

DETERMINING SOUND, SMELL, AND TOUCH ATTRIBUTES IN SMALL URBAN PARKS USING NGT

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ABSTRACT

All senses in the landscape area are always interrelated in a complex way. Since concept of multi-sensory integration has been considered as an influential factor on the human environmental perception, engagement of the non-visual (sound- smell- touch) factors could add some information to human knowledge. The literature review of the paper initially addressed the effectiveness of non-visual factors. The summary extracted Natural, and Mechanical, Human, Instrumental (for sound), in addition Natural, Environmental related and Human-body (for smell), and finally Natural and Furniture (for touch). Furthermore, research with application of literature conducted NGT (Nominal Group Technique) to determine more salient information regarding availability of non-visual attributes in the urban environment (e.g. small urban parks). The finding of this research could offer some insight into the design elements. Indeed, the extracted information could help the designers and policy makers to propose applicable and appropriate combination of the elements in the urban area such as small urban parks to establish a more successful environment.

Keywords: Non-Visual Factors, Sound, Smell, Touch, NGT, Multisensory Integration

1 INTRODUCTION

Landscape assessment studies have mostly concentrated on the visual dimension of the landscapes (Soliva & Hunziker, 2009). When people assess the landscape they are influenced not only by the visual preference judgment, but also by other factors such as values, assumptions, knowledge, life situations, interests and other multi-sensory understanding (Bell, 2012).

Previously conducted studies have confirmed that, the aesthetic response activated by the environment, could stimulate the visual attributes of the environment (Nassauer, 1980). Ulrich (1993), on the other hand, has indicated that our perception of the environment is multi-sensory. Hekkert (2006) claimed that, aesthetic experience is restricted to the pleasure that results from sensory perception. Sathian and Zangaladze (2001) have advocated that the relationship between non-visual tasks and visual aspects of the space plays the main role in mental sensory processing. However, vision is still the most reliable sense, which can capture environmental information effectively and efficiently.

2 REVIEW OF LITERATURE

Terms of non-visual factors which have been proposed by some scholars in their researches (e.g. Aglioti & Pazzaglia, 2011; Southworth, 1969; Visell et

al., 2009) are the indicators of senses other than vision. In this regard, Fawcett, Ellingham, and Platt (2008) used the multi-modal integration for assessing aesthetic quality, which consisted of three main components. The first component is a series of independent attributes describing the object; the second referred to the utility and function of each attribute; and the third is the weight attached to each attribute. It was affirmed that the sensory experience by considering the non-visual factors affect the aesthetic experience.

Awareness of the non-visual factors can mostly influence our experience of the environment. In this regard, Chen, Adimo, and Bao (2009) evaluated the non-visual factors at the Hangzhou flower garden using the quantitative holistic evaluation. They reported that there was a strong indication for the respondents' perception in terms of their non-visual understanding and preferences. The respondents regarded the visual, olfactory, auditory, and tactile elements to influence aesthetic quality of the landscape.

Non-visual factors have been investigated in other fields for some time. These include definition, terminology, rating scales, and usage of the product (Aust, Oddo, Wild, Mills, & Deupree, 1987). The Sensory Cognitive Theory as proposed by Hill (2003) suggested that the costumer typically senses first, feels or thinks next and acts last. However, more attention is also required concerning the multi-sensory perception for various products and materials (Whitaker, Simões-Franklin, & Newell, 2008). Coeterier (1996) claimed that understanding and perception on sensory quality must be considered as a silent attribute which defines the landscape perception. He explains that the sensory information in the landscape might work in two ways - either as senses such as hearing and feeling or as information like the message, which provides the objects with an identity. All of the senses, as part of human understanding about environment and life have always influenced our actions, emotions, memories, preferences, choices, and perceptions (Krishna, 2010). Most things in the environment are experienced by multiple senses which give us a sense of knowledge about that specific space, place, and object as well (Chen et al., 2009). For example, in the field of production, the sensory

