaches which focus on psychological and social influences within real life, laboratory and memory-based studies (Xiao, 2021). The design of methodology as a combination of SMD and OI provided in-depth data. Qualitative data gathering methods were advantageous on data inquiry of smell experiences, since smell perception, emotions and associated memories were highly subjective and difficult to reach. OIs were conducted with the purpose of data triangulation as phase 2. This second phase provided the researcher to ask more questions for more detailed information on personal memories. This methodology of using SMD and OI together is one of the strengths of this study regarding language challenge in smell studies.

While focusing on the recalled smell experiences of participants smell mixtures were not provided to the participants as mnemonic cues since it is impossible to replicate the original smellscape (Xiao, 2021) of the memories. The methods used in the study were based on subjectivity of embodied smell experiences, which could include emotional bias, yet this was the only possible way of reaching the long-term memories. Since smell memories are evoked when the exact smell cue is perceived, even replicating smells as a result of challenging laboratory processes would not be applicable and credible for this study since the original smell of the memory would not be achieved.

At the end of the pilot study and OI, participants were asked to comment on the questions and the study in general. Some of the participants said that it was difficult for them to express their emotions while some participants were more open to express their feelings. They provided more detailed sensory and emotional data. A few participants commented on the challenge of defining smells which is a deficiency of our language. As presented by Majid (2021) talking about smells is difficult and people are not used to talk about smell perception frequently, which reflects upon the nature of the English language. Yet this deficiency is dependent on culture and some languages include more lexicons on smell perception (Majid, 2021). Regarding the responses and comment of the participants, writing down the details on incidents was not easy and they felt more comfortable while talking. Some participants were comfortable with video calls while some participants preferred audio call through Zoom.

Respondents were free to choose which smell experience they would like to share as a critical incident. The chosen smell experiences were somehow more impressive for them. The reasons of choices were changing from person to person. For some participants the intensity of the smell was affective in their choice. Positive or negative emotions

accompanying the smell experience were influencing factors for some participants.

Familiarity of the smell or the place was another aspect effecting the choice of participants.

The results seem to support the previous literature. Smells of hotels, coffee stores and clothing stores which are called as *signature scent* (Thompson & Barratt, 2017, p140-147), create pleasant emotions and create bonding with the brand by attracting customer's attention even before entering the space. Not only during the experience of smell perception but also during the recall process, the same emotions and thoughts were evoked at the participants considering the brand identities. This shows that these brands were successful on creating bonds with the customers by generating smell-place associations in minds. The general design of the environments, the social context and the quality of services/products were also effective on the smell experience and person-space relationships.

It was expected that the increase of frequency and the duration of visit to have a positive impact on emotions generated as a result of previous smell experiences. There are studies defending both views which support the idea that emotional place bonding occurs as a result of long time periods of interaction with space (Hay, 1998; Low & Altman, 1992; Stedman, 2006) and the opposite view that emotional bonding not always occurs as a result of visiting behavior (Bolan, 1997; Stedman, 2002; Stokols & Shumaker, 1981). Relations of both views were encountered in the results.

The results of SMD and OI were parallel with the expectations. Places that provide emotion regulation such as natural environments were visited frequently by participants, which were defined as restorative environments in the literature (Ratcliffe & Korpela, 2016). Some of the participants preferred natural settings for doing meditation, staying alone, exercising, escaping and focusing. In some incidents social bonding was effective on the meaning making process of places as stated in previous studies (Tuan, 1977, Eisenhauer

et. al., 2000). When people established strong social bonds, visiting frequency and duration were increased independent of smell. Some of these places were favorite places which means an emotional bond was produced between the place and the person. Smell perception was not the only reason in these relations but it was a powerful part of them which enhance the emotion formation.

As spaces were visited more frequently, the meanings were assigned to the places by collection of different experiences/memories. The literature review supports this finding (Manzo,2005). Especially residential areas from childhood memories such as grandparent's houses were associated with positive emotions which caused the spaces to gain positive meanings. This meaning making process resulted in place-bonding. The remembered smell experiences were causing pleasant memory related emotions but the current emotions were mostly unpleasant due to loss of people.

Some space types such as hospitals, swimming pools, coiffeurs, patisseries and coffee stores had smell-place associations in the memories of participants. Even though smell experience has subjective roots, the smellscapes of these places were called by the names of the places, for instance as hospital smell or patisserie smell. This suggests a strong place-smell association and shows that space types may be matched with specific smellscapes and coded this way in memories.

