



CHAPTER TWO

Theory and research

Introduction

A pleasant fragrance has the ability to illuminate its surrounds, uplift the spirit of the people smelling it and conjure up beautiful memories (Mercola 2015), it also has positive health and mental benefits in store for us, yet it is not often used in Landscape design.

Throughout history smell has been regarded as less important than sight and touch especially in the enlightenment era. Smell was considered the sense of intuition and sentiment and was associated with women only. Worse still, smell was associated with 'savagery' and even madness (Cattaneo 2003:12).

This raises important questions, why is there a lesser value that we place on smell? Is smell of less meaning and not as useful as a design tool in society today? Or is this lack of understanding and appreciation instead the product of extended development of a built environments that failed to provide great satisfaction to “delight our nostrils, tickle our trigeminal nerves and stimulate our olfactory imaginations” (Henshaw 2014:23).

Dr Victoria Henshaw, urban smell specialist and author of *Urban Smellscapes* from the University of Sheffield (2014) believes that the built environment professions have suffered from disciplinary perspectives and that they ignored design opportunities inspired by the sense of smell.

To smell nature is an amazing experience as nature offers an enormous amount of pleasant smells for one to enjoy. This opportunity has not been sufficiently explored in Landscape Architecture and this dissertation will focus on fully exploiting the design potential of smell in the landscape.

This chapter will consider the sense of smell by three themes, namely; the power of smell, the role of fragrance in design and characteristics influencing smellscape design. It will also be discussed how smell in landscape design can lead to economic empowerment and finally, how landscape design through smell can uplift a community spiritually.

The Power of Smell

“As an adult, you can distinguish about 10,000 different smells” (Wyatt 2014).

The reason one seems to be flooded by nostalgia or certain memories when they smell something specific, is because human odorant receptors (neurons in the brain responsible for the detection of odours) are connected to a part of the brain (see figure 2.1) which controls emotions and is concerned with mood and instinct. This is called the limbic system, the most primitive part of the brain. Aromatic sensations perceived are conveyed to the cortex, where cognitive recognition occurs only after the limbic system has been stimulated. By the time one correctly identifies a scent, for example jasmine, it has already activated the limbic system, stirring up deep emotional responses (Fox 2002:4).

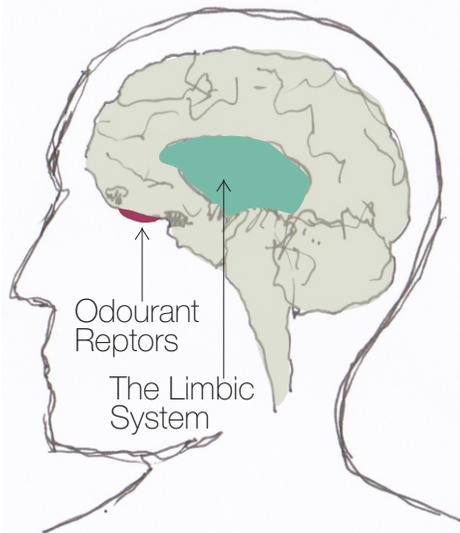


Figure 2.1: The location of the limbic system and odourant reptors in the brain (Author 2016)

Studies have shown that seventy five percent of emotions are triggered by smell and that these emotions are specifically linked to emotion, well-being, pleasure and memory (Palmer 2013).

For this reason it is suggested by Meyer that; “Landscape architects designing gardens for the senses must be able to understand how large odorant molecules become chemical impulses into the brain and thus links to the memory of the time and place of the experience” (Meyer 2007:9).

Helen Keller a world famous deaf and blind activist and author of the book *The World I live In* (2013) stated the following: “I doubt if there is any sensation arising from sight more delightful than the odours which filter though sun-warmed, wind-tossed branches, or the tide of scents which swells, subsided, rises again wave on wave, filling the wide world with sweetness. A whiff of the universe makes us dream of worlds we have never seen, recalls in a flash entire epoch of our dearest experience”. Have we then forgotten about this delight that the sensory aromatic sphere has to offer due to the habits we have developed to focus only on the visual? The author believes that one can learn from Keller’s experience of the sensory and revive these feelings in individuals imparting beautiful memories into their existence by creating spaces that provoke them.