evaluation is employed to evoke, analyze, measure, and interpret the reactions to the characterization of materials as they are perceived by different senses. It has been noted that in view of the aesthetic perception, multi-sensory stimuli and integration of all the senses such as olfactory, tactile, vision, and auditory senses can give rise to the formation of a robust method for assessing aesthetic quality (Uzzell, 1989). In this context, Lindström (2005) developed a more holistic five-sense dimensional approach with the aim of exploring the relationship between the senses, indicating that the multi-sensory experiences influence the perception of product quality and increase the users' preferences toward a particular product. According to Thwaites and Simkins (2007), in the route aspect of the direction, which gives humans a sense of future possibility, two dimensions called sensory and kinetic are reckoned as the main factors. In the sensory factor, exploration and mystery, which relate to vision, smell, and sound are counted as the sub-scales. In a schematic model for aesthetic experience Leder, Belke, Oeberst, and Augustin (2004) proposed that implicit and explicit integration among information involves all the senses (Figure 1). The following subsections elaborate more on effectiveness and attributes of non-visual factors (sound, smell and touch cues), along with their functionality through literature.

2.1 Sound

The transmission of the waves' sequence through the air or water or any objective materials can be named as the sound, which its perception in effect relates to a certain range of frequency, and is varied between 20Hz and 20 kHz (Raichel, 2006). The application of sound differs from person to person, which could be applied to detection, navigation, communication, and so forth. The sound wave might be different in terms of its speed, characteristic, properties, and its pressure level (Dalkir, 2013). Human can hear different kinds of sounds, which can be animate or inanimate (Gelman, Spelke, & Meck, 1983). All of the sounds in practice tend to be a symbol in our brains, which decodes their meanings when they are heard. The sound has a vital impact on different fields, such as the product and advertisement evaluation, the perception of the ambience in the public environment as well

as the landscape and the city area. In fact, the perception of pure sense auditions can be referred to as the sound (Krishna, 2012).

Southworth (1969) demonstrated that the individual evaluation of sound is concerned with three diverse aspects. These are the availability of the information in the sound, the context, and the level of the sound. All of these, become the leading factors in some circumstances being used to evaluate the sound perception from an individual's point of view. It is well agreed that the sound source identification is a complex task, while several items such as the shape, size, and materials of the sounds can impose an effect on the sound source identification (Lutfi, 2007). Moreover, because of the environmental context, there is typically a variation in the sound

transmission from its source to the receiver. The sound, which we hear, depends not only on its source but also on the obstacle in the context. The setting or the place in which the sound is embedded generates the requirements, which in turn determine how we perceive or evaluate such a sound. These impacts imposed by the place on the perceived sound maybe beheld as the context effects which are in connection with the psychological aspect of a place (Nilsson & Berglund, 2006). Guastavino (2006) has provided further evidences confirming that the people organize the sounds consistent with the meaning attributed to the acoustic signal as a semantic cue pointing to a source rather than on the basis of the abstract physical properties.