This study is one of the first studies realized in Türkiye in terms of smellscape. The results provided unique data regarding Turkish culture and different cities of Türkiye. Such as climate attributes of Blacksea region as humid and rainy occurred in the results, it was reflected upon smell experience and even matched with characteristics of people in the memories. Also, cultural values of İstanbul were among the results such as *Kadıköy-Beşiktaş ferry with smells of tea, bagel and sea*. Likewise, smells of spice bazaar are part of cultural heritage of Istanbul. Some smells in the autobiographic memories were belonging to

cultural foods such as *black cabbage*, *manti* and *burnt orange peel*. Those data are original outcomes of this study and do not have any correspondence in the previous studies.

Different than previous studies, this study found out complex relationships regarding smellscape and person-space relations. There were both unique smells in autobiographical memory of participants and recurring smells with different or same associations, and emotions in a dispersed geography. Data on pleasant emotions and pleasant smell types were clustered in some smells. As presented in the previous section, valuable patterns were found between categories.

Participants of this study were young adults between ages of 20-30 which mostly resulted in sharing of childhood memories. Their episodic memories supplied vivid expressions of memories and emotion which was a prospected situation from previous study of St. Jacques and Levine (2007). If the age group was expanded to include older adults, the memories could involve teenage years and adult years as well. Restricting the sample to only young adults also provided similar cultural and up to date memories of 90s. Also, expressions and language of the participants were similar regarding their generation. In terms of episodic memory, it was aimed to prevent emotional bias by choosing younger age groups and the results were not including overstatements regarding emotions, which is a success of the methodology design.

CHAPTER 6

CONCLUSION

The aim of this study was investigating the important factors in the recall of smell-based memory of place, analyzing its relation to emotions and person-space relations.

Referencing to an in-depth literature review of smell perception, memory, emotions and person-space relations; participants were asked to recall their smell memories in order to reveal possible smell-place associations, place meanings and emotional bonds. This study may generate an interest in designers to create frequently visited and remembered places by integrating smell perception to their designs. Thus, smell would not be an underrated sense in architectural design anymore.

Considering the findings, visiting frequency/duration and reason are influencing factors on the collection of experiences which lead to attaining meanings to places. The meaning making process involves emotions that are formed as a result of multisensory experience of the place. The smell perception may result in positive, neutral and negative feelings which are associated with the contexts of places. The results of this study show that smells are effective on meaning-making process and they can either directly create place-bonding or be a significant part of this process.

OI methods provided data triangulation by revealing subtle information in episodic memories especially regarding multisensory experience of space. SMD was sufficient

enough to generate main and sub categories of thematic analysis. The data gathered from OI's confirmed the results of patterns that are generated from SMD.

This study is one of the first in multisensory research area, which analyze the junction points of place, memory, emotions and person-space relations regarding both interior and exterior spaces. Architects, interior architects, landscape architects, retail designers, environmental psychology researchers and anthropologists can benefit from this thesis study. The results may help architects to design, not only vision, but smell-dominated places, which would stay in minds of visitors in the long term.

The research and design studies regarding experience of environment mostly focus on the present moment experience of space. Design decisions are formed around the questions of "what will the user feel, how will the user use the space, which activities will she/he carry out?". This study emphasizes the significance of remembered place experiences. Pleasantness of the experience is remembered and this affects well being thus it has influence on place bonding and visiting behaviors of individuals. As design implications, the designers may ask "how will the user recall her experience in short of long time?". Since smell influences emotions unconsciously, integrating sense of smell within the design process, smell gains more power than just having a use value. Also this study considers smell experience in all space types, unlike studies on retail design area; and it investigates the impact of smell on voluntary visits to places. The results may be used in design of public spaces, such as schools and hospitals, in order to increase visiting frequencies and well beings of individuals during visits to these places.

6.1. Limitations

The sense of smell was studied by different disciplines as anthropology and psychology yet in environmental studies there were limited number of studies. Adding to this, the subjectivity of smell perception and intangibility of smell caused challenges at the

design stage of the study. The methodology of this study was designed to include a small sample group and the study had an exploratory nature which limits generalizations at the results. By revising the methods of the study, the quantitative data which gathered from a broader sample size could result in more universal outcomes. Furthermore, the relation between sense of smell and use of language was another limitation for the study. It was challenging for some participants to express their memories, emotions and describe the smells.

6.2. Future Research

Directions for further research could involve using the proposed data gathering methods as a multi-method technique in multisensory studies for different senses. The proposed methodology can be used with small revisions for researching the collective memory of specific places with an addition of in situ method such as smell walks. Furthermore, the results of this study involve highly unique values of Turkish culture. In further studies, this research design may yield in same categories yet different sub categories in different cultures. Also, the study involved young adults only; in further studies different age groups may be researched considering smell-based memory of place.