The Role of Fragrance in Design

Harold Osbourne (in Nishimura 2011:33) claims, on the basis of aesthetic-attitude theory, that one can experience a smell aesthetically as well as a musical note or a colour by sustaining attention with heightened awareness to the sensory content itself (Nishimura 2011:33).

The ability of smell to transform spatial experience has an effect upon the emotions and not on the intellect as highlighted by the section above and quote by Keller. Through these circumstances observed, spaces and their shapes and forms can be changed and moulded. As Malnar and Vodvarka (in Bowring 2006:163) observed, “The question remains whether odours—and our sensing of them—can act as primary determinants of spatial judgements. If by this we mean effective spatial judgments, the answer must surely be affirmative (Bowring 2006:163).

Questions arise as to how something that is invisible can be characterised, revealed and represented spatially? Bowring (2006;161) suggests that the visual has a part to play in triggering sensorial experience and thus should not be forgotten as Meyer (2007:10) noted “Landscape architects have largely neglected the sense of smell to focus on visual and auditory effects” but to place emphasis on such olfactory elusive elements, visual elements need to be present to frame the invisible (Bowring 2006:161).

Research on the human sense of smell has escalated with recent interest on the topic among academics due to its various applications in healing, improving general health and quality of life

(Pines 2004). Except for its health benefits smell has become a branding tool whereas hotel chains in America have developed and claimed certain scents as their signature fragrance; Sheraton Hotels smell like jasmine, fig and clove, Westin lobbies use white tea fragrance to scent their spaces and the Four Points Hotels smell of cinnamon. Smell has the potential to advance businesses to personalise their image and stir the user to store their experience in a deeper part of their memory.

The many benefits and evidence of considering specifically smell in spatial experiences and processes is evident. Landscape Architects can move forward by seeking practical ways in which to accomplish the design with smell within the discipline.

Characteristics Influencing Smellscape Design

Smellscapes are classified by Henshaw (2014) as “the total smell landscape, including individual odours, odours that have mixed, and the overall background odours”. The smell specific places and spaces that are designed by the author can be classified as smellscapes.

According to Henshaw (2014:181) the congruence between odour and place impacts on perceptions of both. Characteristics and factors influencing smellscapes could be identified as: air movement, topography, microclimates & moisture in the air, materials (hard and soft), activity density, age group of the perceiver of smell and memory. Each of these will be considered respectively:



Air Movement

Any smell that one perceives in an outdoor space is due to odorous chemicals transmitted from its original source by the wind to our olfactory system. Air movement is made visible through the physical effects it has on the environment for example leaves withering. The haptic and thermal qualities that wind projects onto one's skin also make the individual aware of its presence. (Henshaw 2014:168-169).

Wind exposure promotes heat loss in winter, but can be used for ventilation and cooling in warmer climates. In addition, the prevailing wind direction has an influence on the dispersion of dust, noise and odour. Built environmental form can impact directly on odour concentration, dilution and movement (Henshaw 2014:182). The transmission of odour through the air from the source is what one ultimately smells, thus wind and air quality directly affects what smells are perceived in the end. The term regularly used to describe air is “fresh” this is when other traffic pollutants have not been emitted by the wind (Henshaw 2014:169). Wind is perceived to dilute negative odour intensities with fresh air and odours of vegetation at a micro level (Henshaw 2014:171).