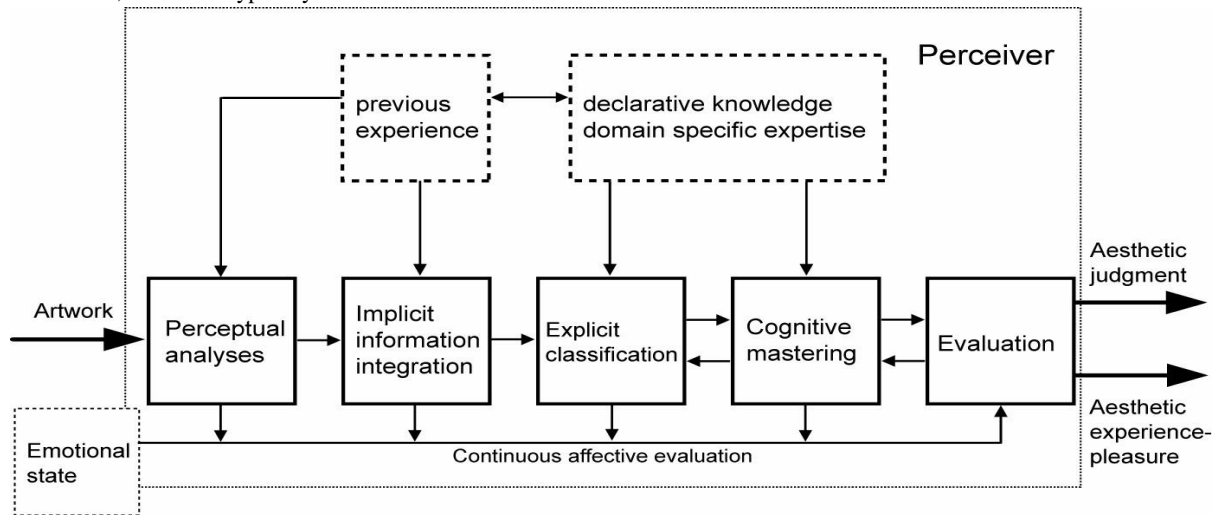


Figure 1: Schematic model for aesthetic experience; Source: adopted from (Leder et al., 2004)

Cats-Baril and Gibson (1987) have suggested that both the intensities and duration of the sound imposes an impact on the hearer's evaluation in a particular context. They have also maintained that the sound can be evaluated as an extreme to enhance in one side and to detract at the other extreme. J. L. Carles, Barrio, and de Lucio (1999) declared that in the

natural landscape two main functions of the sound (the abstract structure and interpretation of the sound) are required in order to complete the visual data. Actually, it can be inferred from their research that the naturalistic sound has an influential effect on the environment. In reality, the sensitivity of the vegetated areas is more than the built setting areas in terms of acoustic

stimuli. This sensitivity can be increased by the interaction of the availability of different sounds in the environment. Desirable and undesirable sounds can indeed enhance or detract the individual's preferences towards any environments. Furthermore, they found that the individual preferences related to the sound inclined more towards the natural sound, followed by the man-made sounds. However, it was suggested that the attempt to identify the information relevant to sound appreciations in different contexts could enhance space quality.

Sound is a complex system, especially in urban areas. Sound preferences are affected by various factors (such as demographic, behavioral, and psychological factors), which could be considered from both social and physical aspects (Cain, Jennings, & Poxon, 2013; Semidor, 2006). The study by Yu and Kang (2008) found out that the social and demographic factors have an insignificant effect on the sound level evaluation in the urban open spaces. It was suggested that different variations might exist for different urban spaces. Clark and Stankey (1979) mentioned two categories of sound, which ranged from a completely undeveloped to a highly developed environment. In an urban setting, mechanical and none mechanical sounds decrease users' preferences. However, users expect to hear mechanical and none mechanical sounds as a part of an urban setting. Thus, they suggested that they type of sound would influence the quality of the spaces consistent with its setting.

By considering the acoustic comfort, W Yang and J Kang (2005) highlighted that there were differences between the quantitative measurement and subjective evaluation of the soundscape of the same landscape. Cain et al. (2013) illustrated the multi-dimensional evaluation of sound in four different categories. These include sound of aircraft, environmental sound, musical sound, vehicles and other artificial sound as well as "common" sound. They suggested that by applying emotional description of the sound one could be positioned to form a 2D perceptual space. Yu and Kang (2010) evaluated sound preferences based on different kinds of factors. They categorized sound preferences into natural, human,

mechanical, and instrumental sounds. Their study found that older people preferred natural sounds. They also found that age and educational level influenced sound preferences in urban open spaces (Yu & Kang, 2008). There is also the possibility that cultural differences could affect sound preferences.

