

## TREES IN THE CITY – PERCEPTION AND AESTHETIC EXPRESSION

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The present article deals with the aesthetical impact of trees and their relating importance for people in the urban context of open spaces. Indeed, trees therefore have ecological and climate compensating effects, but also social, individual importance, which is noted through the human perception of their spatial effect. Methodologically, this article is based on a literature analysis and sums up essential research results of the design and spatial impact of urban trees. Thereby, the results show that the importance of trees in the urban context and in their symbolical effect offers a reconnection to our phylogenetic heritage and fulfils our longing for the natural. The aesthetic appearance contributes essentially to the revaluation of the urban realm, but, furthermore, the health promoting impact on the human being is of particular significance.

**Keywords:** Phylogenesis, relationship to the natural, tree aesthetics, health promotion, contemplation

### 1 Introduction

Open spaces are mirrors and creative expressions of people's requests and, therefore, they are built upon natural and cultural requirements of a city. On the other hand, green and open spaces are places of personal experiences, which, only by perception, are getting real. In this sense, people develop emotional relationships towards landscapes and urban areas, next to all the ecological interactions. Therefore, the constructive experience of urbanity is very much depending on the substantial part of our personal relationship towards this realm. Based on this approach, the article explores the perceptual and aesthetic significance of urban trees and green areas with the aim of demonstrating the associated health benefits and promoting the understanding of the holistic access to the landscape space. The psychologically and physically relevant perception reactions in relation to space atmospheres and their health-promoting effects are compared, brought together and discussed in the context of different studies.

### 2 Methods

The present article has been prepared by using the method of literature research and analysis. As part of the literature analysis, scientific publications on the

aesthetic, atmospheric, symbolic and health-promoting effects of green spaces and trees were evaluated in the context of spatial perception. The focus lies on perception and the associated psychological effects of natural landscape green spaces and trees, based on their design quality, aesthetic effects and atmosphere. Empirical, artistic and theoretical articles are included in the work.

### 3 Results and discussion

Within the context of urban public green and open spaces, there can be named four factors. As a central design element of green and open spaces in the urban realm, the micro landscape of an urban tree can also be looked at with these four factors in mind which are divided in the Aesthetic factors, the Individual and Social factors, the Ecological factors and the Economic factors (see Table 1).

The focus of this work lies on the constructive experience of urbanity and refers to its:

1. esthetic,
2. individual factors.

Both are to a significant extent carried by our personal relationship towards open spaces, which are based on the personal experiences with the design qualities of open space. Upon the relationships with spaces, we generate inner images from every spatial encounter.



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**Table 1** Central factors of greenery, trees, and open spaces

Aesthetic factors	Individual and social factors	Ecological factors	Economic factors
– cultural-aesthetic function	– motion range – living space	– habitat flora & fauna	– spatial reserves for urban development
– spatial development in the urban realm	– personal development	– soil protection, water filter, groundwater	– site quality
– spatial structure	– communication and socialisation	– air hygiene, oxygen, temperature compensation	– production area – agriculture and forestry
– vegetation structure	– recreation – nature experience	– securing a healthy vital surrounding	– infrastructure areas

Source: Frohmann 2019 after Bochnig/Selle 1992

### 3.1 On phylogenetic importance of trees

After Bourassa, these personal and collective acquired patterns of experience are based on three factors of perception. On ontogenesis as a factor of the personal experience of the recognition of a subjective-worldliness; on sociogenesis as a factor of the collective spatial experience of the cultural environment, and on phylogenesis which functions as a biological link towards the natural. Thereby, the focus lies on the levels of experience, which relate to the aesthetic-spatial evolution of human beings and the nature. As a personally and collectively manifested relationship towards the natural, the longing for nature functions as a soul-bond in our inner world (Bourassa, 1990; Guski and Blöbaum, 2003).