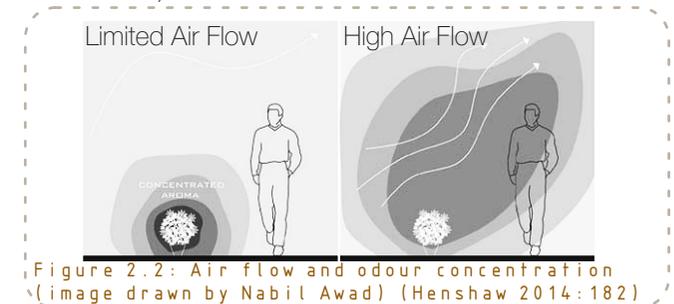


Figure 2.2: Air flow and odour concentration (image drawn by Nabil Awad) (Henshaw 2014:182)

If there is less air movement in an area you would generally smell a lot more, the smells would also be much stronger. Henshaw (2014:182) suggest that designers should use the built environment form to limit wind speed to a gentle breeze of less than five meters per second; this is a general guideline but may differ depending on the specific context. A desired environment such as this is suggested so that the smells would not be overpowering but disperse into the air to be permitted by the human nose on a comfortable level. Wind is the carrier of odour, this can be perceived as negative or positive (Henshaw 2014:183).

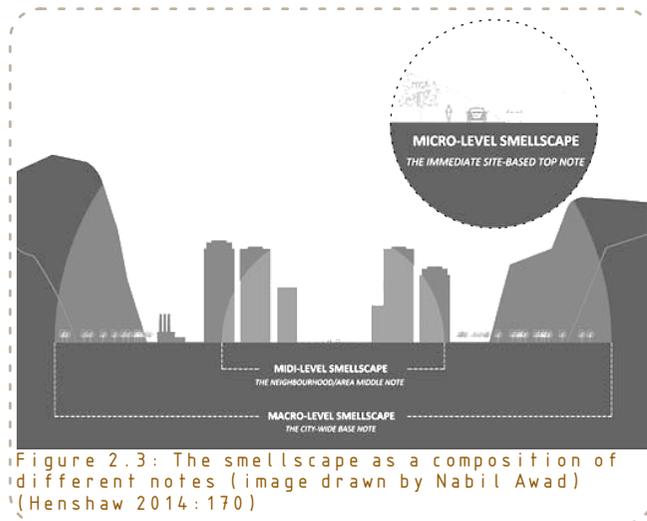


Figure 2.3: The smellscape as a composition of different notes (image drawn by Nabil Awad) (Henshaw 2014:170)

When looking at the structure of smellsapes in the city it can be categorised into base, middle and top notes, just like in perfumery. As seen in figure 2.3 the larger macro-level smellsapes (involuntary odours) forms the background to smellscape experiences. Within this realm we then experience episodic odours within the mid-level smellscape realm; this would be dominant smells within a specific neighbourhood. Then

Lastly, the individual experiences micro-level smellsapes which are short lived or intense specific smells coming from a building or specific activity nearby. The lack or presence, as well as intensity of air movement in an area, can influence urban smellsapes on a variety of levels (Henshaw 2014:171).

The size and layout of spaces have the potential to direct air flow or to limit it.



Microclimate and moisture in the air

Creating microclimates that are colder and release moisture in the air will allow the odour molecules in some spaces to be enhanced and the specific smell in areas will be clearly conveyed to the user.

It is a proven fact that one can smell things better in the spring and summer this is because of additional moisture in the air. To explain this theory by means of a practical example there can be noted that ones sense of smell is also much stronger after exercise. This is due to “increased moisture in the nasal passage” (Palmer 2013).

“Colder (denser) air also means there is a higher concentration of odour molecules per square inch. Similarly, water vapour traps scent molecules, enhancing the odour they release and slowing their diffusion into the air. A combination of cool, moist air results in scent that stronger as well as heavier and closer to the ground” (Dr Woods: 2015).



Topography

Topography influences smellsapes through; aspect, slope and heat accumulation as well as drainage. “Topography plays a significant role in the movement of air in and around the city, important in promoting more positive experiences” (Henshaw 2014:187).