Some available literature associated with the role of the sound and its influences on our lives in the nature or the urban areas are listed in Table 1

Table 1: List of studies on Sound

Source	Effect studied
(Southworth, 1969)	Spatial Information – Visual Perception
(Clark & Stankey, 1979)	The Quality Of the Space
(Kariel, 1980)	Recreational Choices
(Anderson, Mulligan, Goodman, & Regen, 1983)	Appraisal of a Given Place
(Kellaris & Kent, 1993)	Pleasure and Arousal
(Tester, 1994)	Sense of Understanding The space
(J. L. Carles et al., 1999)	Setting Quality
(North, Hargreaves, & McKendrick, 1999)	Choice Selecting
(Yalch & Spangenberg, 2000)	Enjoyment- Fell Like Spending less Time
(Zampini & Spence, 2005)	Taste Perceptions
(Guastavino, 2006)	Socialized Activities
(Öhrström, Skånberg, Svensson, & Gidlöf-Gunnarsson, 2006)	Well Being- health
(Tyrväinen, Mäkinen, & Schipperijn, 2007)	Recreation Experiences
(Atkinson, 2007)	Spatial and Temporal Patterns
(Yu & Kang, 2008)	Watching Behavior- Selecting The Views
(Visell et al., 2009)	Perception of Visible Activity
(Benfield, Bell, Troup, & Soderstrom, 2010); (Brown, Kang, & Gjestland, 2011)	Environmental Assessment

Table 2 represents the extracted items from literature with reference to different kinds of sounds in the urban area. Influence of sound with different attributes could be extracted from literature, however, further information needed to categorize these information in the urban environment.

Table 2: Extracted items from literature on different kinds of sounds

Human sound	Mechanical sound	Instrumental sound	Natural sound	Source
	Downtown traffic, trail bike, cars		Songbirds, crickets, wind in tress, broking dog, insects	(Anderson et al., 1983)
			Running water, water, doves, nightingales	(J. Carles, Bernáldez, & Lucio, 1992)
			Water, birdsong	(Björk, 1986, 1995)
			The rustling of leaves	(Coeterier, 1996)
	Road traffic	Festivals sounds, Azan		(Al-harthy & Tamura, 1999)
Residential neighborhood voices, footsteps, conversations, shouts	Car horns		Stream with birdsong, sound of water, dogs, Thunder	(J. L. Carles et al., 1999)
	Passing vehicle	Quiet or silent space	Sound of ducks, splashing& purely water	(J. L. Carles et al., 1999; Kelsch, 2006)
	Road traffic, machinery,	Mobile phone		(Anderson et al., 1983; Guastavino, 2006; Nilsson & Berglund, 2006; Tamura, 2002; Wei Yang & Jian Kang, 2005)
Children playing			Water	(Chiesura, 2004; Gidlöf-Gunnarsson & Öhrström, 2007)
Sound from the neighborhood	Sound of motor vehicles	Music from the public audio system, peaceful silence	Moving water and waterfall (purl water), birds, frog croak, plant shaking in the wind,	(Chen et al., 2009)
Speaking, footstep, children shouting	Traffic(car, bus, vehicle parking);construction	Music (in open space, from stores, from passing car); bell(church, clock)	Bird, insect, water	(Yu & Kang, 2010)
Human voices.	Ground traffic sounds, anthropogenic, traffic		Bird calls, breeze through foliage	(Benfield et al., 2010)
Footsteps, Voice (speech, singing, laughter)	Roadway traffic, construction	Bells, clock chimes, fireworks, Music, Azan	Wind, Water, wildlife	(Brown et al., 2011)

2.2 Smell

The sense of smell (olfaction) is a process of detecting chemicals, which are floating in the air. When the electrical activity is produced in the hair cells, the information there will be transmitted to the olfactory bulb (Parker, 2004). After transmitting the signal to the brain, which is a part of the limbic system, the emotional behavior and memories start to recognize the scent (Sousa, 2011). Some researchers have indicated that the encoded information will remain longer than the other senses in the human memory

thorough the smell sense (e.g. Köster, 2002; Morrin & Ratneshwar, 2003). The association between the olfaction and memory in our brains with the physical and neural proximities can result in this fact (Krishna, Lwin, & Morrin, 2010). Humans usually have difficulties in remembering the names of the smell but they can identify the previous smell even after many years (Lawless & Engen, 1977; Schab & Crowder, 1995). It could be surprising to hear that humans can recognize 10,000 different scents and their combinations in the different environments (L. Buck & Axel, 1991). L. B.

