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DOCTORAL THESIS

URBAN PUBLIC SPACES DESIGNED FOR HUMAN FLOURISHING

THE BEHAVIORAL AND NEUROPHYSIOLOGICAL RELATIONSHIP OF HUMANS WITH THE BUILT ENVIRONMENT



UNIVERSITÀ DEGLI STUDI "G.D'ANNUNZIO" CHIETI - PESCARA
DOTTORATO **CULTURE DEL PROGETTO: CREATIVITÀ, PATRIMONIO, AMBIENTE**

First we shape the cities — then they shape us.

Jan Ghel

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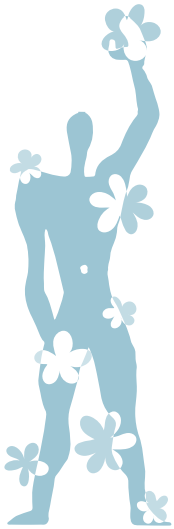
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INTRODUCTION

As architects, we design for people.
Human needs have always shaped what we imagined, designed, and built. However, architectural design has often lost sight of human needs, deviating from what can be defined as a human-centric and empathetic model. Instead, it has succumbed to the ocularcentric tradition and the dominance of visual perception at the expense of all other senses[1].

Designing a public space, without a doubt, requires attention. In the act of *proiectare*—projecting an idea into space—it is essential to consider the practical functions to be incorporated and, above all, the multitude of people who will inhabit that space. «*Empathy is a talent that can be developed and refined, and it is more important than technical skills for the practice of an architect*».[2]
Therefore, when creating new urban spaces for social interaction or redeveloping the urban fabric, architects must employ their empathetic talent as a key competence to promote citizens' well-being.

This thesis aims to analyze and reflect on human health and well-being concerning urban public spaces, with particular attention to the role of perception and the behavioral and neurophysiological impact of these places.
The research project seeks to identify how the design of public spaces and cities can incorporate these factors to indirectly enhance human health and well-being through the physical experience of these environments.

The project will analyze 18 public spaces and assess their impact through quantitative and qualitative methodologies drawn from environmental psychology, neurophysiology, and architecture. These methods will enable measuring and

1 Pallasmaa, J. (2005)
2 Mallgrave, H.F., (2018)

identifying contemporary public spaces' flourishing potential. The findings of these experiments will help identify key public space design elements that can contribute to improving urban planning and design practices. Additionally, the results will raise public awareness of the importance of well-being and the significant impact that urban design can have on health and quality of life.

To explore the complex field of health and well-being, this research draws on disciplines outside the realm of architecture, such as cognitive psychology, environmental psychology, and neuroscience. The central concept of this research project is that human beings, as biologically embodied entities, unconsciously respond to the characteristics of their surrounding environment.

Our presence in the real world constantly interacts with the spaces we inhabit—whether natural environments or designed spaces such as buildings and open areas. This relationship between space and cognition is co-evolution, defined by a cause-effect dynamic[3] [4]. Therefore, the way architects design spaces has the power to influence and shape human behavior and neurophysiological responses.

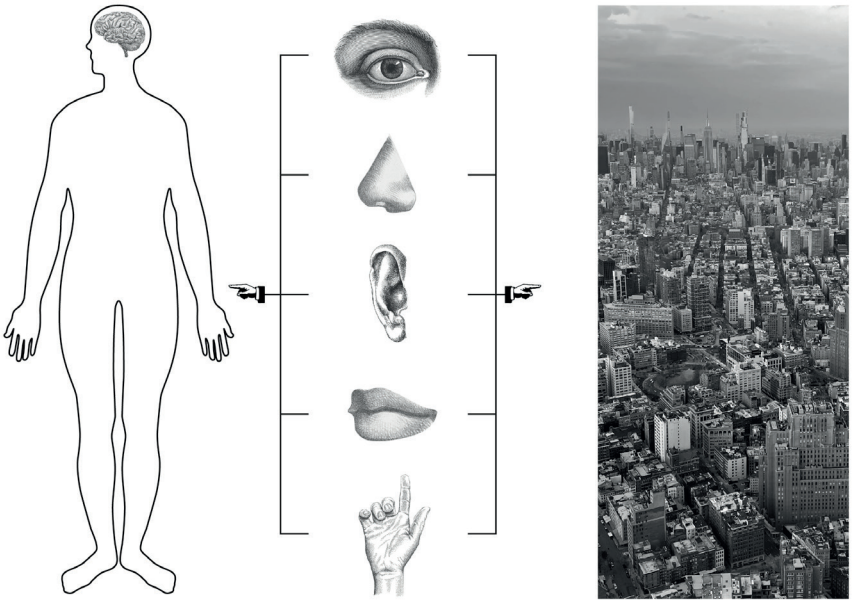


Figure 0.01
Man perceives the urban environment through his senses, which influences him neurophysiologically and behaviourally.

[3] Gallagher, S. (2017)
[4] Varela, F. J., Thompson, E., & Rosch, E. (1991)

This thesis aims to bring this approach into the field of architectural design, focusing on design elements that can enhance well-being within urban contexts and alleviate mental stress. Depending on the context, these qualities can be implemented and supported physically differently.

This research operates within a highly interdisciplinary field, utilizing methods and tools from architecture, psychology, and neuroscience while integrating theoretical concepts from environmental psychology and cognitive science.
The ultimate goal is to provide a spatial and design-oriented exploration of the under-researched yet highly relevant concept of ***flourishing public space***.

1 | PART ONE
FLOURISHING

Cities are the heart of human vitality.
Although it may seem obvious, cities currently accommodate 54% of the global population, and according to the United Nations, this figure is projected to rise to 70% by 2030.
Within cities, people work, play, rest, socialize, and live most of their lives. Although these activities have always taken place in urban environments, the ways and forms through which people engage in them have evolved over time.
At the end of the 19th century, cities were designed with a clear focus on human scale. However, the Industrial Revolution triggered profound economic, social, and cultural transformations that gradually reshaped urban organization. The rapid mechanization of production and accelerated urbanization caused a massive population shift from rural areas to urban centers, generating new residential density patterns and redefining the relationship between public and private spaces.

At the beginning of the 20th century, these transformations were further accelerated by the advent of Fordism—a production model based on standardization, assembly lines, and mass production. While Fordism revolutionized industrial workflows in American cities, it sparked a radical reorganization of urban space. Cities were redesigned according to a functionalist logic that prioritized automobile mobility and the segregation of urban functions, in line with the growing dominance of cars as the primary mode of private transportation. This evolution led to widespread urban sprawl, characterized by suburban residential neighborhoods separated from commercial and industrial hubs, resulting in the fragmentation of urban continuity and a significant reduction in the compact density typical of pre-industrial cities.
This vision was further solidified by modernism, which radicalized the idea of urbanization based on efficiency, fun-

ctionality, and the rigid division of urban zones, as theorized in the Charter of Athens[5] (1933). The automobile became a symbol of modernity—an emblem of speed and individual mobility—further accelerating the transformation of urban environments. Cities began prioritizing large roadways and infrastructure dedicated to vehicular traffic, often at the expense of human scale and the quality of public space.

While this reorganization enabled unprecedented urban expansion and new spatial configurations, it also contributed to the fragmentation of the social fabric and the decline of public gathering spaces.

The Fordist city model prioritized the efficiency of flows over the quality of lived spaces, producing urban environments designed more for cars than people. As a result, public spaces were progressively marginalized, leading to the reduction of tree-lined boulevards, bike paths, children's playgrounds, and urban parks. In this context, public space lost its centrality in urban design, giving way to fragmented urbanization that often lacks spaces for encounter and social interaction.



Figure 1.01
Automobile in corsa – Giacomo Balla (1912-1913) from https://www.flickr.com/photos/116153022@N02/16327433183

[5] For more details see the Athens Restoration Charter

This transformation has redefined the function of urban space. The Greek agorà—a place of meeting and exchange—gave way to a focus on speed, efficiency, and the centralization of activities within buildings.

Today, these dynamics highlight the urgent need to rethink urban design, shifting toward creating inclusive and sustainable public spaces capable of meeting contemporary needs for well-being, soft mobility, and social connectivity. The goal is to restore space for tree-lined boulevards, bicycle lanes, children's play areas, and urban parks—elements that can recenter public space within the urban fabric and foster human-centered urban life.

However, if our cities are designed primarily for transportation and for reaching point B from point A as quickly as possible, they will fail to consider what happens to people between the buildings.

A study conducted by scientists from the Max Planck Institute for Human Development in Berlin demonstrated that exposure to urban areas with heavy traffic increases stress levels compared to exposure to natural environments. To conduct the experiment, the research team used functional magnetic resonance imaging (fMRI) to record real-time changes in brain activity.