Aspect, Slope and heat accumulation

Hillier and more undulating topography in areas can also be problematic for example where vehicles stop on inclines traffic odours seem to be particularly strong (Henshaw2014:186). The topography of an area along with the wind direction also affects the frequency and detection of odour in an ambient environment (Naddeo et al 2013:188).

As cold air on southern slopes in the southern hemisphere moves down odour is most likely to move with the air. These conditions are further altered in more windy conditions and become more unpredictable.

Drainage

Where the topography is flat and allows for water to become stagnant and starts to emit bad odours it can have a negative influence on the surrounds. (Henshaw 2014:186).

4 Materials (Hard and Soft Elements)

Henshaw stresses how different building materials can have an effect on the smell of spaces. This is determined by the age of a building project and its materials as well as the type of materials used and whether they had absorption or non-absorption qualities. The effect that vegetation has on its surrounding smellscape is also quite great. It affects the legibility (2014:188) experience of place (2014: 190) and they are associated with specific memories of which the most are good and happy memories (2014:174).

The breathing in of odours of vegetation seems to have a cleansing effect and a good impact on the human body and health. These specific odours of different types of vegetation were most of the times associated with positive memories, emotional attachments, well-being and feelings of nostalgia and escape. Henshaw notes (2014:174). "I guess flowers again are what you associate with happiness and contentment." The introduction of more greenery into urban areas was therefore seen as a direct means of improving smell environments: "We need more green to smell good."

From case studies Henshaw noted that: 'Occasionally participants went out of their way to smell flowers: '...little low bushes and tiny flowers, a lovely smell ... if I'm in the area, I'm going shopping down there and I've got time, I nip in and have a sniff' (Henshaw 2014:177).

Planting is, therefore, one of the most important and direct materials to our purposeful intentions to smell the environment.

5 Activity Density

Activity density usually influences the smellscape on a micro-level. Depending on the functionality of the space and the sort of smells that would be emitted in the space, it would ask for different design guidelines. Looking specifically at activities taking place within the public sphere Henshaw (2014:183) suggest that it is the intensity of the space as well as their closed and concentrated nature that contribute to their success in terms of smellscape design.

Henshaw uses markets as an example where different odours as well as energy from different stalls feed off of each other to create an overall vibrant environment. The different smells give the user the freedom of choice to interact with their unique preferred stall. This applies within market buildings as well as in the wider ambient outdoor environment (Henshaw 2014:184).

6 User Age Group

There is also a distinction in the way different age groups perceive smells; this has the potential to influence the outcome of different spaces and plant palettes. Up until the age of 4, any smell - no matter how gross to adults - is merely interesting to children (Wyatt 2014. TED Talks). Sensory experiences are crucial for the proper development of children's brain (Gainsley 2012:2).

It is important that all of the five senses; smell, touch, sight, hearing and taste gets stimulated. Encouraging and understanding the way that children play and experience the natural world is clearly important. The author will not specifically focus on children play areas in detail but it will be considered on a master plan level.

7 Memory

As mentioned under the topic: The Power of Smell in this Chapter, memory is notably significant when considering designing with smell for smell is directly linked to a part of the brain responsible for memory and emotion. Steven Spears national leader in performance-based design and recently elevated to the American Society of Landscape Architects Council of Fellows, notes that there are still many open-ended possibilities and opportunities when looking at the way people use space due to specific memories of a space or place and the connection it has to the human senses. Spears stated that "human sensory design is a key component of the design process and I am keenly interested in this and want to know more. How can designers use the human senses and their relation to memory in a provocative way? More importantly, how can this be measured so that it becomes the research avenue of a design process?" (Landscape Architecture Foundation 2014)

Conclusion

As these olfactory design tools were laid out, in theory, the challenge will be to translate them into design. The sense of smell as a design informant is making waves in the built environment industry with much research to support the current theories. The potential of odour in design can thus now be recognised and used to create spaces.

Designers should effectively test these seven aspects and their impact on the smellscape to create designs that can influence the experience of the user at a level often not considered.