Buck (2005), declared that people have at least 1000 genes which encode different scents in the memory. Willander and Larsson (2006) expressed that the olfactory information in the brain was older than the verbal and visual information in view of autobiographical memories. People can recognize different scents, which they have encountered previously in their brain. The accuracy of this recognition can be from a second to years after the exposure (Zucco, 2003). Cats-Baril and Gibson (1987) suggested that the evaluation of smell must be within the context if it is intended to evaluate preferential rates for users. They proposed that the smell attributes could be evaluated from one extreme to detract toward the other extreme to enhance the size. Bosmans (2006) discovered that the scents and different smells would enhance the evaluation of products and stores. Moreover, Chen et al. (2009) asserted in a study that, most of the visitors were able to recognize the smell in the environment (Flower garden).

It should be noticed that some of the studies in the literature have sought to explain the olfaction and its relation with memory, cognition, and emotion (Ehrlichman & Bastone, 1992; Richardson & Zucco, 1989; Schab, 1991). In this regard, the categorization of Natural, Manmade or Environmental and Human-body related smell could be extracted for further consideration (e.g. Chen et al., 2009; Rikowski & Grammer, 1999). Studies about this sense and its influence on the behavior, emotion, preferences and other human conditions are yet scarce. However, some available literature in different fields about olfactory sense and its value is mentioned in Table 3.

2.3 Touch

It is understood that senses are ordered by a hierarchy (Krishna, 2012). In this regard, the activation of neural receptors particularly in the human's skin is called the touch, the somatosensory or tactition (Fitzgibbon et al., 2012). With the touch sense, humans can feel the pressure, itching, temperature, depth, materials, and so on. In the Aristotle's theory known as the aesthesis or sensation theory proposed in the 4th century BC, it was suggested that the acuity of touch stimuli can be increased by other senses, and vice versa. The real picture of any objects can be practically visualized

by using the touch senses. In fact, the first intuitive development in the womb will be the touch sense for any humans, while it will be also the last sense lost in humans with age (Stevens, Cruz, Marks, & Lakatos, 1998). With regard to the pregnancy period, Krishna (2012) indicated that any humans start with touching their own selves before stepping into the real world. In the mentioned study, she arranged all the senses in the order of appearance by the following hierarchy; the touch, smell, taste, audition, and vision.

Table 3: List of studies on smell

Source	Effect studied
(Baron, 1980, 1981)	Interpersonal Attraction- Social Perception- Physical Aggression
(Mitchell, Kahn, & Knasko, 1995)	Variety Seeking Behavior- Elaboration of Product
(Todrank, Byrnes, Wrzesniewski, & Rozin, 1995)	Public Preferences- Success or Failure of Social Relationship- Preferences for Photo Choosing
(Coetier, 1996)	Sense of Identity to the Objects
(Platek, Burch, & Gallup Jr, 2001)	Self-Identification
(Chu & Downes, 2002)	Recognition of Autobiographical Memories in Human
(Zucco, 2003)	Recognition
(Morrin & Ratneshwar, 2003)	Recall and Recognition of the Brands
(Kelsch, 2006)	Border in the Spaces
(Bosmans, 2006)	Evaluation of Product
(Spangenberg, Crowley, & Henderson, 1996)	
(Chen et al., 2009)	Landscape Preferences
(Krishna et al., 2010)	Memory of Associated Information