Sixty-three healthy adult volunteers were asked to complete questionnaires, perform a working memory task, and undergo MRI scans while responding to questions, some designed to induce social stress. Participants were randomly divided into two groups: the first took a one-hour walk in an urban environment, while the other walked in a natural setting.

After the walk, each participant underwent a second fMRI scan while performing an additional stress-inducing task and completed another questionnaire. The results showed that activity in brain regions associated with stress decreased in the group that walked in nature. In contrast, no such

reduction was observed in the group that walked in the urban environment[6].
This experiment provides scientific evidence that spending time in nature can reduce stress more effectively than time spent in traffic-heavy urban areas.
This finding highlights that "gray" cities—characterized by a predominance of spaces for mobility and transportation at the expense of green areas—harm human health.
Furthermore, reimagining cities through a greener lens is about improving public health and enhancing cities' sustainability and resilience.

In the complex reality of our contemporary world, we navigate a multifaceted landscape shaped by a series of challenges across different layers of action and implementation. Rapid urbanization and the swift expansion of urban areas pose significant challenges, including city growth, the development of new infrastructure, resource management, and individual and collective well-being.
Climate change is now an undeniable reality and has increasingly impacted how we live and perceive the planet Earth over the past decade. It is among the greatest challenges of the century and has been described as «*the greatest concern for humanity's future*»[7].
Cities are the primary arenas where the impacts of climate change manifest, as urbanization increases their vulnerability. Like living organisms, cities depend on resources and energy to survive[8].
The consequences of climate change extend beyond human populations and cities, affecting entire ecosystems and global biodiversity. Both endemic and non-endemic species suffer from habitat loss, pushing many towards extinction.

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6 Sudimac, S., Sale, V. & Kühn, S. (2022)

7 World Economic Forum. (2016). Mastering the Fourth Industrial Revolution. Retrieved from https://www.weforum.org/events/world-economic-forum-annual-meeting-2016

8 Zucaro, A., Maselli, G., & Ulgiati, S. (2022)

Moreover, contemporary lifestyles are characterized by rising work pressures and increasing societal demands, which contribute to heightened levels of chronic stress. Elevated cortisol levels, a biomarker of chronic stress, can lead to long-term health issues, including diabetes[9].

Lifestyle-related diseases, such as diabetes, cardiovascular disorders, and obesity, result from a combination of factors, including sedentary behavior, unhealthy eating habits, and increased exposure to environmental toxins[10].

However, these diseases are also closely linked to climate change and environmental degradation[11].

The areas where higher stress levels are measured are urban areas, compared to rural areas. A higher production of stress in these areas results in a higher number of cases of clinical depression, schizophrenia, and anxiety disorder.[12]

The relationship between health and the environments in which people live is deeply interconnected. As a result, our cities and buildings can significantly impact and even negatively affect our physical and mental health.

The World Health Organization (WHO) published a report highlighting the connection between certain symptoms and prolonged exposure to buildings with specific negative environmental characteristics, bringing attention to the issue of *Sick Building Syndrome*[13].

Sick Building Syndrome (SBS), also known as "building-related illness," is a condition in which building occupants experience symptoms that appear to be linked to the time spent within the building itself.

The symptoms of SBS can vary widely and include:

- ***Respiratory issues:*** Coughing, throat irritation, nasal congestion, and difficulty breathing.

9 Dervishi, K. (2020)
10 Henson, J., De Craemer, M. & Yates, T. (2023)
11 Haines, A., Kovats, R. S., Campbell-Lendrum, D., & Corvalán, C. (2006)
12 Colin Ellard. (2015)
13 World Health Organization. (1983).

- ***Skin conditions:*** Dryness, itching, or skin rashes.
- ***Eye-related symptoms:*** Dryness, itching, or eye irritation.
- ***General symptoms:*** Headaches, fatigue, difficulty concentrating, and nausea.

One of the primary causes of SBS is insufficient ventilation, which can increase the concentration of indoor pollutants. Additionally, chemical substances or mold can develop within buildings, negatively affecting health. Other contributing factors include uncomfortable temperatures, poor lighting, excessive noise, and other environmental issues.
In 1988, the World Health Organization (WHO) launched the Healthy Cities program, a global initiative aimed at placing health at the forefront of cities' social and political agenda. This initiative seeks to promote urban health through the active involvement of local communities.
It becomes clear how essential it is to prioritize citizens' health not only by allocating funds for hospitals or healthcare facilities but also by implementing proactive and preventive measures to create healthy cities.

«*We shape our buildings, and afterward, our buildings shape us*»[14]

Architecture is not only made up of physical elements within a space, such as walls, doors, windows, fixtures, floors, etc. It embraces a broader dimension of being. In an architectural space, indoors or outdoors, we perceive our surroundings and experience them through our senses.
«*Our body and its emotional foundations, both at a conscious and preconscious level, shape how we think and engage with the world. In urban cultures, this shaping generally occurs in an environment built by an architect*».[15] This statement highlights that the mind-body system is not a dualistic entity

[14] Churchill, W. (1943, October 28). Speech to the House of Lords. Retrieved from Hansard and Winston Churchill.org.
[15] Mallgrave H.F. (2015)

of two distinct and separate parts, each with its properties. Instead, it is a unified system where the designed external environment influences how we respond to the world around us.

In *Being and Time*, Martin Heidegger distances himself from the dualistic view of mind and body, introducing the concept of *Dasein*, which can be translated as being in the world. Heidegger emphasizes the fundamental role of human relationships with the world in shaping individual identity.
If the surrounding environment shapes how we think and feel, it becomes essential to understand how emotions function. Comprehending how space affects our emotions is highly complex, as emotions are formed through a combination of biological, cognitive, and social factors. They are also influenced by the cultural and social constructs within which they are expressed.

In 1908, on the outskirts of Dresden, Germany, construction began on a new town designed to promote the health and well-being of its inhabitants—Hellerau.
Conceived by the visionary industrialist Karl Schmidt and designed in collaboration with architect Richard Riemerschmid, Hellerau is one of the earliest examples of modern urban planning that enhances the quality of life through the integrated design of residential, industrial, and social spaces.

Hellerau was founded on Ebenezer Howard's *Garden City Movement* principles, which advocated balancing urbanization and nature. The settlement was envisioned as a place where urban and rural life could coexist harmoniously, fostering both physical and mental well-being. The concept behind Hellerau was to provide not only functional housing and green spaces but also cultural, educational, and recreational infrastructure to support a rich and meaningful com-

munity life.

One of Hellerau's most innovative aspects was its integration of social and cultural reform ideals into architectural and urban planning practices.

The Festival Theatre, designed by architect Heinrich Tessenow, became the heart of the community—a venue for performing arts and a space for collective participation and educational experimentation.

Schmidt and Tessenow's vision reflected a holistic approach: the built environment was intended to stimulate not only functionality but also the intellect and emotions of its inhabitants.

The residents of Hellerau actively participated in social and cultural experiments aimed at redefining how people lived and interacted. Public space design played a crucial role in this vision by fostering social connections by creating squares, communal gardens, and pedestrian pathways.

These public spaces were designed to encourage an active and participatory lifestyle, anticipating many contemporary insights on the importance of public space for individual and collective well-being.

The Hellerau experiment is a vital reference within the context of your thesis, as it demonstrates how urban planning and architecture can be powerful tools for influencing human health and behavior.

The principles that guided Hellerau's design remain profoundly relevant today, particularly in addressing urban health and sustainability challenges.

Hellerau was more than an architectural project—it was an integrated vision that combined architecture, nature, and community. It exemplifies that the design of healthy and resilient cities is not a new concept but one deeply rooted in the history of urban planning.

This historical case offers a valuable precedent for contemporary thinking about cities as living organisms, where

inhabitants' physical, mental, and social well-being is intrinsically linked to the built environment.
A city is not only a place for gathering and infrastructure but an actual metabolic organism—an *augmented city*[16] capable of transforming and metabolizing resources and acting as a creative device for generating fertile relationships.
This vision highlights cities' dynamic, ever-evolving nature, where the quality of urban space profoundly shapes the health and well-being of citizens.