As a final statement, this smell study may open a path to both small scale and urban scale environmental studies to consider not only control of unpleasant smells but also integrating smell perception into design of environments. Future research may be on incorporation of sense of smell into the place-making projects of PPS which generates projects with cooperation of public by asking “What makes a Great Place?” (PPS, 2003). As one of the multisensory properties of place, smell perception may be studied as a part of their “place diagram” (PPS, 2003) which analyzes qualities of public spaces with the purpose of helping local designers for designing successful public places (Nouri & Costa, 2017). For instance, considering the restorative impact of natural environments and its

smell, more greenery may be added to urban environments. Interior spaces of public buildings may be designed in terms of smellscape in order to create meaningful places with emotional bonds that would last in collective memory of people.



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APPENDICES

APPENDIX A



Bilkent Üniversitesi

Akademik İşler Rektör Yardımcılığı

Tarih : 21 Şubat 2022
Gönderilen : Didem Zengin
Tez Danışmanı : Burçak Altay
Gönderen : H. Altay Güvenir
İnsan Araştırmaları Etik Kurulu Başkanı
Konu : “Smell Based ...” çalışması etik kurul onayı

Üniversitemiz İnsan Araştırmaları Etik Kurulu, 21 Şubat 2022 tarihli görüşme sonucu, “*Smell Based Memory of Place and Person-Space Relations*” isimli çalışmanız kapsamında yapmayı önerdiğiniz etkinlik için etik onay vermiş bulunmaktadır. Onay, ekte verilmiş olan çalışma önerisi, çalışma yürütücüleri ve bilgilendirme formu için geçerlidir.

Bu onay, yapmayı önerdiğiniz çalışmanın genel bilim etiği açısından bir değerlendirmedir. Çalışmanızda, kurumumuzun değerlendirmesi dışında kalabilen özel etik ve yasal sınırlamalara uymakla ayrıca yükümlüsünüz.

Kovid-19 salgını nedeniyle konulmuş olan kısıtlamaların yürürlükte olduğu süre içinde, tüm komite toplantıları elektronik ortamda yapılmaktadır; aşağıda isimleri bulunan Bilkent Üniversitesi Etik Kurulu Üyeleri adına bu yazıyı imzalama yetkisi kurul başkanındadır.

Etik Kurul Üyeleri:

Ünvan / İsim	Bölüm / Uzmanlık	
Prof.Dr. H. Altay Güvenir	Bilgisayar Mühendisliği	Başkan
Prof.Dr. Erdal Onar	Hukuk	Üye
Prof.Dr. Haldun Özaktaş	Elektrik ve Elektronik Müh.	Üye
Doç.Dr. Işık Yuluğ	Moleküler Biyoloji ve Genetik	Üye
Dr. Öğr. Üyesi Burcu Ayşen Ürgen	Psikoloji	Üye
Dr. Öğr. Üyesi Didem Özkul McGeoch	İletişim ve Tasarımı	Yedek Üye
Dr. Öğr. Üyesi A.Barış Özbilen	Hukuk	Yedek Üye

Kurul karar/toplantı No: 2022_02_21_01

APPENDIX B

SMELL DIARY

Please fill in the form with 2 remembered smell experience from the past and 2 recent smell experience.

SMELL NUMBER	1	2	3	4
DATE (day/month/year)				
PLACE				
DEFINITION OF SMELL(S)				
Please write a paragraph about EMOTIONS, ASSOCIATIONS and MEMORIES that the smell(s) make you think/feel/remember.				
FREQUENCY OF VISIT				
REASON OF VISIT				
How does the SMELL OF THE PLACE CHANGE?				
How do your EMOTIONS/ ASSOCIATIONS/ MEMORIES of the place and the smell change?				

APPENDIX C

ONLINE INTERVIEW QUESTIONS OF PILOT STUDY

1. Could you think of a smell experience from your childhood?
2. Could you think of a smell experience in public interiors from your childhood?
3. Could you think of a smell experience in public interiors from your high school/university years?
4. Could you think of a smell that you experience in public interiors today or this week?

Sub-questions are shaped according to the direction of the dialogue:

- a. Does it belong a specific place?
- b. How is the smell?
- c. How do you feel when you think of the smell?
- d. What are the associations?
- e. What are your memories related to that smell?
- f. How do you feel when you visit the place? (Pleasant, unpleasant, neutral)
- g. Why do you visit and in how frequently do you (used to) visit this place?
- h. Does the place smell the same at your every visit?
- i. Do you feel the same when you sense the same smell?
- j. Does the smell make you remember the place when you sense it at another location?

APPENDIX D

A DIARY ON SMELL BASED MEMORY OF PLACE

This form is prepared for the purpose of a master study "SMELL BASED MEMORY OF PLACE and PERSON-SPACE RELATIONS" which is conducted at I.D. Bilkent University Department of Interior Architecture and Environmental Design. The aim of this study is to contribute to architectural design/research literature by investigating the influence of remembered smell experience on place memory, the emotions and human-place relations within the scope of place identity, place meaning, place-bonding. For participating the study, you need to be older than 18 and fluently speaking either English or Turkish language.