Information about objects can be categorized with reference to their geometric aspects (such as size, shape, and orientation) or/and material properties (such as texture and weight) (Whitaker et al., 2008). However, tactile senses are able to result in representing the objects based on their characteristics. After seeing or touching an object, we allow our brains to encode such information to make perceptual decisions for recognition,

action, or aesthetic judgment, which can deal with its quality or attractiveness (McGuire, 1976). The quality aspect of the touch has been the most important aspect of the touch perception. In line with this, the most important differences between the male and female perceptions toward touch, involve the context, personal perceptions, and the nature of the objects (Stier & Hall, 1984). Touch can lead to a variety of behaviors ranging from aggressive to the most intimate behaviors. In fact, it can be claimed that the sense of touch is sensitive to what is seen and the environment may increase its sensitivity. To evaluate touch, Peck and Childers (2003) created a scale for the touch which they called the ‘need for touch’. The scale considers individual differences in preference for the touch information. The subscales of this touch scale included autotelic and instrumental dimensions. The instrumental need explains the functional dimension, while the autotelic need measures the emotional component touch. With regard to the evaluation of multi-sensory factors in the landscape, Chen et al. (2009) stated that the users typically appreciate the touching features in parks because they give them a sense of undergoing a further experience with nature. Furthermore, they dealt with the categorization of natural and manmade tactile factors in the park. Visible objects texture of the park is important for the users. However, reorganizing the tactile quality in terms of understanding their values in the landscape is quite difficult for people. The importance of the touch sense and its influences in our daily lives has been emphasized by different studies (Table 4).

Table 4: List of studies on touch

Source	Effect studied
(Crusco & Wetzel, 1984)	Increase in the Amount of Tip
(Montagu, 1986)	Emotional and Psychological Health
(Hornik, 1992)	Attitude and Behavior of Costumer
(Peck & Childers, 2003)	Sense of Confidence- Sense of Encouragement
(Ayres & Robbins, 2005)	Cognitive and Perception Processing Systems
(Peck & Wiggins, 2006)	Willingness to Donate
(Pensé-Lhéritier, Guilabert, Bueno, Sahnoun, & Renner, 2006)	Satisfaction
(Williams & Bargh, 2008)	Judgment
(Whitaker et al., 2008)	Perception of the Texture
(Chen et al., 2009)	Sense of Taking More Experience With Nature

It is noticeable that touch, whether between humans and humans or humans and objects, can have an impact on human feelings leading to action or changing one’s behavior. Based on the literature review, two kinds of touch factors, which relate to the Natural and Manmade touches (Chen et al., 2009; Kelsch, 2006) can be extracted. Furthermore, the application of the touch scale which is called the “need for touch” created by Peck and Childers (2003) would be helpful in the categorization of the components (particularly for park furniture). The results related to the extracted information from literature regarding the olfactory and tactile cues in the urban landscape are illustrated in Table 5.

This research helps to map involvement of non-visual factors with application of the extracted attributes from the literature. As it seen, the influence of smell and touch stimuli with different attributes could be extracted from literature; however, further information in this regard is needed.

3 METHODOLOGY

Lack of inductive information extracted from the literature leads to applying the NGT approach, which is initially a qualitative approach. In fact, by using this inductive inquiry, attempts in making a holistic view over the current research could be raised.

As a part of qualitative research, this technique gathers information through structural variation of group decision making in order to attain original items. In this regard, balancing the ideas in different categories based on a mathematical voting technique and a set of rank-ordered decision, help to prioritize the research. At the end, categories and items extracted from this technique could gain group consensus to identify the main ideas and items related to the objectives (Horton, 1980).

3.1 Procedure related to the nominal group technique (NGT)

During March 2012, twenty two local participants at Tabriz-Iran (between 20-58 age with different demographic variables and each session eleven

persons) responded to the questions posed by the researcher two times during two different sessions regarding the availability of different kinds of items and attributes for sound, smell, and touch senses. In order to define a specific context, small urban parks were chosen as sample of study.