1.1 WELL-BEING AND HEALTH

When discussing well-being, it becomes inevitably complex to find a single, comprehensive definition capable of encompassing the broad spectrum of meanings the term entails. Well-being can be classified into various forms: ***Physical Well-being***, which refers to a good state of health; ***Mental and Emotional Well-being***, which relates to the ability to manage emotions positively; and **Social *Well-being***, which derives from our relationships within a community. ***Economic well-being*** and ***spiritual well-being***, which are concerned with inner harmony and peace, and many other types of well-being, can also be considered.
Within this multifaceted vision of well-being, it becomes extremely difficult to establish a universal metric capable of fully measuring its dimensions.
When entering this intricate field, it may seem challenging to imagine how a direct relationship between well-being, health, and architecture could exist.
In a broader sense, the relationship between architecture and medicine has always existed.
Since Ancient Greece, attention to urban planning has demonstrated a focus on public health. In Miletus, for example, the orthogonal grid plan attributed to Hippodamus was designed to facilitate air circulation through the city and

16 Carta, M. (2021)

ensure better sunlight exposure.
Later, in Ancient Rome, the first urban infrastructures to improve public health were developed. These included constructing aqueducts and creating the first and largest sewer system in Rome, the *Cloaca Maxima.*

Book I of Marcus Vitruvius Pollio is certainly an important document that emphasizes health and the importance of knowledge of medical disciplines.
In Chapter 1, Vitruvius states:

> «Architecture is an art comprehending many ſciences and various kinds of erudition ; by the rules of which, the works of all other arts are exa mined. It conſiſts of practice and theory. Practice is the conſtant and accuſtomed attention to the manual operations, and to the ſeveral kinds of materials of which a work may be conſtructed. Theory is the ability to demonſtrate and explain the rules and reaſons of the pro portions of buildings. Architects who have practiſed without theory, and who have been only experienced in the manual part, have not been able to acquire any reputation by their works; and thoſe who have truſted to theory and ſpeculation only, have followed the ſhadow and not the ſubſtance; but thoſe, who are perfectly acquainted with both, like men completely armed, ſpeedily, and with reputation, ſucceed in their endeavours for as in all things, ſo eſpecially in architecture, there are two parts, the ſignified and the ſignifier; the former is that which is here propoſed to be treated of; the latter is the demonſtration of the principles of the ſciences explained; and he who profeſſes architecture, ought to be well exerciſed in both parts. He ſhouid be ingenious, and docile of inſtruction; for neither ingenuity, without education, or education, without ingenuity, can render him a complete artiſt. He ought to have a knowledge of letters, be expert in drawing, learned in geometry, not ignorant of optics, inſtructed in arithmetic, well read in hiſtory, to have dili gently attended to philoſophy, to have a knowledge of muſic, not a ſtranger to phyſic, underſtanding in the law, and be converſant in aſtronomy and the aſpe&s of the heavens ; why theſe are neceſſary, the following are the reaſons.»[17]

explaining how the profession of the architect is a complex profession that must bring together different fields of knowledge for a bigger vision. This is also related to medical disciplines.
A crucial contribution to the history of cities and public health came from the *hygienist movement* between the 18th and 19th centuries. Rooted in medical, epidemiological, and

[17] Vitruvius Pollio. (1791)

urban studies, this movement promoted a radical transformation of the urban environment through improvements in public hygiene. Hygienist theories profoundly influenced urban planning, leading to the design of tree-lined boulevards, garden neighborhoods, and the functional zoning of cities, with distinct separations between residential, industrial, and commercial areas.

The Industrial Revolution had driven an unprecedented urban expansion, marked by overcrowding, pollution, and poor sanitary conditions, which contributed to the spreading of infectious diseases such as cholera and tuberculosis. Hygienists were concerned not only with the human body but also with the social body, aiming to heal the city's "sick" fabric through urban surgery[18].

Their impact is evident in the significant urban transformations of the 19th century, such as the *Garden Cities* proposed by Ebenezer Howard.

In his work *To-Morrow: A Peaceful Path to Real Reform*[19], Howard introduced the theory of the Three Magnets:

> «The town and the country may, therefore, be regarded as two magnets, each striving to draw the people to itself — a rivalry which a new form of life, partaking of the nature of both, comes to take part in. This may be illustrated by a diagram of 'The Three Magnets,' in which the chief advantages of the Town and of the Country are set forth with their corresponding drawbacks, while the advantages of the Town-Country are seen to be free from the disadvantages of either»[20].

This concept laid the foundation for his later formalization of the *Garden City* model in 1902. Howard proposed an alternative to the congestion of industrial metropolises, envisioning self-sufficient settlements that combined the advantages of urban and rural life. Garden Cities were to be designed with controlled residential density, surrounded by a greenbelt, and equipped with public spaces, services, and industries harmoniously integrated into the urban fabric.

18 Zucconi, G. (2022)
19 Howard, E. (1898)
20 ibidem.

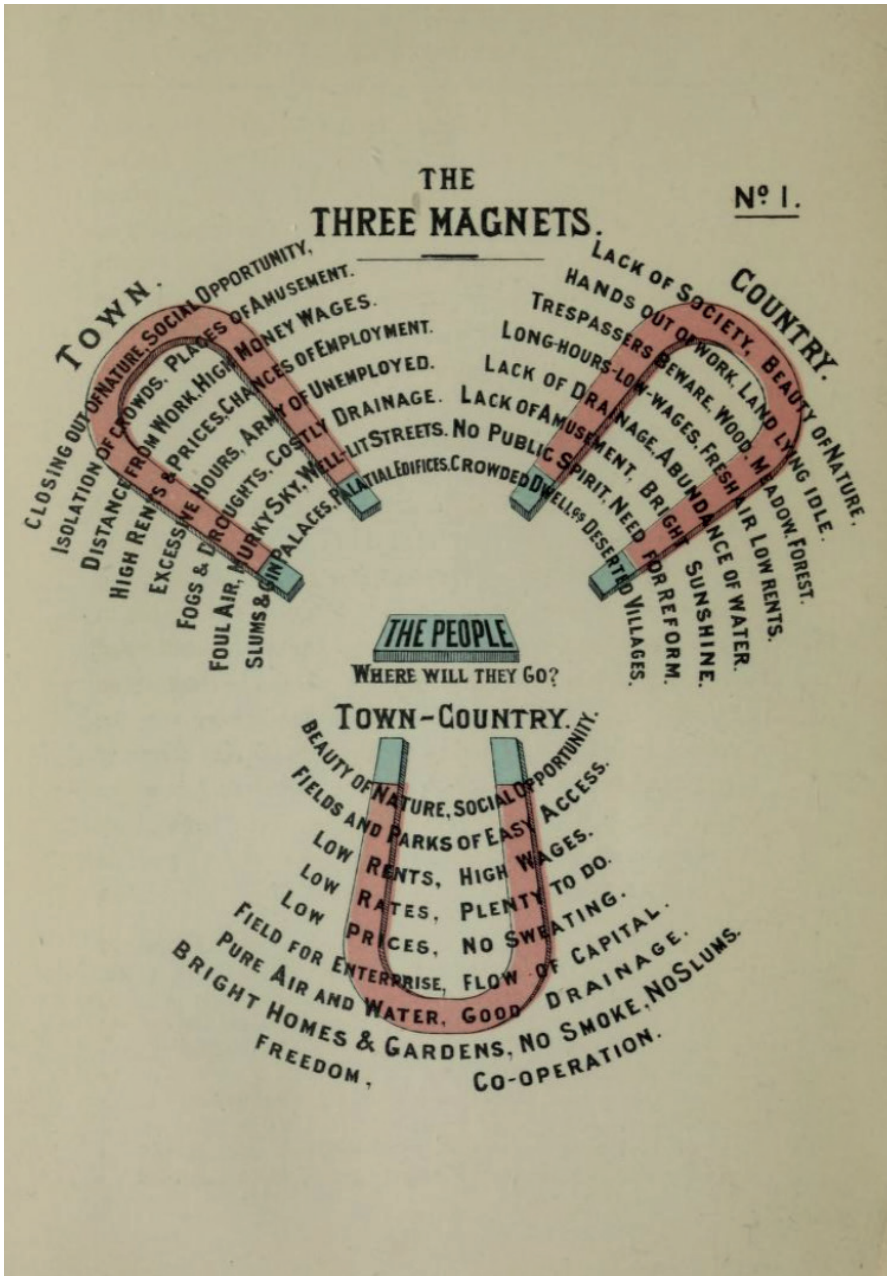


Figure 1.02
Ebenezer Howard's illustration of the three magnets in To-Morrow: a peaceful path to real reform.

From the mid-19th century onwards, new urban transformations reshaped several European cities through a necessary new vision to address public health issues.

In this context, Georges-Eugène Haussmann was one of the key figures who shaped Paris as we know it today. As the Prefect of the Seine under Napoleon III, Haussmann transformed Paris during his 17 years in office through five categories of interventions: roadworks, building works, parks, utilities, and administrative restructuring[21].

[21] Des Cars J., Pinon P. (1991)

Among the most crucial measures for the "sanitization" of the French capital were the grands travaux, which involved demolishing overcrowded medieval neighborhoods to improve air circulation and natural lighting. Additionally, the construction of the Bois de Boulogne, a large urban park west of the city center, and the Bois de Vincennes to the east provided Paris with two essential green lungs. Another significant improvement for urban health was the construction of a new and extensive sewage system separating wastewater from rainwater.