The diary includes 3 parts. At the first, please answer the questions on your demographic information. At the 2nd and 3rd parts, you are expected to answer the questions regarding your recent and past experiences on sense of smell and matching place memories. There are 5 pages in the form, please make sure to read them all (the 5th page includes an invitation for the 2nd phase of the research study). It will approximately take 1 hour in total. In part 1, you will be asked to focus on a recent smell experience in which "recent experience" means experiences within last 6 months. In Part 2, you will be asked to recall two past smell experience and answer the following questions by focusing on the experiences respectively. Past experience includes your memories before last six months.

This study is approved by I.D. Bilkent University Ethical Committee. Within the study we do not have any provisions on risks to upset you. Yet, participation to this research study is totally on voluntary basis. Therefore, if you feel uncomfortable when sharing any personal information, you can stop sharing and request us to delete the records. Participants are free to read and change their answers to the diary questions by adding or deleting necessary parts.

All the data will be kept confidential and your forms will be accessible to researchers only. At research analysis, your answers will be shared anonymously and they will be assigned with numbers. You have the freedom of withdrawing from the research at any time by informing the researcher. The researcher also has the right to exclude any participant at necessary conditions.

For more detailed information on the research study, please contact with:

Didem Zengin:

Asst. Prof. of Practice Burçak Altay:

Considering the information above, please tick the box below if you are approving to participate in this research study voluntarily.

☐

I agree to participate in the research study that is explained above.

**A DIARY ON SMELL BASED MEMORY OF PLACE-PART 1 DEMOGRAPHIC
INFORMATION FORM**

1. Age:
2. Gender:
3. Educational status:

- ☐ Primary School
- ☐ High School
- ☐ Graduate Degree
- ☐ Master's Degree
- ☐ Doctoral Degree

4. Job:

Job status:

- ☐ Full time
- ☐ Part time
- ☐ Unemployed
- ☐ Retired
- ☐ Student

5. City/Country that you are currently living:

6. Do you have any health problems considering sense of smell? (Recently or any past experiences)

7. Do you have any health problems considering your memory? (Recently or any past experiences)

A DIARY ON SMELL BASED MEMORY OF PLACE-PART 2 RECENT EXPERIENCE DIARY

SMELL NUMBER	RECENT EXPERIENCE: SMELL 1 (within the last 6 months)	RECENT EXPERIENCE: SMELL 2 (within the last 6 months)
1. DATE (Please try to give an exact date as possible as you can remember)		
2. PLACE		
3. DEFINITION OF SMELL(S)		
4. Please try to focus on your past smell experience and write 3-5 sentences on your past feelings of the time you used to visit the place. Considering the social environment, activities, physical details of the place and the relation of the smell to the environment. Please note down if you remember any other sensory stimuli regarding your <u>experience</u> (such as hearing conversations, touching an object, moving around the place, taste of a food, any visual memory).		
5. What was the meaning of the place for you? Please comment on your general thoughts and general feelings about the place considering your smell experience.		
6. FREQUENCY OF VISIT <u>at past</u>		
7. REASON OF VISIT <u>at past</u>		
8. FREQUENCY OF VISIT <u>In last one month</u>		
9. REASON OF VISIT <u>In last one month</u>		
10. How does the smell of the place change if you had any visits in last month?		
11. When you recall your memories or when you visit the place recently, how do your emotions, memories, thoughts about the place and the meaning of the place change now?		

A DIARY ON SMELL BASED MEMORY OF PLACE-PART 3 PAST EXPERIENCE DIARY

SMELL NUMBER	PAST EXPERIENCE: SMELL 3 (earlier than the last 6 months)	PAST EXPERIENCE: SMELL 4 (earlier than the last 6 months)
1. DATE (Please try to give an exact date as possible as you can remember)		
2. PLACE		
3. DEFINITION OF SMELL(S)		
4. Please try to focus on your past smell experience and write 3-5 sentences on your past feelings of the time you used to visit the place. Considering the social environment, activities, physical details of the place and the relation of the smell to the environment. Please note down if you remember any other sensory stimuli regarding your <u>past experience</u> (such as hearing conversations, touching an object, moving around the place, taste of a food, any visual memory).		
5. What was the meaning of the place for you? Please comment on your general thoughts and general feelings about the place considering <u>past</u> .		
6. FREQUENCY OF VISIT <u>at past</u>		
7. REASON OF VISIT <u>at past</u>		
8. FREQUENCY OF VISIT <u>recently</u> (in last 6 months)		
9. REASON OF VISIT <u>recently</u> (in last 6 months)		
10. How does the smell of the place change if you had any <u>recent visits</u> ?		
11. When you recall your memories or when you visit the place recently, how do your emotions, memories, thoughts about the place and the meaning of the place change <u>now</u>?		