Based on given information, small urban parks for current study were defined, urban parks with radius function between 200 to 600 m² (Majnonian, 1996); less than 20000 m² area (Kelsch, 2006); close to neighborhood area, which contains special features, such as vegetation, the sitting area, water features, the playground area (Marcus & Francis, 1997),

and exercise equipment. Need to mention that, all of the participants had experiences with regard to small urban park visitation. To obtain the results related to the small group discussions, several procedures were conducted, such as asking the participants to imagine being in a small urban park or inquiring them to write the existing items regarding whatever they hear, smell, and touch in a small urban park in order to generate the idea. Also, the participant's proposed items were pasted on the wall in order to trigger further discussions; moreover, the items were classified into different groups (guided by the literature review's classification) in addition to voting for prioritizing the ideas.

Table 5: Extracted items from literature on different kinds of smell and touch

Natural Smell	Human-body related Smell	Man-made Smell	Natural Touch	Man-made Touch	Source
Citrus, jasmine blossom	Perfumes	Smog, tobacco smoke			(J. Carles et al., 1992) (Schiffman & Nagle, 1992)
	People-related odors (soaps, shampoos, lotions, sweaty, musty)				(Todrank et al., 1995)
	Body Odor				(Rikowski & Grammer, 1999)
Flowering perennials and annuals, freshly mown grass, flowering trees			Variety of Flower, lawn, water	Gravel path	(Kelsch, 2006)
				Tightness, Slipperiness, Limpness, Softness (sensorial attributes)	(Pensé-Lh�eritier et al., 2006)
Flower, grass, water			Clean clear water, smooth and rough tree barks, smoothly shaped large rocks, Flower petals, small round pebbles in shallow rivers and ponds	Sculptures	(Chen et al., 2009)

4 RESULTS

After conducting NGT, extracted information for sound and smell, touch separately were classified. Furthermore, combination of attributes based on literature and NGT were presented.

4.1 *Extracted attributes for sound stimuli*

The Following sections elaborate on accessing to non-visual variables through the NGT approach. Table 6 illustrates the results regarding the sound items.

Table 6: Sound items extracted from NGT

Sound				
No	Natural	Instrumental	Human	Mechanical
1	Songbirds	Mobile ringtone	Children normal playing	Car engines
2	Bird chirping	Music (Mobile devices, park audio system)	The voice of people talking to phone	Motorbikes
3	Wind in the foliage	Singing with instrument	Children screaming	Car horns
4	Running water	Azan	Whispering	Lawn mowers
5	Rolling dry leaves	Reciting holly Quran	People's footsteps	Sprinkler equipment
6	Fountain	Silence	Children playing with playground equipment	Bicycle wheels
7	Stagnant water	Speaker's sound of hawker	People when using exercise equipment	Construction
8	Animal	Police or ambulance car alarm	Park's guard	Park powerhouse
9	Rain, Thunder	Park's speaker sound rather than music	Voice of beggars	Car crash
10	Dry leaves being crushed		The sound of people fighting	Airplane

4.2 *Extracted attributes for smell and touch stimuli*

In effect, by balancing the individual ideas, NGT generated a greater amount of concepts to conform and confront issues through the constructive procedure. Table 7 demonstrates the results extracted from the second session regarding the smell and touch attributes.

Table 7: Smell and touch items extracted from NGT

No	Smell			Touch	
	Natural	Man-made	Human Related	Natural	Man-made
1	Grass	Cigarette	Perfume	Grass	Sitting equipment's (such as bench)
2	Flower	Hubble bubble (shisha)	Body odor	Flower	Pavement
3	Trees (leaves)	Food being cooked	Shampoo or soap	Green Leaves and branches	Decorative elements (statue, alcove etc.)
4	Wet soil	Plant chemical spray		Breeze	Playground equipment
5	Dry soil	Garbage & sewage		Natural stone	Playground flooring
6	Dry leaves	Car exhaust		Water	Water dispenser
7	Running water	Construction' dust		Soil	Pole
8	Fire's smoke (barbecue)	Drug		Dry leaves	Walls, rails, small walls
9	Rain's smell	Organic fertilizer		Rain& snow	
10	Green leaves Laying on the ground	Stagnant water		Fruit	
11		Espond's scent		Animal	