If we are now looking at trees and their phylogenetic origin, they belong to the oldest and biggest plants in this world. The average size of naturally grown deciduous trees is around 25–40 m and of coniferous trees around 30–50 m. Besides, the trees' diversity is wide-ranging and shows various forms, structures, rhythms and colours. Urban trees thereby convey a variety of images, experiential spaces and utilization potentials. Based on the design effect, the evolutionary older coniferous trees (gymnosperms) are defined by a distinct main shoot growing upwards. Various species already develop their stems close to the ground for rejuvenation towards the top. On the other hand, deciduous trees develop the crown after a few meters of main shoot growth, with characteristics such as ramified branches in sphere and oval or cylindrical shapes unfolding towards the sky. The changeability of deciduous trees is also observable during the change of all the seasons, where their design characters also transform. The ramified branches are more and more seen with the winter's sun gleaming above them. From spring to autumn, this dense leafy canopy is a realm shade-seeking people are enjoying. Thereby, it is not only about the favoured microclimatic effect, but the spatial quality of a sense of security and of being

accepted into the tree's realm. The transformational processes of deciduous trees reach from a clear branch language, over colourful blossoms to a fully covered crown and, therefore, stand for a versatile quality of experience. Coniferous trees are more self-concentrated and only in exceptional cases undergo the seasonal change. As a general rule, their gestalt character stays the same throughout the year. They convey stability and perseverance (Zauner, 1992.)

If we now look at trees in the context of their natural origin and impact, trees are parts of our phylogenetic heritage and stand for the natural. They connect us on the level of experience with nature and are, therefore, especially with their aesthetic impact the central factor for natural experiences in the urban realm. Within the aesthetic experience of trees, this present work of gestalt impact refers to trees not only influencing the physical, but also mental-psychological conditions of human beings.

### 3.2 On aesthetic importance of trees

The aesthetical dimension of trees plays an essential roll for as people are not only ecologically interlaced but also through the experiences of trees emotionally connected with the urban realm.

The aesthetical dimension of trees plays an essential role for humans, because people are not only ecologically interlaced to nature elements, but also interact emotionally with the trees.

*One single space pervades all beings here: an inner world-space. Silently, the birds fly through us still. Oh, I who want to grow, can gaze outside: a tree will rise inside me...*

(Rainer Maria Rilke – translated by David Young<sup>1</sup>)

<sup>1</sup> RILKE, R.M. – translated by YOUNG, D. The Cortland Review. <http://www.cortlandreview.com/features/13/summer/young.php>, 4.7.19



The poem of Rainer Maria Rilke shows the emotionally effective force of a tree. He describes the communication between the own unconscious inner world and the outer world, by using the symbolic analogy of him, who wants to grow and the tree, standing outside and at the same time growing inside of him. In this point of view, the one realm – the inner world realm – reaches through all beings.

In this context, the psychoanalyst C. G. Jung (1995) names the archetypical relationship of humans towards landscape and trees, where outer images are being consciously saved in form of inner images as personally or collectively lived experiences. These images as primary images build the foundation for the experience of landscape.

Already in 1802, the painter Otto Runge wrote that landscape exists for humans to see themselves, their characteristics and passions within all flowers, plants, and all natural phenomena; in every flower and tree it is getting more and more distinct, how in each and every plant a sense of human spirit, idea or perception is underlying (Runge in Barz, 1995). Therefore, the aesthetic relationship of human beings exists through the sensual encounter of landscape and its individual elements, which embody an inner and outer reality. This relationship resembles a conscious stream flowing between human beings and trees. The logic of the tree experience is a psychological one, where the human being exchanges emotional and psychological realities with trees (Salber in Scholz, 1993).

The tree itself has an important role in mythology, various legends, fairy tales and traditions. The tree inspires artists and takes part in the art of painting, poetry and music, thus turning into a tree of world, life, knowledge, phylogenetics, and into a sacred tree. This great importance is the result of a collective force of the tree itself, which was developed through all the people over all the thousands of years, and still to this day, is personally being experienced and perceived.

*“Trees are sanctuaries. Whoever knows how to speak to them, whoever knows how to listen to them, can learn the truth. They do not preach learning and precepts, they preach, undeterred by particulars, the ancient law of life.”*

(Hermann Hesse, 2014<sup>2</sup>)

2 HESSE, H. – Translation by goodreads. <https://www.goodreads.com/quotes/266635-trees-are-sanctuaries-whoever-knows-how-to-speak-to-them>, 4.7.19

Therefore, trees represent the origin of all living. The trees' holistic aesthetics stands for the fundamental principle of growth and development, but also for vitality within the rhythm of life, intertwined between the interactions of sky-scape and land-scape. All its branches reach for the sun in the sky to catch ever little beam of light and warmth. All its roots are strongly embedded in the soil and nourish it with nutrients of life. In this interaction of heaven and earth, it grows, blossoms, bears fruits and dies apparently when winter is coming, for being born again in spring.