INVITATION FOR THE 2ND PART OF THE STUDY

The data gathering part of the research study includes 2 parts. The “DIARY ON SMELL BASED MEMORY OF PLACE” is the first phase of the study. At the second phase, online in-depth interviews will be realized over Zoom. You will be asked to choose one recent and one past experience from your smell diary. Similar but more in-depth questions will be asked to you during the interview and the interview framework is designed to create a relaxed environment. The interviews will be recorded and will be reached only by the researchers. The records will be decoded into text for analysis of the data. The information (at the first page) regarding confidentiality of personal data and records, is valid also for the second phase of the study. You have the freedom of withdrawing from the study, requesting to delete the interview records and making any changes at the text.

Participating the second phase is also voluntary. If you would like to participate at the second phase of the study after filling this form, please write your name below, for us to get into contact with you through e-mail.

Name/ Surname:

APPENDIX E

KOKU KAYNAKLI MEKÂNSAL HAFIZA ÜZERİNE BİR GÜNLÜK

Bu form İ.D. Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı Bölümü dâhilinde "Koku Kaynaklı Mekânsal Hafıza ve İnsan-Mekân İlişkileri" adlı Yüksek Lisans Tez Çalışması için hazırlanmıştır. Çalışmanın amacı; hatırlanan koku deneyiminin mekânsal hafızaya, duygulara ve insan-mekân ilişkilerine etkisini (mekânsal kimlik, mekânın anlamı ve aidiyet kavramları üzerinden) inceleyerek mimari tasarım ve araştırma literatürüne katkı sağlamaktır. Çalışmaya katılabilmek için 18 yaşından büyük olmanız ve İngilizce ya da Türkçe dillerini akıcı bir şekilde konuşabiliyor olmanız gerekmektedir.

Bu günlük 3 bölümden oluşmaktadır. Birinci kısımda lütfen demografik bilgiler içeren soruları cevaplayınız. İkinci ve üçüncü kısımlarda; yakın zamanda ve geçmişte yaşadığınız koku deneyimlerinize ile bunlarla eşleşen mekânsal hatıralarınız hakkındaki soruları cevaplamanız beklenmektedir. Bu form 5 sayfadan oluşmaktadır, lütfen hepsini okuduğunuzdan emin olun (5. Sayfada araştırmanın ikinci aşamasına katılım için bir davetiye bulunmaktadır). Bu formu doldurmanız toplamda yaklaşık bir saat sürecektir. Birinci bölümde yakın zamanda yaşadığınız 2 farklı koku deneyimine odaklanmanız istenmektedir, bu çalışmada "yakın zaman" dilimi son 6 ayı kapsamaktadır. İkinci bölümde, geçmişe ait 2 koku deneyiminizi anımsamanız ve sırayla bu deneyimlere odaklanarak beraberindeki soruları yanıtlamanız beklenmektedir. Burada "geçmiş deneyimlerden kasıt son altı aydan önceki anılarınızdır.

Bu çalışma, İ.D. Bilkent Üniversitesi İnsan Araştırmaları Etik Kurulu tarafından onaylanmıştır. Çalışma kapsamında size rahatsız edecek herhangi bir risk öngörmüyoruz. Fakat bu çalışmaya katılım tamamen gönüllülük esaslarına dayanır. Bu sebeple, kişisel bilgilerinizden herhangi birini paylaşırken rahatsızlık duyarsanız, paylaşmayı durdurabilir ve kayıtların silinmesini rica edebilirsiniz. Katılımcılar günlük sorularına verdikleri yanıtları okumakta, eklemeler yaparak ya da gerekli alanları silerek değişiklik yapmakta özgürdür.

Çalışma sürecinde tüm bilgiler gizli tutulacak ve formlarınız sadece araştırmacıların ulaşımında olacaktır. Araştırmanın analiz kısmında cevaplarınız isimsiz bir şekilde paylaşılacak ve isimleriniz numaralarla eşleştirilecektir. Araştırmacıyı bilgilendirmek suretiyle, dilediğiniz zaman araştırmadan çekilme hakkına sahipsiniz. Gerekli durumlarda, araştırmacı da herhangi bir katılımcıyı çalışmaya dâhil etmeme hakkına sahiptir.

Yukarıda belirtilen bilgiler doğrultusunda, gönüllü olarak çalışmaya katılmayı onaylıyorsanız lütfen aşağıdaki kutucuğu işaretleyin.

☐

Yukarıda açıklanan araştırma çalışmasına katılmak istiyorum.