4.3 Items adopted from NGT and literature review

The combination of items extracted from literature and NGT varied remarkably. Due to the availability of the scale regarding the need for touch (Peck & Childers, 2003) and consideration of the design aspects, in terms of touch items, the manmade items in this category were defined as furniture (bench, alcove, statue, pole, water dispenser) available in most of the small urban parks. Table 8 shows all items in terms of sound, smell and touch stimuli, which most of people can classify in small urban parks.

Table 8: Adopted items from NGT and literature review

Sound	
Human	1-Sound of people using the exercise equipment; 2-Voice of children playing; 3- Footsteps; 4-Normal voice; 5-Whispering; 6- Children using playground equipment; 7-Parks' guard; 8- Children's screaming; 9-People talking to phone
Natural	1-Water fountain; 2-Wind in the foliage; 3-Dry leaves being crushed; 4-Crickets; 5-Rolling dry leaves; 6-Running water; 7-Bird chirping; 8-Songbirds; 9- Rustling leaves; 10-Sound of small manmade waterfall
Instrumental	1-Music from the park audio system; 2-People singing with instruments; 3-Mobile ringtone; 4-Speaker's sound of hawk; 5-Music from the people's mobile device; 6-Music from vehicles passing by; 7-Any sounds other than the music from park audio system; 8- Reciting holly Quran; 9-Azan; 10- Completely quiet(relaxed atmosphere) space
Mechanical	1-Car horn; 2-Car engine; 3-Bicycle wheels; 4-Car's traffic; 5- Construction; 6-Motorbike; 7-Sound of sprinkler
Smell	
Natural	1-Flower; 2-Tree's leaves; 3-Running water; 4-Grass; 5-Wet soil; 6-Dry leaves; 7-Dry soil; 8-Green leaves laying on the ground
Human-body Related	1-Perfume; 2-Shampoo 3-Soap
Man-made or Environmental	1-Car exhaust; 2- Plant chemical spray; 3- Dust from construction; 4-Smoke (cigarette); 5- Organic fertilizer; 6- Stagnant water; 7- Shisha; 8-Cooked food
Touch	
Natural	1-Breeze; 2-Water; 3-Grass; 4-Green leaves and branches; 5-Dry leaves; 6-Natural Stone; 7-Soil; 8-Flower; 9-Fruits
Man-made	Furniture (Need for autotelic and instrumental Touch)

5 CONCLUSION

With attention to the lack of knowledge about human's need for sensory perception (Krishna, 2012) particularly in the landscape field and accuracy in the senses, which are vary from person to person (Gilbert & Gill, 2000), an overview research on senses rather than vision can spark additional researches. By taking into account the multi-sensory perceptions of the humans, this research was set out to address the effectiveness of non-visual factors in a vast area. Literature revealed that four constructs as Natural, Mechanical, Instrumental and Human (Yu & Kang, 2010) could be named as subscales for sound stimuli. In this regard, Natural, Environmental (Chen et al., 2009), Human-body related (Rikowski & Grammer, 1999) could define smell categories; while, Natural (Chen et al., 2009) and Furniture related (need for touch) (Peck & Childers, 2003) were touch's portions. Due to lack of inductive information extracted from literature, application of NGT helped current article to identify more related items and attributes of non-visual factors in the urban area (In this research small urban parks)c. However, to acquire the other components of the non-visual senses, more discussions and elaboration are certainly required. Attention to people preferences based on their non-visual perception and collaboration between all senses would be suggested for further studies. This issue will be discussed in detail on ongoing paper by same authors.

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