Another notable example of the relationship between urban planning and well-being is Ildefons Cerdà's urban plan for Barcelona, known as the *Plan de Ensanche* (Expansion Plan), approved in 1859. Cerdà, a visionary engineer and urban planner, designed the plan to address medieval Barcelona's overcrowding and unhealthy conditions confined within city walls. His proposal aimed not only at functional city expansion but also at improving residents' living conditions by incorporating principles of urban hygiene, efficiency, and accessibility.

Cerdà's plan was based on a regular orthogonal grid that divided the territory into uniform blocks (*manzanas*). This layout not only ensured order and easy navigation but was also designed to maximize ventilation and natural light. Each block featured chamfered corners to facilitate air circulation and light penetration, thereby preventing the formation of unhealthy, stagnant areas. Moreover, Cerdà originally intended for each block to include large green spaces at its center, providing residents with areas for socialization and relaxation. However, many of these spaces were later occupied by buildings.

Another revolutionary aspect of Cerdà's plan was its focus on sanitary infrastructure. The project included an advanced drainage system for managing wastewater and rainwater, reducing the risk of communicable diseases. The planning

also addressed transportation and communication needs by introducing wide, straight avenues that promoted efficient mobility without sacrificing pedestrian space.

Cerdà did not limit himself to a purely technical approach. In his *Teoría General de la Urbanización*, published in 1867, he presented a holistic vision of urban planning as a discipline serving social well-being:

> «He founded the discipline of urban planning in a peculiar place: the library. It was there that he realized that 'nothing, absolutely nothing, had been written' about the problems affecting large urban centers. This realization did not lead him to express an idea of the city through drawings but rather to undertake a different operation: to search for 'new words to express new ideas'»[22]

Thus, he imagined the city as a living organism, where public spaces and infrastructure should be designed to improve quality of life, promote health and safety, and foster a sense of community.

By contrast, Naples was facing severe public health issues at the end of the 19th century. Urban overcrowding had reached extreme levels, with one of the highest population densities in Europe. This overcrowding resulted in disastrous sanitary conditions, especially in the poorest neighborhoods. Infrastructures were inadequate: many buildings lacked efficient sewage systems and had no access to potable water, which was often contaminated.

Epidemics were frequent and devastating. Cholera, in particular, struck the city repeatedly, with one of the most severe outbreaks occurring between 1884 and 1885.

In response to this crisis, during the 1880s, the government began recognizing the urgent need for sanitary interventions. One of the most significant projects was the rehabilitation of the *Rione Terra*, an urban redevelopment initiative aimed at improving public health and living conditions. New laws and sanitary regulations were introduced to prevent

[22] Clemente A.A. (2020)

the spread of diseases and improve hygiene standards.
Once again, using urban strategies allowed space to transform and become a remedy[23].

A significant contribution to the relationship between cities and well-being came in 1876 with Benjamin Ward Richardson and his work *Hygeia, the City of Health*. This imaginative work, for which Richardson himself apologizes—«*Pardon me for drawing upon your imaginations as I describe it*»[24]—represents one of the first systematic visions of a city designed to optimize the health conditions of its inhabitants, anticipating many principles that would later guide modern building and urban planning regulations.
Richardson proposed a low-density urban model, limiting the population to 100,000 inhabitants—a recurring feature in urban utopias, which set population caps to control urban growth and ensure optimal living conditions. The city covers an area of about 16 km², with an average density of 25 people per hectare, distributed across 20,000 low-rise single-family or terraced houses, ensuring proper population distribution and safety. Taller buildings, limited to three or four stories, are spaced apart and concentrated in places designated for markets or shops.
The urban structure is based on a strict orthogonal grid, with significant arteries oriented east to west to ensure proper ventilation and natural lighting. All streets are wide and tree-lined, and empty spaces «are surrounded with garden space and add not only to the beauty but to the healthiness of the city.»[25] Heavy traffic and railway lines are underground beneath the main streets, separating transport functions from residential areas to reduce noise and pollution.
Richardson's design also pays close attention to housing

23 Choay F. (1996)
24 Richardson B. W. (1876)
25 Ibidem.

construction. Homes are built from glazed, water-resistant bricks with transverse perforations to allow air circulation between buildings. Inside, the chosen wall color is a soft gray, considered most pleasant to the eye. The project's focus extends beyond the sanitation of spaces to encompass the happiness and comfort of those living within them, already reflecting an awareness of psychophysical well-being. Richardson's project centers on values such as order, geometry, and, above all, hygiene and cleanliness, foreshadowing the urban transformations of modernity and themes of physical and mental well-being. *Hygeia* is not just a theoretical exercise; it is a vision that integrates architecture, urban planning, and public health, demonstrating how urban design can become a tool for promoting collective well-being.

If space can be medicine, then the city can be a cure. A more thoughtful design of urban spaces can best promote health and well-being. However, to fully understand the therapeutic potential of urban space, it is essential to adopt a *salutogenic* approach.

The concept of *salutogenesis*, introduced by sociologist Aaron Antonovsky, shifts the focus from disease prevention and treatment to enhancing the factors that promote health and well-being. This paradigm does not view health as a static state but as a dynamic process influenced by social, psychological, and environmental determinants.

In architecture and urban planning, a salutogenic approach means designing spaces that stimulate individuals' inner and relational resources, fostering the sense of coherence defined by Antonovsky: comprehensibility, manageability, and meaningfulness. Spaces should be intuitive and accessible, capable of generating positive experiences and social connections, and designed with a holistic vision that embraces physical, mental, and social well-being.

From this perspective, elements such as natural light, ven-

tilation, urban greenery, and material quality are not merely technical details but essential for stimulating city dwellers' health and well-being.

1.2 A MATTER OF HAPPINESS, BEAUTY, AND WELL-BEING

In a design vision centered on well-being, where people's needs and experiences are placed at the heart of the design process, it is essential to conceive buildings and urban spaces that positively and healthily influence their users. Designing to promote beauty and well-being ultimately means aiming for the user's happiness.

However, defining what it means to design for beauty, well-being, and happiness is a complex challenge. Although architects have pursued these goals for centuries in their design practices, they have rarely been explicitly stated or declared as such. Words like "beauty" have often been forgotten, dismissed, or repudiated in the contemporary architectural lexicon.

Even in other disciplines, terms like "happiness" have long been overlooked or considered marginal. For example, the psychologist Martin E.P. Seligman questioned why psychology had focused predominantly on human unhappiness rather than happiness since Freud. In 2002, Seligman proposed the theory of *Authentic Happiness*, which posits that happiness can be analyzed through three fundamental elements that we choose for our well-being: positive emotions, engagement, and meaning.

The first element involves positive emotions such as pleasure, ecstasy, affection, and comfort. These are states we strive for, and that satisfy us.

The second element, engagement, refers to the continuous flow of activities we pursue with passion and dedication—what Seligman calls a "life of engagement." These activities fully absorb us, allowing us to experience positive emotions effortlessly.

The third element, meaning, differs from the first two because it implies an orientation toward a purpose greater than ourselves. It is often described as the sense of our life: finding an objective that transcends our ego and gives a higher value to our existence.

Throughout his career, Seligman continued to evolve his research, eventually questioning the theory of *Authentic Happiness* and developing a new vision centered on well-being as the core of his framework:

> «Thales thought that everything was water.
> Aristotle thought that all human action was to achieve happiness.
> Nietzsche thought that all human action was to get power.
> Freud thought that all human action was to avoid anxiety.
> All of these giants made the grand mistake of monism, in which all hu man motives come down to just one. [...] Of these monisms, my original view was closest to Aristotle's—that everything we do is done in order to make us happy—but I actually detest the word happiness, which is so overused that it has become almost meaningless. It is an unworkable term for science or for any practical goal such as education, therapy, public policy, or just changing your personal life. [...] Understanding happiness requires a theory, and this [...] is my new theory»[26]

This paradigm shift no longer measures happiness through Life Satisfaction but through Flourishing, placing well-being rather than happiness as the core objective of positive psychology.

	TOPIC	MEASURE	GOAL
AUTHENTIC HAPPINESS THEORY	Happiness	Life satisfaction	Increase life satisfaction
WELL-BEING THEORY	Well-being	Positive emotions, engagement, meaning, positive relationships and accomplishment	Increase flourishing by increasing positive emotions, engagement, meaning, positive relationships and accomplishment

Table 1.01
differences in topic, measure and goal between Authentic Happiness Theory and Well-being Theory

Seligman developed his theory of well-being through this new vision, introducing three major distinctions from his previous theory of authentic happiness, where happiness was the sole parameter of interest.