### 3.3 Trees and their importance for health promotion

Urban images influence the well-being of human beings. What kind of special impact plants and especially trees have on health promotion is shown in numerous studies (ST Leger, 2003). In his study, Ulrich proves that 23 patients having a view into green space with natural qualities need less time to recover and, therefore, stay shorter in hospital compared to 23 patients having a view to house facades without any greenery. Furthermore, they needed fewer painkillers and had better mood (Ulrich 1984). In a later article, he noted: “Findings from several studies have converged in indicating that simply viewing certain types of nature and garden scenes significantly ameliorates stress within only five minutes or less” (Ulrich, 2002).

Kaplan shows that naturally equipped open spaces near the working environment have a great positive impact on the people working there. “The addition of flowers and converting some mowed areas to more natural landscaping could not only enhance the appearance of the workplace, but have substantial environmental benefits. At the same time, such changes can contribute to the well being of those who participate, as well as their co-workers” (Kaplan, 2007).

For the importance of places, which enable a natural experience in direct context to the built environment and direct closeness of buildings itself, Hartig notes: “Environmental evaluations, motivations for outdoor recreation, and benefits attributed to contact with the nature all speak to the existence of experiential bonds between the natural and the built” (Hartig, 1993). Özgüner and Kendle compare the emotional impact of natural versus formal designed parklands in Sheffield (UK), where quantitative surveys showed, that visitors of the naturally designed green spaces (“wild nature”) especially felt naturalness and freedom, whereas visitors of the formal green spaces (“formal nature”) felt more of an overall peaceful, calm and stress



1 – Rock area



2 – Beside the waterfall



3 – Copse

■ **Figure 1:** The different types of the investigated sites and places near the Krimmler Waterfalls/Austria

relieving encounter. The wilder natural park offers more possibilities for socialisation (Özgüner/Kendle, 2006). Kaplan and Austin confirm that vegetation-specific open spaces with trees, forests, and meadows, and a natural characteristic, raise the satisfaction of residents in near lying neighbourhoods. This means peri-urban forests upgrade adjacent districts and are being experienced as attractive (Kaplan and Austin, 2004).

Let us come to the Biophilia aspect, which is based on the biologist Edward O. Wilson. This hypothesis gives an important basis when discussing nature and its effects on human beings. This theory establishes the love of man for nature on the innate emotional relationship with plants and animals. It is a very popular theory that is discussed in many studies. Wilson states that Biophilia "... is the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of ultimate human nature" (Kellert and Wilson, 1995; Majors, 2019). The Biophilia Hypothesis also builds a bridge to Bourrassa's phylogenetic warfare mode. Both theories are based on our phylogenetic heritage, which makes the sense of naturalness a matter of course.