KOKU KAYNAKLI MEKÂNSAL HAFIZA ÜZERİNE BİR GÜNLÜK-BÖLÜM 1 DEMOGRAFİK BİLGİ FORMU

1. Yaş:
2. Cinsiyet:
3. Eğitim durumu:
 - ☐ İlkokul
 - ☐ Lise
 - ☐ Lisans mezunu
 - ☐ Yüksek lisans
 - ☐ Doktora
4. Meslek:
5. Çalışma durumu:
 - ☐ Tam zamanlı
 - ☐ Yarı zamanlı
 - ☐ Çalışmıyor
 - ☐ Emekli
 - ☐ Öğrenci
6. Şu anda ikamet ettiğiniz şehir/ülke:
Delft/Hollanda
7. Koku duyunuz hakkında herhangi bir sağlık probleminiz var mı? (Yakın zamanda ya da geçmiş deneyimlerinizde)
8. Hafızanız hakkında herhangi bir sağlık probleminiz var mı? (Yakın zamanda ya da geçmiş deneyimlerinizde)

KOKU KAYNAKLI MEKÂNSAL HAFIZA ÜZERİNE BİR GÜNLÜK-BÖLÜM 2 YAKIN ZAMAN DENEYİMLERİ GÜNLÜĞÜ

KOKU NUMARASI	YAKIN ZAMAN DENEYİMİ: KOKU 1 (son 6 ay içinde)	YAKIN ZAMAN DENEYİMİ: KOKU 2 (son 6 ay içinde)
1. TARİH (Lütfen hatırlayabildiğiniz en doğru tarihi vermeye çalışın)		
2. MEKÂN		
3. KOKU(LARIN) TANIM(LAR)I		
4. Lütfen yakın geçmişten bir koku deneyiminize odaklanın ve mekânı ziyaret ettiğiniz zamanki hisleriniz hakkında 3-5 cümle yazın. Sosyal çevreyi, aktiviteleri, mekânın fiziksel detaylarını ve kokunun çevreyle ilişkisini göz önünde bulundurun. Deneyiminiz hakkında hatırladığınız diğer duyuşsal uyarıları da lütfen not alın(duyduğunuz konuşmalar, dokunduğunuz eşyalar, mekândaki dolaşımınız, bir yiyeceğin tadı veya herhangi bir görsel hatıra).		
5. Mekânın sizin için anlamı neydi? Lütfen koku deneyiminizi göz önünde bulundurarak, mekân hakkındaki genel düşüncelerinizi ve duygularınızı yorumlayın.		
6. ZİYARET SIKLIĞI <u>Geçmişte</u>		
7. ZİYARET NEDENİ <u>Geçmişte</u>		
8. ZİYARET SIKLIĞI <u>Son bir ayda</u>		
9. ZİYARET NEDENİ <u>Son bir ayda</u>		
10. Son bir ayda ziyaret ettiyseniz, mekânın kokusu nasıl değişti?		
11. Bugün anılarınızı hatırladığınızda veya yakın tarihte mekânı ziyaret ettiğinizde; duygularınız, hatıralarınız, mekân hakkındaki düşünceleriniz ve mekânın anlamı nasıl değişti?		

KOKU KAYNAKLI MEKÂNSAL HAFIZA ÜZERİNE BİR GÜNLÜK-BÖLÜM 3 GEÇMİŞ ZAMAN DENEYİMLERİ GÜNLÜĞÜ

KOKU NUMARASI	GEÇMİŞ ZAMAN DENEYİMİ: KOKU 3 (6 aydan önce)	GEÇMİŞ ZAMAN DENEYİMİ: KOKU 4 (6 aydan önce)
1. TARİH (Lütfen hatırlayabildiğiniz en doğru tarihi vermeye çalışın)		
2. MEKÂN		
3. KOKU(LARIN) TANIM(LAR)I		
4. Lütfen yakın geçmişten bir koku deneyiminize odaklanın ve mekânı ziyaret ettiğiniz zamanki hisleriniz hakkında 3-5 cümle yazın. Sosyal çevreyi, aktiviteleri, mekânın fiziksel detaylarını ve kokunun çevreyle ilişkisini göz önünde bulundurun. Deneyiminiz hakkında hatırladığınız diğer duysal uyaranları da lütfen not alın(duyduğunuz konuşmalar, dokunduğunuz eşyalar, mekândaki dolaşımınız, bir yiyeceğin tadı veya herhangi bir görsel hatıra).		
5. Mekânın sizin için anlamı neydi? Lütfen koku deneyiminizi göz önünde bulundurarak, mekân hakkındaki genel düşüncelerinizi ve duygularınızı yorumlayın.		
6. ZİYARET SIKLIĞI <u>Geçmişte</u>		
7. ZİYARET NEDENİ <u>Geçmişte</u>		
8. ZİYARET SIKLIĞI <u>Son zamanlarda</u> (son 6 ay içinde)		
9. ZİYARET NEDENİ <u>Son zamanlarda</u> (son 6 ay içinde)		
10. Son altı ayda ziyaret ettiyseniz, mekânın kokusu nasıl değişti?		
11. Bugün anılarınızı hatırladığınızda veya yakın tarihte mekânı ziyaret ettiğinizde; duygularınız, hatıralarınız, mekân hakkındaki düşünceleriniz ve mekânın anlamı nasıl değişti?		