The first distinction concerns the conceptual focus: While the theory of authentic happiness focuses exclusively on

[26] Martin E. P. Seligman (2011)

improving life satisfaction and increasing positive emotions, the theory of well-being shifts attention to a broader and more articulated perspective, which includes elements such as meaning, engagement, and personal accomplishment. This approach recognizes that human well-being cannot be reduced to a good mood but also encompasses dimensions that transcend immediate pleasure, such as a sense of purpose and active participation in life.

The second distinction concerns the criterion of measurement. In the theory of well-being, the reference parameter is no longer limited to life satisfaction but is instead based on the concept of flourishing, which includes a combination of positive emotions, meaningful relationships, goal achievement, a sense of belonging, and active engagement. This multidimensional concept surpasses the limitation of mood-based measurement, acknowledging that elements such as engagement and meaning are fundamental to well-being, even if they do not always produce immediate positive emotions.

Finally, the third distinction pertains to the moral and social scope of the theory. Seligman emphasizes that an approach focused solely on mood risks, excluding individuals and social groups who live significant and engaged lives despite not exhibiting high levels of positivity. On the other hand, the theory of well-being offers a more democratic and inclusive perspective, valuing the contributions of those who find meaning and fulfillment in activities not necessarily linked to happiness in a narrow sense.

This approach represents an ethical shift within positive psychology, which no longer aims solely to maximize personal satisfaction but seeks to promote a broader and more comprehensive form of well-being at both the individual and collective levels.

Well-being is a construct, meaning a psychological characteristic that cannot be directly measured, whereas hap-

piness is a «*real thing*».[27]

Seligman defines happiness as a "real thing," meaning it is directly measurable through a specific set of operationalized parameters, which form a measurement system that makes it quantifiable.

For example, if we consider a city's livability as a construct, we could define it through various measurable factors, each contributing to the overall perception of livability without thoroughly exhausting its meaning.

The livability of a city depends on a combination of concrete and measurable elements, such as:

- ***Air quality*** (measured in particles per million, PM2.5),
- ***Accessibility to services*** (evaluated by the number of services reachable within a 15-minute walk),
- ***Percentage of green spaces*** per inhabitant,
- ***Perceived safety*** is measured through surveys or crime rate analyses.

None of these elements alone defines livability; instead, their interaction determines how livable an urban environment is perceived to be. Therefore, livability is a multidimensional construct that requires a complex approach to be understood and measured.

Similarly, Seligman's initial theory of *authentic happiness* focuses on a "real thing": happiness, which he defines through life satisfaction from a unidimensional perspective.

This form of happiness is measured by asking individuals to rate their life satisfaction on a scale from 1 to 10. According to this theory, people who experience more positive emotions, greater engagement, and a deep sense of meaning tend to be the happiest and report the highest levels of life satisfaction.

However, the theory of well-being introduces a more articulated perspective.

27 Ibidem.

Seligman argues that well-being is not a "real thing" but a construct of various measurable elements. Each of these elements contributes to well-being, but none of them alone defines it exhaustively.

This fundamental difference shifts the focus from the attempt to maximize happiness—understood as life satisfaction—to a broader and more nuanced understanding of well-being, which includes dimensions such as meaning, engagement, and positive emotions. Just as a city's livability depends on the combination of elements such as air quality, accessibility, green spaces, and security, well-being is built through the interaction of various elements, each essential in creating a comprehensive vision of life quality. This approach not only expands the theoretical understanding of well-being but also offers a practical model for designing interventions to improve people's lives.

As supported by Seligman[28], embracing the concept of flourishing recognizes that well-being is not merely the absence of stress or disease but a complex, multidimensional state achieved through a balance between physical, mental, and social well-being. This state drives us to live with vitality, fosters engagement and enables us to build positive relationships. However, when discussing well-being in relation to architecture, it is crucial to consider factors such as beauty and happiness—elements that not only influence human experience but also play a central role in defining the quality of a designed space.

Since its origins, architecture has recognized beauty as an essential component for the well-being of inhabitants and the harmony of the built environment. In the *Ten Books on Architecture*, dedicated to Augustus and written between 29 BCE and 23 BCE, Vitruvius introduced his famous triad: *Firmitas*, *Utilitas*, *Venustas*—solidity, Utility, and Beauty. In

28 Ibidem.

Vitruvian thought, beauty was closely linked to proportion, symmetry, and ornamentation, which were not mere aesthetic details but structural and symbolic elements conferring balance and harmony to classical architecture.

A similar concept is found in the ancient practice of *Feng Shui* in China, where the organization of built space aimed to create harmony between humans and the environment through the balance of energy (*chi*). In this case, too, beauty and well-being were not separate but deeply interconnected through design and spatial arrangement.
With the advent of modern architecture in the 20th century, the relationship between beauty and function underwent a radical shift. Louis Sullivan's famous principle, «*form ever follows function*»[29] placed utility at the center of design, reducing the role of beauty to a secondary element or one subordinate to functionality. However, contemporary theories that emphasize the importance of aesthetics in the human experience of spaces have challenged this vision.

«*there is a role and function for beauty in our time*»[30]

In our time, beauty can no longer serve only an aesthetic function; it must be deeper and more profound, capable of impacting people.
When speaking of Architecture and Beauty, one could argue that «*beauty is the ability of spatial forms to generate attraction and desire in people [...] an incremental concept that expands with the social capacity to develop new meanings and new aspirations*»[31].
This role today can be crucial, not only psychologically but also in terms of psychology's effects on well-being. Some

29 Sullivan, L. (1896)
30 Ando, T. (2002)
31 Ricci, M. (2019)

studies indicate that the aesthetic qualities of architecture influence our mood, cognitive function, behavior, and even mental health[32] [33] [34] [35]. Moreover, the level of complexity in the images we are exposed to generates different preferences in us, leading us to favor images with a moderate level of architectural and artistic complexity. Conversely, images with excessive complexity can overwhelm the visual system[36].

For instance, the *aesthetic triad*—composed of symmetry, balance, and proportion—offers a framework for understanding how visual elements influence the perception of beauty and well-being.
Although Vitruvius' triad remains a foundational reference, the question arises as to whether, in contemporary architecture, this classical conception is still sufficient to address the aesthetic and functional challenges of more complex and diverse spaces. Addressing these challenges does not merely mean considering aesthetics and functionality, but also developing a design sensitivity that considers the perceptual and cognitive dimensions of spatial experience. Built environments are not mere backdrops; they interact with the senses, memory, and emotions of those who navigate them. Designing space, therefore, means creating conditions capable of fostering well-being through a deeper relationship between form, material, and perception.

32 Adams, M. (2014)
33 Cooper, R., Burton, E., & Cooper, C.L. (2014)
34 Harting, T. (2008)
35 Joye, Y. (2007)
36 Kotabe, H. P., Kardan, O., & Berman, M. G. (2016)

1.3 LOST/MISSING WORDS

BEAUTY

/ˈbjuːti/

noun

1. a combination of qualities, such as shape, colour, or form, that pleases the aesthetic senses, especially the sight.

HAPPINESS

/ˈhapɪnɪs/

noun

1. the state of being happy.

WELL-BEING

/ˌwɛlˈbiːɪŋ/

noun

1. the state of being comfortable, healthy, or happy.

FLOURISHING

/ˈflʌrɪʃɪŋ/

adjective

1. developing rapidly and successfully; thriving.

Beauty, happiness, well-being, and flourishing represent fundamental concepts in human life, capable of profoundly influencing our perception and emotional state. Definitions like those found in the online *Oxford English Dictionary* describe beauty as «*the quality of being pleasing to the senses or to the mind*»[37] and well-being as «*the state of being healthy, happy, or prosperous; physical, psychological, or moral welfare*»[38]. The term flourishing, however, goes beyond these definitions, implying personal growth that leads to health, happiness, and fulfillment.

37 https://www.oxfordlearnersdictionaries.com/definition/american_english/beauty

38 https://www.oed.com/dictionary/well-being_n?tl=true

These concepts seem naturally connected to architecture, as the discipline—both an art and a science of space—can evoke emotions, promote well-being, and contribute to the flourishing of individuals and communities. Reading the definitions of beauty, happiness, well-being, and flourishing, it is not difficult to imagine their application within the architectural context. It would seem natural to assume that good architecture should be able to satisfy the soul through the senses, provide fulfilling experiences, and create a harmonious state of physical, spiritual, and mental well-being.

However, when examining dictionaries and architectural treatises, a paradox emerges: terms such as beauty, happiness, and well-being are not always used to describe architecture. They are often relegated to a marginal role, and in some cases, they are entirely absent.