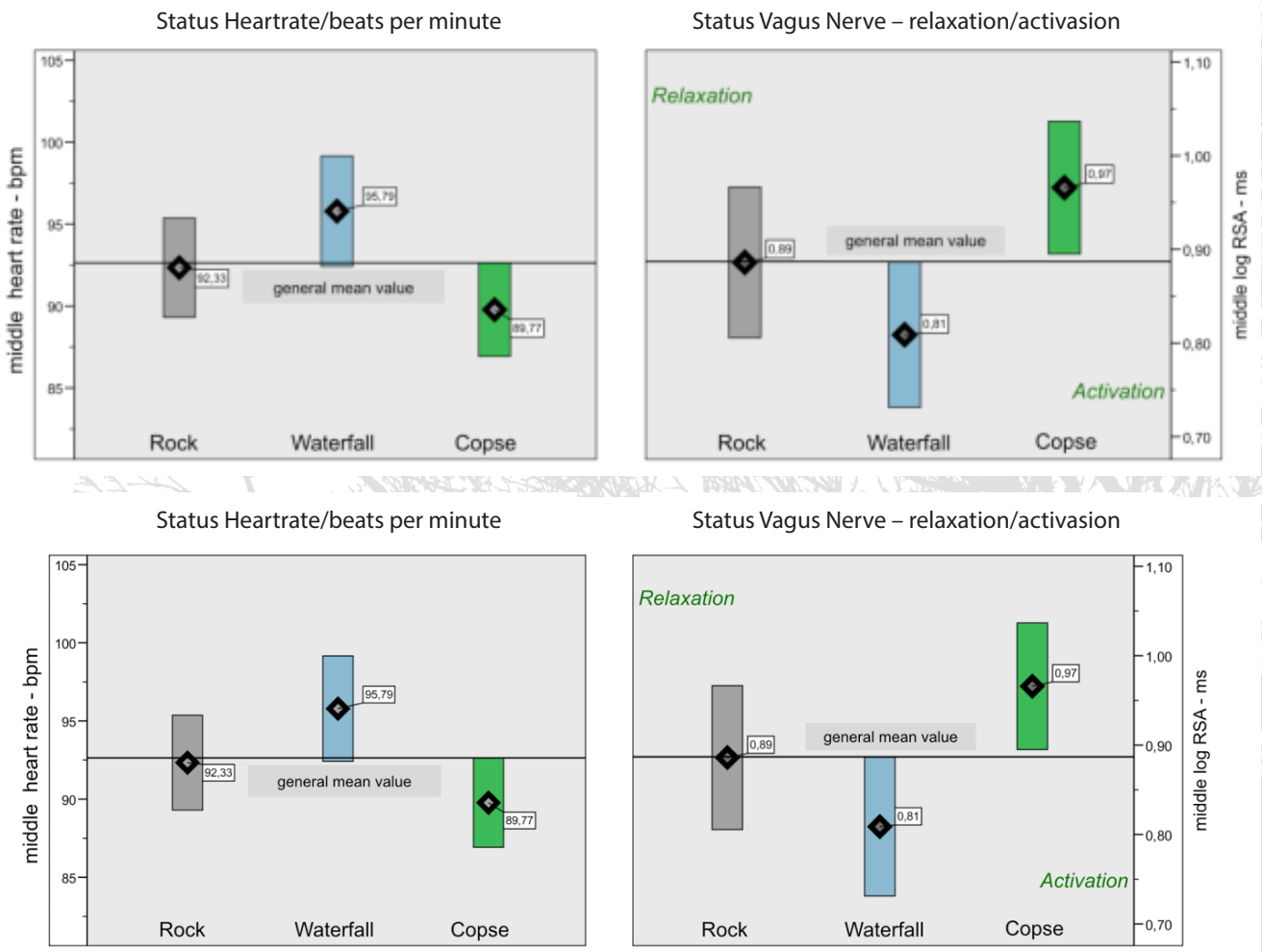
The following two studies refer that urban residences pose a higher risk of psychiatric disorders, but the causes remain unknown. In this context, the two studies confirm the factor that naturally shaped open spaces having a positive effect on health. Besides the attractiveness that green spaces provide, Grahn and Stigsdotter prove that people who spend more time in urban green spaces are less vulnerable for stress-related disorders. The accessibility of these green areas plays hereby a major key role (Grahn and Stigsdotter, 2003). The health-promoting effect of green spaces on the human psyche described by Grahn and Stigsdotter is confirmed by a Danish study (Engemann et al., 2019). This paper deals with the research of children in contact with green open spaces. Between 1985 and 2013, the landscapes around the parental homes of one million Danish children up to 10 years were investigated on the basis of high-resolution satellite pictures in the vicinity of places of residence. In the center of the research stands the analysis of the normalized difference vegetation index within a 210 × 210 m square around each person's place of residence. The results show that the longer the children grew up in contact with green spaces, the lower the risk of becoming mentally ill. The children who grew up in the "green" had by 55 percent lower risk of becoming mentally ill than people without natural surroundings. "Our results

show that green space during childhood is associated with better mental health, supporting efforts to better integrate natural environments into urban planning and childhood life“ (Engemann et al., 2019).

The health-promoting effect of green spaces as well as trees is related to the previously described aspect of the phylogenetically related perception of space so close to the natural. In accordance with this point of view, open spaces and trees are spaces of resonance, which connect people in their perceptive encounters with trees with their own inner nature and, therefore, satisfy the evolutionary longing for nature. The sociologist Hartmut Rosa explains the tree as a plea for the experience of the natural, as a retreat into the untouched outer nature is one of the most reliable ways of getting to hear the voice of our inner nature (Rosa, 2018).