How Can Landscape Design Lead to Economic Empowerment

Now that we have verified the impact of smell on user perception and spatial experience, in the context of Salvokop we need to ask how can landscape design through smell lead to economic empowerment.

What is economic empowerment?

Economic Empowerment is the capacity of a poor individual to benefit from economic development processes in a system which allow the individual to contribute to and fairly benefit from the economic progression. The terms of the individuals involvement in the process are recognised for the value of their assistances (contribution). The individuals' dignity is respected and it is made possible for the individual to equitably negotiate a fairer distribution of the benefits of growth (Eyben et al. 2008:9-10).

“Empowerment broadens poor people's freedom of choice and action, expanding their assets and capabilities and enabling them... to participate in, negotiate with, influence, control and hold institutions (or rather spaces and activities) accountable, that affect their lives” (Eyben et al. 2008:5).

Economic empowerment enables individuals to think beyond their immediate survival needs, taking them from surviving to thriving, facilitating the individual to exercise greater control over their resources and choices (Eyben 2008:10). Landscape Architecture interventions should be designed and programmed in such a way as to create a diverse range of job opportunities

(permanent and temporary). They should also create additional job opportunities for example where someone is employed in a park to harvest seed or cuttings from a productive garden for the specific functioning and program of the park. The employee then learns a new skill and now he/she can also harvest some extra seeds and cuttings to sell in his/her community. Food gardens can also provide a community with specific economic and health benefits plus work opportunities.

How can Landscape Design through Smell lead to Economic Empowerment

To economically empower a community smell in itself cannot do much but the product which emits pleasant fragrance can. Through the production of essential oil many job opportunities can be created consisting of permanent positions as well as temporary positions to create opportunities for additional income. The programming on the site and functions of the intervention thus also needs to fit in with existing organizations on site if possible to promote the involvement of as many organizations as possible to ensure the resilience of the intervention.

A very simple way to assist in the process of economic empowerment and the sustainability of a community would be to enable and educate a community on the benefits of urban agriculture to provoke a movement and action to care for and sustain personal and communal gardens that can be managed by POP-UP (People's Upliftment Program) a non-governmental organizations currently operating on the site. As the price of food increases due to transport costs and a lack of water to irrigate large portions of agriculture, a

need arises to promote productive food gardens which can easily be watered on a small scale by recycling water. Many individuals and residents can cut some of their expenses on basic needs like food. Although the focus of the project will not be on this specific topic the author feels it is still important to be incorporated in all urban green spaces and it is thus part of the framework and masterplan for this design proposal as taste is also another sense often neglected in landscape design.

How does one economically empowerment a community?

Several guidance programs exist to direct organizations in catalysing the economic empowerment of people who are living in poverty for example POVNET and The Noar Foundation who offers a wide variety of strategies.

The author has looked at these international models as they have proven to be successful but also due to the lack of proper South African models to initiate the economic empowerment of communities.

According to The Noar Foundation for Global Community Development from the USA, sustainable economic growth of communities will take place in environments that do the following:

To reach sustainable economic growth the design needs to:	Translated in specific design proposal for Salvokop
1.Promote and <u>cultivates opportunities</u> for economic growth in communities.	New job opportunities will be created through interventions such as the essential oil factory, coffee shops, restaurants and the fragrant flower market.
2.Provide <u>educational advancement</u> for the surrounding community on a tertiary, secondary and at university level.	Through the integration of POP-UP and surrounding educational facilities learning will become a big part of the design and program. Outdoor learning will also be encouraged with specific safe routes from the educational facilities to the park. People can further be educated by what they see on info boards in the design.
3.Promotes and understands the unique <u>community identity</u>	Salvokop has evolved as a community into a diverse neighbourhood housing people from many ethnicities and backgrounds. This must influence the design proposal in material, spatial and programmatic levels.
4.Endorses healthy <u>social and familial interaction</u>	The new design intervention will greatly encourage social interaction Designing diverse and comfortable public spaces for different scales of gathering. The design will seek to incorporate some of the design materials seen in the area.
5.Values <u>men and woman as equal</u> , striving to provide equal opportunities for both (Noar Foundation. 2010)	This principle will be revealed in the program and governing bodies on site as the equal treatment of both men and women is of importance to POP-UP. POP-UP will be incorporated in many design decisions and programs on site.