Beauty has been one of the pillars of architecture since its origins. Defined by the *Dizionario della Lingua Italiana* as «*quality of what is beautiful or what appears so to the senses and the spirit*,»[39] beauty manifests as a multisensory quality capable of generating harmony among spaces, forms, and perceptions.
In *De Architectura* by Vitruvius, the term "beauty" appears 14 times and "beautiful" 10 times. Vitruvius associates beauty with the harmony of proportions and functionality, emphasizing that:
«*The eye is constantly seeking after beauty; and if we do not endeavour to gratify it by proper proportions and an increase of size, where necessary, a work will always be clumsy and disagree.*»[40]
«*Projections are more beautiful when they are equal to the*

39 https://www.treccani.it/vocabolario/bellezza/
40 Vitruvius Pollio. (1997)

height of the member.»[41]

These statements emphasize the importance of geometric proportions and formal precision, a perspective that overlooks beauty's emotional and experiential dimensions.

In the *Dictionary of Architecture and Landscape Architecture*[42] by James Stevens Curl, the word "beauty" appears 38 times, while "beautiful" occurs 124 times, primarily in descriptive contexts. In the definition of Beautiful, there is a reference to Edmund Burke, who describes beauty as «*was a property which causes love, and consisted of relative smallness, smoothness, absence of angularity, and brightness of colour.*»[43]

However, these descriptions remain anchored in a historical perspective, without exploring the transformative role of beauty in human experience.

In the *Penguin Dictionary of Architecture*[44], "beauty" appears 13 times and "beautiful" 24 times, often used as qualifying adjectives. A significant example is the reference to Isamu Noguchi, who designed the *California Scenario* in Costa Mesa, California, describing it as «*beautiful and disturbing gardens to awaken us to a new awareness of our solitude*»[45], to awaken emotional and spiritual awareness. This example represents a rare integration of beauty as a tool to inspire introspection and personal connection.



Figure 1.03
California Scenario in Costa Mesa, California By Isamu Noguchi. (1982)
© 2012–2025 NJ IN LA

41 Ibidem.
42 Curl, J. S. (2006).
43 Burke, E. (1990)
44 Fleming, J., Honour, H., & Pevsner, N. (1998)
45 Ibidem.

In the *Short Dictionary of Architecture*[46] by Dora Ware and Betty Beatty, for instance, the word beauty appears only once, in the description of Mr. Howard Robertson in his illuminating book, *The Principles of Architectural Composition*:

> «Clothed with the beauty of proportion and detail which represents something approaching finality in this particular form of design, and having therefore inherent decorative qualities, classic columns and en tablatures form a means of expressing form and line contrast which is tried and ready to hand. Small wonder, therefore, that the architect seizes on the Orders to provide his dominant decorative effect.»

Happiness, defined as «*the complete experience of fulfillment*,»[47] is one of the implicit objectives of architecture, even though it is rarely mentioned explicitly in theoretical texts. In *De Architectura* by Vitruvius, the term "happiness" never appears, reflecting an architectural vision more focused on aesthetics and functionality rather than the emotional well-being of individuals. In the *Dictionary of Architecture and Landscape Architecture*, happiness emerges in the definition of the word Elysium, described as a «*place where a state of ideal or perfect happiness may be achieved.*»[48] This ideal, applied to landscaped gardens and picturesque cemeteries, suggests a symbolic connection between landscape and inner serenity but lacks direct application in contemporary urban design. However, in the Penguin Dictionary of Architecture, "happiness" is mentioned seven times. Among these, a significant example is the work of Frederick Law Olmsted, who designed the *Riverside Housing Estate* in Illinois with sinuous curves and green spaces to evoke «*leisure, contemplation, and a happy tranquility.*»[49] This approach demonstrates how design can create tangible experiences of happiness by integrating nature, open spaces, and social interactions. Meanwhile, the Short *Dictionary of Architecture* does not dedicate a single word to happiness and its concept.

46 Ware, D., & Beatty, B. (1944)
47 https://languages.oup.com/google-dictionary-it/
48 Curl, J. S. (2006)
49 Fleming, J., Honour, H., & Pevsner, N. (1998)



Figure 1.04
General Plan of Riverside in Illinois by Frederick Law Olmsted. (1869)

Well-being, understood as «*a harmonious state of physical and spiritual health*,»[50] represents a key dimension in understanding the impact of architecture on human life. Neuroscientific studies demonstrate that well-designed environments can reduce stress, improve concentration, and promote mental health[51].

Despite its significance, the term "well-being" is virtually absent from major reference texts. In Cyril M. Harris's *Dictionary of Architecture & Construction*, well-being is not explicitly addressed. Similarly, the *Short Dictionary of Architecture* entirely ignores the concept of well-being, reflecting an academic tradition focused on technical aspects rather than human-centered considerations.

Flourishing, or the capacity for personal growth leading to health, happiness, and fulfillment, is a relatively new architectural concept but carries profound implications for contemporary design.

In the *Dictionary of Architecture and Landscape Architecture*,

50 https://languages.oup.com/google-dictionary-it/
51 Mallgrave H.F. (2018)

the term "flourishing" appears only four times, primarily in economic or professional contexts, without exploring its potential in design. However, the notion of flourishing could serve as the foundation for a new architectural vision, where spaces do not merely fulfill functional needs but actively promote personal and collective growth, creating environments that inspire and connect people.

The analysis of beauty, happiness, well-being, and flourishing in theoretical texts highlights a gap between the intuitive importance of these values and their marginal role in architectural theory. To address this discrepancy, it is imperative to redefine the language and priorities of architectural design. This theoretical silence underscores a lack of attention to the deeper, sensory aspects of design, emphasizing the need for a renewed focus on the human dimension of architecture. Rethinking architecture through these values is not merely a return to its humanistic roots but an essential step toward a more conscious and sustainable design approach capable of addressing the challenges of the 21st century. A growing number of architects and researchers are moving in this direction, questioning fundamental aspects that have always driven architectural design, such as: What does it mean when we talk about architectural quality?

Zumthor, for instance, answered this question in the following way:

> «It is a question I have little difficulty in answering. Quality in architecture does not – not to me anyway – mean inclusion in architectural guides or histories of architecture or getting my work into this or that publication. Quality architecture to me is when it manages to move me. [...] How do people design things with such a beautiful, natural presence, things that move me every single time.»[52]

In his definition of architectural quality, Zumthor emphasizes architecture's ability to evoke emotions through its presence, beauty, and natural essence.

52 Zumthor, P. (2006)

Similarly, in 2023, Thomas Heatherwick attempted to answer what it means to talk about quality in architecture with the launch of *Humanise*. This project is a kind of battle against dull, soulless buildings, outlining what he calls «*the anatomy of boring*,»[53] consisting of a series of characteristics that make buildings unappealing today:

«*Too flat, too plain, too straight, too shiny, too monotonous, too anonymous, too serious. But, [...] it's important not to become fixated on every one of these points. [...] Boring is like an equation.*»[54]

Heatherwick's campaign opposes the rationalist approach that has characterized much of 20th and 21st-century architectural design, where efficiency and economic optimization have often led to the creation of anonymous environments devoid of sensory interaction. He highlights how the quality of the built environment is not just an aesthetic or functional issue but a key factor in individuals' psychological and social well-being.

Several environmental psychology and neuroscience studies have demonstrated that monotonous buildings lacking visual complexity can negatively affect people's physiological responses, increasing cortisol levels and inducing stress[55].

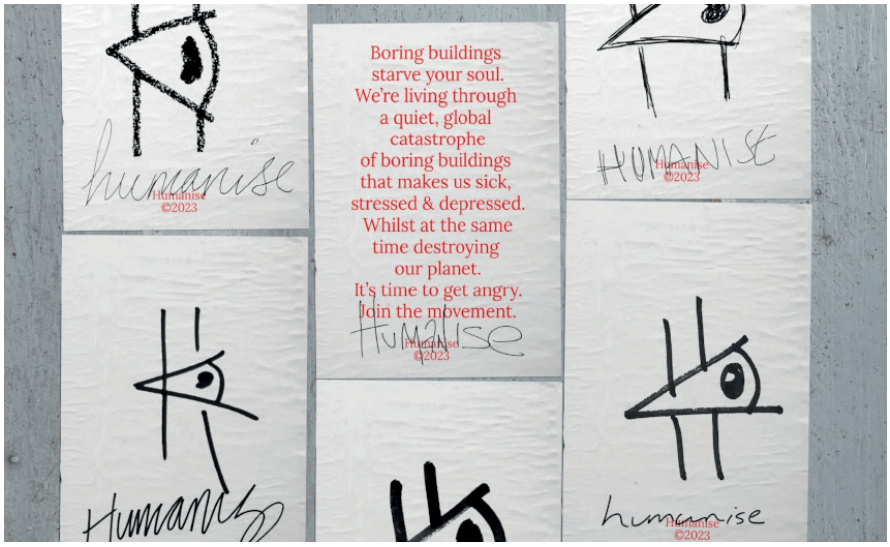


Figure 1.05
the Heatherwick Humanise project's advertising campaign

53 Heatherwick, T. (2023)
54 Ibidem.
55 Ibidem.

Beauty fell out of favor not only in the arts and architecture during the 20th century but also in psychology[56]. Some researchers are now studying the role of beauty and ugliness in shaping human emotions and behaviors.