ÇALIŞMANIN 2. AŞAMASI İÇİN DAVET

Bu çalışmanın veri toplama süreci iki aşamadan oluşmaktadır. “KOKU KAYNAKLI MEKÂNSAL HAFIZA ÜZERİNE BİR GÜNLÜK” çalışmanın ilk aşamasını oluşturmaktadır. İkinci aşamada, “Zoom” üzerinden daha detaylı röportajlar gerçekleştirilecektir. Bu aşamada, günlüğünüzden bir yakın zaman ve bir geçmiş deneyiminizi seçmeniz istenecektir. Röportaj boyunca, size birinci aşamaya benzer ancak daha detaylı sorular sorulacaktır ve röportaj soruları rahat bir ortam yaratmak için tasarlanmıştır. Röportajlar kayıt edilecek ve ulaşımı sadece araştırmacıya açık olacaktır. Verilerin analizi için kayıtlar deşifre edilecek ve yazıya dökülecektir. Formun ilk sayfasında belirtilen kişisel verilerin ve kayıtların gizliliği hakkındaki bilgilendirme, ikinci aşama için de geçerlidir. Dilediğiniz zaman çalışmadan çekilme, röportaj kayıtlarını silme ve cevaplarınızda değişiklik yapmak hakkına sahipsiniz.

Çalışmanın ikinci bölümüne katılım da gönüllülük esasına bağlıdır. Bu formu doldurduktan sonra ikinci aşamaya katılmak istiyorsanız, sizinle e-posta yoluyla iletişime geçebilmemiz için lütfen isminizi aşağıya yazınız.

Adınız/ Soyadınız:



APPENDIX F

ONLINE INTERVIEW FRAMEWORK

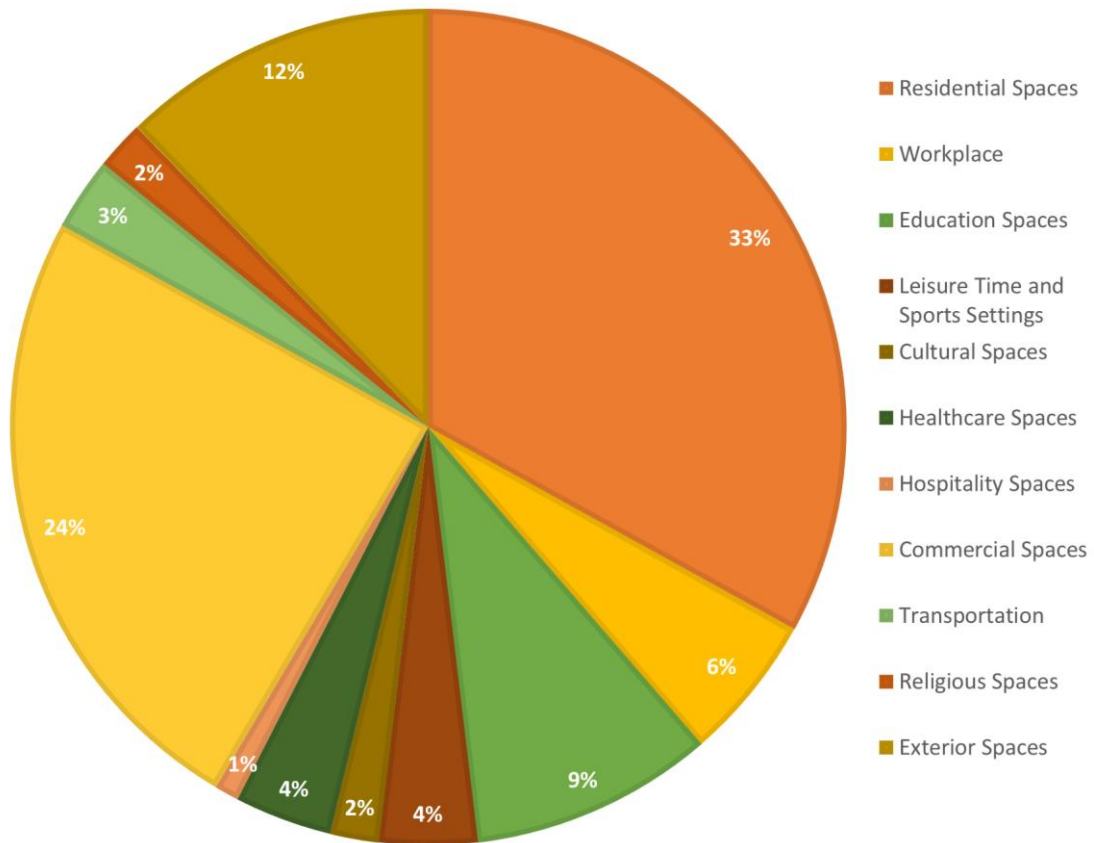
Could you please choose one of the smell experiences from your smell diary? You may choose to think on another experience that you recalled after you submitted the diary. It may be a pleasant, unpleasant or neutral smell at any context.