On the basis of the objective that different green spaces influence the state of well-being of the human beings, the question arises to what extent differently spatially shaped spatial structures affect humans accordingly. To this end, a study was carried out in 2004 near the Krimml Waterfalls in Salzburg. One of the aims was to investigate the atmospheric and contemplative effects of different landscape types on the human circulatory system. The investigation was carried out in 2004 by Frohmann et.al at the Krimmler Waterfalls in Austria where 3 different places were examined regarding their atmospheric effect.

The rock area lies at the foot of a rock moraine and is shaped with different little rocks. The area next to the waterfall is also an area without trees and is featured by the dynamics and freshness of water. The third place is marked with an open and bright tree structure (copse).



■ **Figure 2:** Results of heart rate measurement and the RSA activation of the examined people in context to the investigated sites and places  
 The copse show a lower Heart Frequency by 6 beats per minute against the waterfall. The Relaxation Factor of the Vagus Nerv confirms the heart frequency  
 Source: Fromann et al., 2004



The framework conditions at the three landscape scenes were working. The sun was shining on both days. Temperature: (1) 19 °C/(2) 20 °C/(3) 20 °C. Air humidity: (1) 28%/(2) 31%/(3) 28%. Noise volume: (1) 55 dpi/(2) 69 dpi/(3) 60 dpi.

The experimental procedures were carried out in two days with opposite experimental sequence. As many as 14 people were measured for 10 minutes for each spot, always standing in the same posture with their eyes closed. The examinations were done with the method of the heart rate variability (HRV) as an indicator for the vegetative nervous system's activity. Two parameters were important:

1. the heart frequency (HR) is one of the most significant vegetative values as it varies greatly with physical or emotional activity;
2. the respiratory sinus arrhythmia (logRSA) is a measure for vagus nerve activity, state of rest and relaxation.

The measurements show particularly an interesting result in terms of the effect of the 3 compared sites. At the place with the "copse" character the calming effect was significant. The heart rate decreased by up to 6 beats per minute compared to the "Waterfall". The "Rock" place lies between the waterfall and the copse, although this place was quieter than the copse. It is interesting as it shows the two points in the context of the atmospheric effect of trees. The first point shows that trees compared to the rock and waterfall areas help to reduce stress by lowering the Pulse Rate and encouraging calmness through the Vagus Nerve. The second point relates to the fact that the atmospheric effect of spaces in the perception reaction by humans also takes place with closed eyes (Frohmann et al., 2010).

## 4 Conclusion

From the obvious relationship between the natural experience and symbolic importance of trees it becomes clear, that not only ecological factors are reasons for planting trees in cities. At the same time, it is necessary to pay attention to the species selection, the estimated size and the site tolerance, so that the trees have the opportunity to fully develop their phylogenetic and health-promoting effects on humans. Therefore, it is important to maintain healthy and vital trees and city forests in urban areas.

The connection between the perception and the recovery potential of trees enable a contemplative encounter with their atmospheric radiance. The special impact refers here to their vitality, where it

is assumed that the atmosphere of trees is shifting people into a physically and psychologically pleasant disposition. In this sense, groves and individual trees allow personal experiences of tranquillity and inner contentment. And this will take place also with closed eyes. The empathetic encounter with trees forms a basis for psychologically relaxing spatial experiences – processes which can be compared with contemplative experiences and, therefore, have calming effects on human beings.

Theories on the effect of the Nature experience and the Biophylla effect and the phylogenetical perception are based on numerous studies that show that the common evolution between nature and culture is anchored in the subconscious mind of human beings. The love for nature is innate to us humans and a part of the living relationship between trees and people. In this sense, trees promote the emotional relationship of humans to rural and urban landscapes. Especially, the stay under trees has a calming effect on humans through the contemplative perception of its atmosphere. In summary, the phylogenetic relevance of trees is an essential basis for their health-promotion effect on the psychological level for humans and, therefore, it plays a central role in the perception of nature in urban areas. In addition, it can be stated that apart from the aesthetics, the atmospheric effect of trees also has a recreational significance.

All the named design-relevant and health-promotional effects of trees combined together with their ecological and economic importance for appreciation in the urban realm justify their planting, maintenance, and relational perception.

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