One of the leading figures in this field is Dr. Helmut Leder, head of the *Empirical Visual Aesthetics Lab* in Vienna, specializing in the psychological study of visual aesthetics. One of his most significant studies, *An Island of Stability*, investigated the relationship between aesthetic perception and memory in patients with Alzheimer's disease.

Participants were randomly shown a series of paintings and asked to rank them from the most to the least attractive based on their beauty. Despite cognitive impairments caused by the disease, patients completed the task without difficulty.

Two weeks later, the experiment was repeated with the same subjects and the same artworks, though they did not remember having performed the activity before. Surprisingly, most maintained the same ranking preferences as in the previous session.[57]

This result suggests that even in advanced cognitive decline, the ability to perceive and evaluate beauty remains intact, confirming the deep and persistent value of aesthetic experience.

Another noteworthy study was conducted in New York, specifically along Houston Street, to analyze people's emotional reactions as they moved through different urban environments.

Participants were asked to wear electronic bracelets capable of detecting their physiological responses, allowing researchers to measure their emotional state in relation to their surroundings.

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56 Sagmeister, S., & Walsh, J. (2018)

57 Graham, D., Stockinger, S., and Leder, H. (2013)

When exposed to skyscrapers and glass-facade buildings with an anonymous appearance, participants described the area as "bland," "monotonous," and "passionless," and physiological measurements revealed signs of boredom.
Conversely, upon reaching East Houston Street, an area filled with restaurants, open doors, and windows, participants described the environment with words like "lively," "busy," and "socializing." Their bracelets recorded elevated levels of physical excitement.[58]
This study provides insights into how urban residents experience their surroundings and how these preferences influence the livability and "happiness" of urban spaces.

In 2021, Jenny Roe and Layla McCay reignited the discussion on well-being and mental health in cities with their theory of Restorative Urbanism. This concept is based on the interaction of seven pillars: *The Green City*, *The Blue City*, *The Sensory City*, *The Neighbourly City*, *The Active City*, *The Playable City*, and *The Inclusive City*.
Together, these elements contribute to the creation of the Restorative City.
The goal of the Restorative City is to enhance the built environment's ability to support emotional regulation, fostering a sense of security, belonging, and social connection. More importantly, it aims to promote both physical and mental well-being.[59]



Figure 1.06
The Restorative City: Neighbourhood Scale

58 Ellard, C. (2015)
59 Roe, J., McCay, L. (2022)

All these contributions highlight the need for a paradigm shift in architectural and urban design, where beauty, sensory experience, and well-being become essential components of the design process.

Rethinking architecture and the city in this direction is not just a theoretical challenge but a concrete response to the needs of the 21st century, where the quality of the built environment can—and must—play a key role in promoting collective health and happiness.

2 | PART TWO
METHODOLOGY

The research project was structured through a process that integrates architecture, psychology, and neuroscience to foster well-being through flourishing.
This research results from a six-month study abroad period at the New York Institute of Technology in Manhattan under the supervision of Professor Marcella Del Signore, an expert in neuro-urbanism and the cognitive relationship between humans and the environment.
The interdisciplinary approach adopted in this study has enabled the development of an innovative methodology to investigate the effects of public space on human well-being.

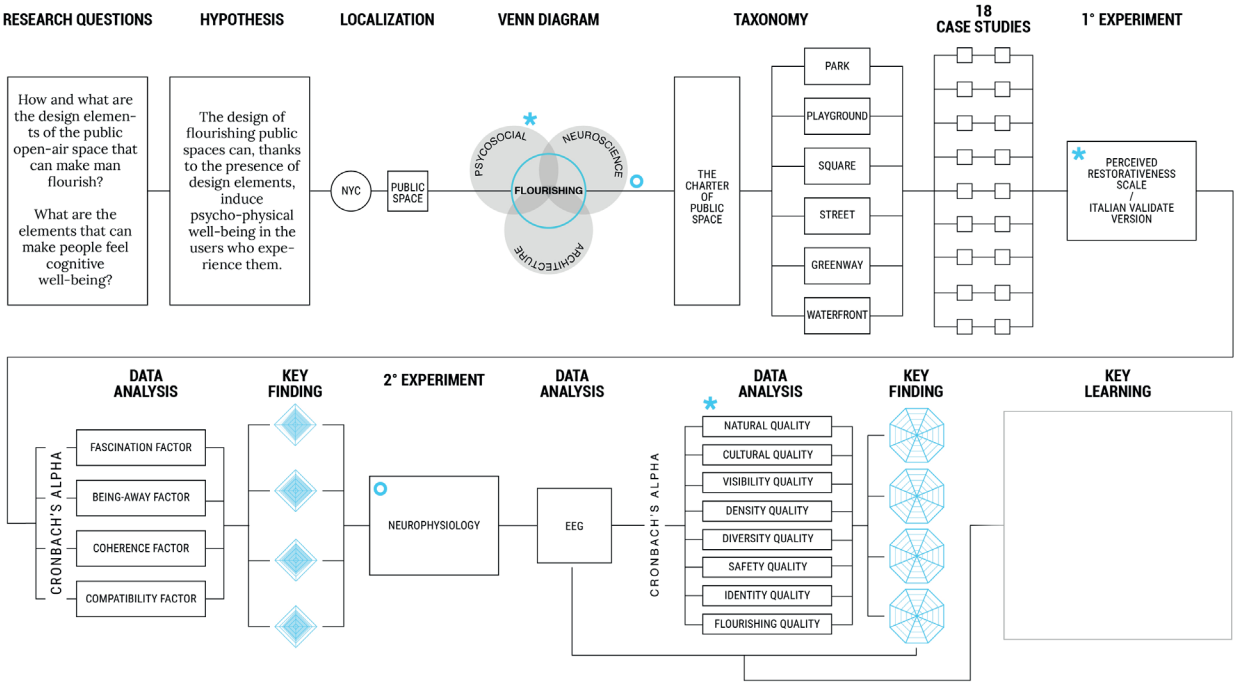


Figure 2.01
Thesis workflow made by the author.

The research aims to investigate a crucial question that guides the entire study:
What design elements can architects implement to enhance well-being in public spaces and foster cognitive and physical well-being, and how should they be designed?
The goal is not simply to answer this question but to explore it through an interdisciplinary approach, combining methods from architecture, environmental psychology, and neuroscience.
The underlying hypothesis of the research is that our bodies

constantly interact with the surrounding space. Humans live and spend most of their lives within cities, inside buildings, or in continuous relationships with the built environment. Suppose the relationship between humans and their surroundings is a continuous cause-and-effect exchange (see Introduction). In that case, it is possible to design environments that passively influence behavior and psycho-physical well-being.

A qualitative-quantitative methodological framework was developed to identify regenerative architectural elements in public spaces and measure and assess urban environments' regenerative potential. This framework consists of three phases, each linked to the three disciplines involved in the study.

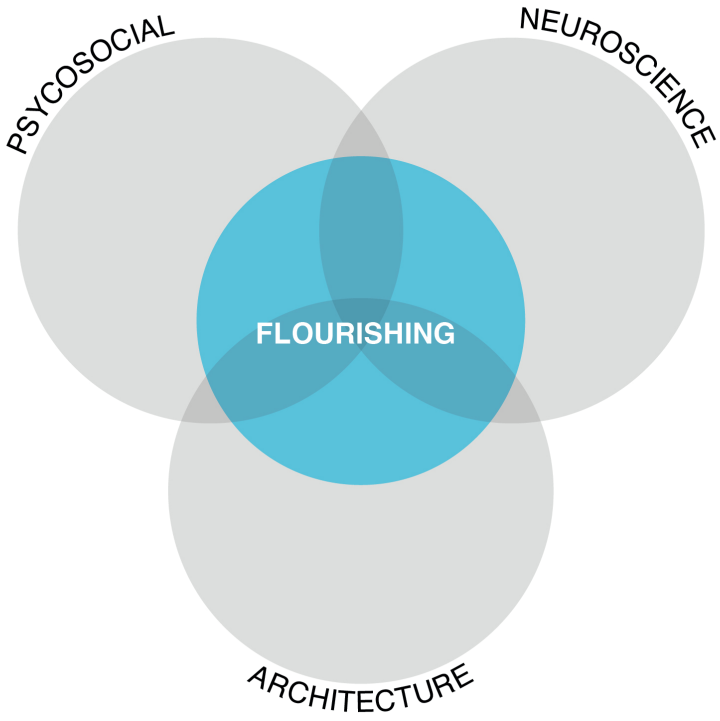


Figure 2.02
Kiviat diagram of the relationships between disciplines made by the author

The first phase of the project involved an in-depth study of the "Public Space Charter." This research created a taxonomy of different types of public spaces, classified into six main categories: parks, squares, playgrounds, greenways,

waterfronts, and streets. Following this classification, 18 specific study areas were selected and analyzed to examine the characteristics and dynamics of each type of space.