Please take a deep breath, if it feels better, you can close your eyes. Take your time and try to relax. When you are ready, please try to focus on your chosen smell experience.

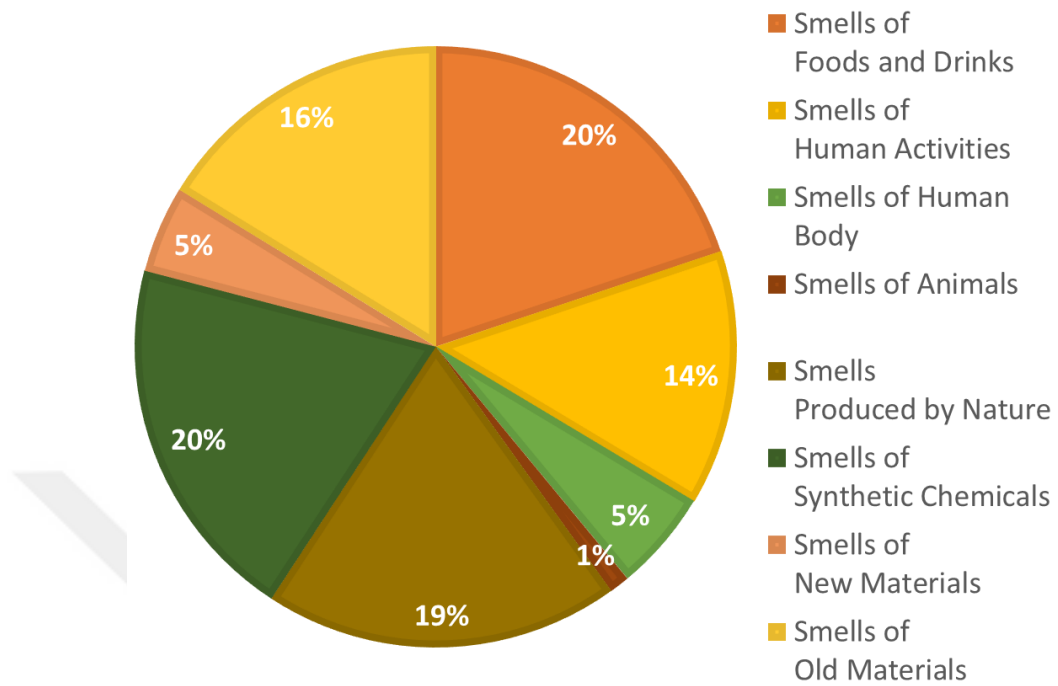
1. Does the smell belong to a specific place? Could you describe the place?
2. Please try to imagine yourself within the place. Could you describe the smell? (Frequency, intensity, its source/location, pleasantness)
3. Do you have any kind of a specific word, metaphor or concept to express your embodied experience of smell with?
4. How do you feel when you think of this smell?
5. When you recall the smell what kind of associations come to your mind? They may be thoughts, other sensory stimuli (sounds, scenes, tactile/kinesthetic experiences), people, objects, activities, physical features of the environment that are matching to the smell.
6. What was the meaning of that smell for you?
7. How frequently you were visiting the place? How long you were staying there? Was the smell of the place changing at each visit?
8. What was your reason of visit in general?
9. What were your feelings/emotions related to this place?
10. What was the meaning of this place for you?
11. Was the smell affective on your feelings/emotions about the place?
12. Would you prefer this place to smell differently? Would you still want to visit the place?
13. Please think that you are walking within different locations of the place. Could you describe the social and physical environment as you move around the place?
14. As you move around, does the smell change?
15. Have you ever sensed the same smell at a different location?
16. Have you ever visited the place recently? Was it smelling the same?
17. How did you feel when you experienced the same place with the same/different smell?
18. How does the meaning of the place and meaning of the smell change when you think of it now?
19. Is there anything else you would like to add about your experience or the place?

APPENDIX G
(Pie Charts of frequency tables)

Appendix G1: Pie chart with partial percentages for C1 Space Types.



Appendix G2: Pie chart with partial percentages for C2 Smell Types.



Appendix G3. Pie chart with partial percentages for C4 Emotions category.