Figure 2.4: The Noar Foundation principles and local application (Author 2016)

A strategy has been derived from the knowledge gathered on economic empowerment. For the current community to be empowered many opportunities are going to have to be created. The following table illustrates extra programs needed to be in place as an additive to the table above.

Safe and reliable child day care facilities need to be in place to enable parents and caretakers to advance themselves in their daily work.	POP-UP has a day care facility which will be re-designed and used in the programming of the new park (outdoor play will be an emphasis on the development of children at the daycare). This will allow parents to economically advance themselves without having the great full-time responsibility of looking after their children.
Fair business opportunities need to be presented as well as advancement in current or new employment positions.	Creating new job opportunities and innovative employment structure as part of POP-UP students promotion.
Extra income OPPORTUNITIES	In the programme extra income opportunities can be created where an employee has an opportunity to learn from ideas implemented on site and start his/her own initiatives after specific knowledge is gained.
healthy business connections and opportunities to socialise with people from different field	Creating an all-inclusive environment through design and programming.
Environments that promote mental and physical health	Through sensory stimulation, encouraging outdoor activities and spaces that create a sense of belonging (See next section on spiritual upliftment).
inspirations and aspiration – public business talks and skills training	Through programming in multifunctional and comfortable outdoor (or indoor) spaces, using POP-UP as a facilitator to guide these activities.

Figure 2.5: Principles for economic empowerment and local application (Author 2016)

- Courses within the POP-UP skills training programmes can be adjusted to meet local specific needs, and accommodate future development of the proposed design and programme. By working with POP-UP the community can be empowered.

- Drawing tourists and daily visitors to the site and to the products sold on site. Creating programmes where visitors could make their own essential oil to become involved in the process.

In conclusion, the capability of smell to empower a community economically is largely due to a physical product that relates to the sense of smell, in this case, essential oil. This presents business opportunities and allows for a relationship to be born to an organization like POP-UP that already operates on site and empowers the community.

How Can Landscape Design Through Smell Uplift A Community Spiritually?

Restorative Environments

Restorative environments are environments that promote restoration to recover and be renewed physically and psychologically.

Stephen Kaplan, a Professor of Psychology at the University of Michigan identifies four factors that make up restorative environments.

1. Being away from your usual daily setting to rest ones directed attention; this can take place in accessible urban parks.
2. Feelings of extent and emplacement created through design concepts like miniaturization, trails and paths.
3. Fascination with natural elements, masses of flowers, leaves withering in the wind and groupings of trees. Kaplan also refers to these elements as 'soft fascination' having the power to allow people to contemplate deeper thought leading to restoration.
4. The Compatibility of outdoor spaces with the need of the user, for example the need for an employee to take a walk after work or to enjoy lunch in an outdoor setting without having to drive far to be able to satisfy that need.

As an additive to the second factor mentioned above scientific studies have shown that for a holistic spatial experience, emplacement (thought to happen by visual and tangible experiences) should be reconceived to include and acknowledge the power of the rich sensory dimension to which individuals are interconnected

to (Howes 2005:200). As we focus on environment sustainability Choudhury suggests (2015:7) that we also need to "look for urban models that can sustain our sensory lived experience". Working with the human senses can invigorate the outdoor experience.

Victoria Henshaw notes that there is "a potential role for smell in enhancing restorative experiences from urban environments, whether derived from natural or non-natural sources, has previously been overlooked in research on restorative environments" (Henshaw 2014:188). It can thus be said that there are clearly many opportunities for landscape architects to seriously consider designing with the sense of smell in mind.

The benefits of pleasant fragrance

Increased performance

Experiments have shown that exposure to pleasant fragrances significantly enhance performance on work-related tasks. In particular, poignant fragrances such as peppermint, which increase alertness, have been found to improve work based performance (Fox 2002:16).

Increased well-being

"The science of the sense of smell, Aromachology, focuses on our perception of smells. It refers to collection of data to study the interrelationship of psychology and fragrance technology to transmit a variety of specific feelings and enhance behaviour through the olfactory experience. Research seeks to establish the effects of aromas on human behaviour. It focuses on the olfactory system, which provides us with

our sense of smell."

Aromatherapy

Aromatherapy is worth mentioning due to the evidence that can be provided from the practice thereof, solely relying on the human olfactory system. The term Aromatherapy was coined in 1920 by Rene Maurice Gattefosse, a French chemist, to describe the practice of using fragrance oils from plants in healing (Mathrani 2008). The practice of Aromatherapy has been proven to relax, restore and re-energize individuals, by focusing on scent.

Therapeutic environments

As mentioned in chapter one as well as in this chapter, outdoor green spaces have the ability to mentally and physically restore the individual. Daniel Winterbottom and Amy Wagenfeld authors of Therapeutic Gardens name four principles of how this can be achieved on a practical level. In teenagers with ADHD and other attention and behavioural disorders their presence in nature has resulted in significant improvement of their conditions (APA Howard Frumkin 2007).

Therapeutic landscape design principles	How implemented in design
<p>By allowing the user of the space to make choices a sense of control is perceived and experienced. This provides individuals with the sensation of escape (being away) which <u>allows</u> the individual to gain <u>control</u> of his/her emotions and refocus to rationally move forward.</p>	<p>Instead of forcing a user to take one specific route a variety of routes and spatial experiences can be offered to the user in an attempt to satisfy their unique need. Legibility and way-finding will be used to make sure that the visitor does not get lost feeling in control.</p>
<p>Spaces need to foster a <u>sense of belonging</u> and connection, by promoting a sense of attachment and familiarity. A variety of different enclosed, public and private spaces are needed to catalyse social interactions to take place.</p>	<p>Due to the strong connection to memory has to smells and the familiarity of many indigenous plants to be used, new and old memories and connections will be made possible.</p>
<p>Designs need to allow comfortable <u>movement</u> and exercise to take place. Activities like walking jogging, wheelchair mobility, play, gardening and formal exercise uplifts the mood of the partaker and reduces stress among many other benefits.</p>	<p>The design aims to be inclusive in all its efforts and also seeks to encourage exercise by making it more accessible to the public and by providing space for these physical activities to take place.</p>
<p>Spaces need to offer “heightened interactions with nature through the senses”. Encouraging <u>sensory nourishment</u> to take place which improves the emotional state of the individual, fostering positive physiological outcomes and diminished troublesome thoughts (Winterbottom and Wagenfeld 2015:52)</p>	<p>There is a strong focus on the senses in the design of the project specifically focusing on the sense of smell in the vegetation that is provided for interaction. Other smells like that of fresh air, soil, coffee and food is also considered in the design.</p>

Figure 2.6: Therapeutic design principles (Author 2016)

There is not only great opportunity to heal and improve impaired individuals (Winterbottom and Wagenfeld 2015:52) but as mentioned above there are many emotional benefits in store for one by being exposed to a pleasant fragrance. Smell can uplift the individual not just physically but spiritually we do not purely exist just in the physical but just as much in the spiritual. This is a realm that needs to be taken seriously.

Conclusion

Public parks ensure that people come in contact with nature. Contact with nature is proven to provide health benefits and enhance the users' well-being (Frumkin 2007). The natural environment, be it man made or first nature, that lead to all of the beneficial results mentioned in this chapter are clearly due to the holistic experience that we perceive in nature but it is also very clear that pleasant fragrance has a very big part to play in this.

The theoretical design guidelines pertaining to smell, identified and discussed in this chapter are further explored and applied in chapter 6.