The second phase focused on an environmental psychology experiment. For the behavioral data collection, the Perceived Restorativeness Scale (PRS/IT) questionnaire (see Part Four), validated in Italian, was administered to a sample of 99 Italian participants.

The questionnaire was developed and distributed online via Qualtrics and was structured into two parts:

- ***Demographic data collection*.*Visual and auditory stimulus evaluation*:** Participants were shown 18 videos, each with four photographs displayed for 56 seconds, twice, and corresponding ambient sounds. Each video corresponded to one of the 18 public spaces identified in the first research phase. After each video, participants responded to 26 items (questions) based on the PRS/IT scale.

The final sample of 99 participants was fairly homogeneous, with:

- ***Gender distribution***: 60 women, 39 men.
- ***Educational and professional background***: 42 architecture students and/or architects and 57 participants from non-architecture fields.

The third phase focused on a neurophysiology experiment (see Part Five) conducted in four different public spaces in New York City, selected based on the PRS/IT questionnaire results. The two most restorative locations along the waterfronts and the two most restorative locations within the urban fabric were chosen (see Part Four).
These four selected areas were then studied through EEG measurements by analyzing ALPHA brain wave frequencies.

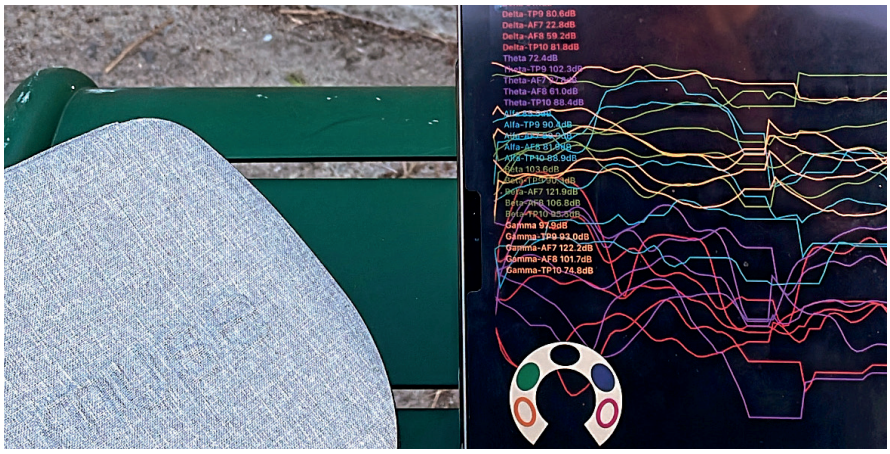


Figure 2.03
Mind Monitor to record RAW data from the Muse 2.0 headband
© Andrea Di Cinzio

Before each EEG recording, participants completed a preliminary screening questionnaire to identify any clinical conditions that could affect the experiment. The screening also included information on the use of medications (e.g., antidepressants) that might interfere with EEG or HRV readings.
Data collection:

- Each ***EEG ecording*** lasted 10 minutes.
- ***12 individuals participated*** in the study.
- Each public space had ***two measurement spots*** for data collection.
- ***The MUSE-2 EEG headband*** was used to record EEG data, allowing for rapid and objective assessment of well-being in real-world settings (see Part Five).

Following the neurophysiological experiment, the third phase included an eight-factor behavioral questionnaire

evaluating public space quality to gain deeper insights into the participants' spatial experience.
The final sample of 12 participants for the neuroscience study was composed of:

- ***8 women and 4 men, aged 24 to 34 years.***

By integrating all three phases—behavioral, perceptual, and neurophysiological—the study identified which public spaces were most effective in enhancing cognitive and psycho-physical restoration. These findings provide valuable insights into how public spaces can be designed to promote well-being both at the behavioral and neurophysiological levels.

3 | PART THREE
CASE STUDIES

3.1 THE CHARTER OF PUBLIC SPACE

The *Charter of Public Space*[1], drafted in the context of the 2013 Biennial of Public Space, was organized by a group of promoters, including the National Institute of Urban Planning (INU), the National Council of Architects, Planners, Landscape Architects, and Conservators (CNAPPC), the Order of Architects of Rome and Province, and the House of Architecture of Roma Tre.

This document represents a fundamental milestone in promoting a new urban culture based on inclusion, sustainability, and quality of life. It was developed in response to the challenges posed by rapid urbanization, the privatization of public spaces, and growing social inequalities, emphasizing the role of public spaces as common goods.

In the contemporary context, where cities are increasingly understood as urban ecosystems, balancing human, economic, and environmental components is essential for urban vitality[2]. The Charter provides a framework to ensure that public spaces are designed, managed, and experienced as accessible, equitable, and sustainable places.

A key section of the document, included in its entirety, presents a comprehensive and multifaceted definition of public space, as follows:

> «6. Public spaces are all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive. Each public space has its own spatial, historic, environmental, social and economic features.
> 7. Public spaces are a key element of individual and social well-being, the places of a community's collective life, expressions of the diversity of their common natural and cultural richness and a foundation of their identity, as expressed by the European Landscape Convention. The community recognizes itself in its public places and pursues the improvement of their spatial quality.
> 8. Public spaces consist of open environments (e.g. streets, sidewalks, squares, gardens, parks) and in sheltered spaces created without a profit motive and for everyone's enjoyment (e.g. public libraries, museums). Both when they possess a clear identity, can be defined as "places". The objective is

1 Garau, P., Lancerin, L., & Sepe, M. (2015)
2 Jacobs, J. (1961)

> that all public spaces should become "places".
> 9. Views differ on whether public spaces should or should not be publicly owned. However, all public spaces that are also publicly owned offer more stable guarantees of access and enjoyment over time, because they are less subject to those legitimate changes of use typical of private ownership.
> 10. Public spaces, whenever safeguards of natural or historical value allow, must be made accessible without barriers to the motorial, sensorially and intellectively handicapped.
> 11. Analogously, all areas even if publicly owned or unfenced, which by their characteristics are substantially unusable by the public inaccessible slopes, abandoned areas, or cut-outs, cannot be considered a public space and cannot be counted as a service or public infrastructure.
> 12. Conversely, public spaces which are not yet accessible and/or usable must be considered as "potential public spaces" , and therefore as a precious resource for the strengthening and renovation of the existing system of public space, and thus of urban quality as a whole.»[3]

This research acknowledges the central role of public space as a catalyst for social and individual well-being within the seven key principles that define it. Specifically, the study focuses on public space's regenerative capacity and users' perceptions of it, with particular attention to ***open-air public spaces***, whether publicly or privately owned.

The analysis of public space, understood as a complex and continuously evolving entity, highlights crucial challenges that intersect with the contemporary urban polycrisis. In this context, several key issues emerge, demanding a critical rethinking of urban and architectural design:

- ***Public Space and Psychological Well-being***

Public spaces play a crucial role in supporting mental and physical well-being. To foster psychological regeneration, they must be designed to integrate natural elements, ergonomic solutions, and multisensory stimuli, capable of promoting a harmonious and relaxing spatial experience.

- ***Urban Inequalities and Accessibility***

The distribution of public spaces within cities is not uniform and often reflects economic and social inequalities. Peripheral and underserved areas tend to lack high-quality

[3] Garau, P., Lancerin, L., & Sepe, M. (2015)

public infrastructure, limiting equitable access to gathering places and well-being-promoting environments.

- ***Longevity Economy and Inclusive Design for Aging***

The increase in life expectancy and aging populations pose new challenges for public space design. Public spaces must be reimagined to ensure accessibility, safety, and opportunities for social interaction for older adults. An inclusive urban environment can significantly enhance the quality of life for the elderly, fostering autonomy and active participation in social life.

- ***Climate Change and Urban Resilience***

Growing climate instability calls for a resilient approach to public space design. Integrating nature-based solutions (NBS)—such as green infrastructure, sustainable stormwater management, and natural shading systems—can help mitigate the impacts of extreme temperatures and intense weather events.

- ***Public Space as an Arena for Democratic Dialogue***

Beyond its physical and environmental functions, public space also has a crucial political and social dimension. It serves as a privileged setting for democratic debate, civic participation, and social cohesion. Ensuring the accessibility and quality of public spaces is, therefore, essential to preserving their role as inclusive arenas open to diversity and collective discourse.

These issues outline the framework this research sets, emphasizing the urgency of an interdisciplinary approach to public space design. By integrating architecture, environmental psychology, and neuroscience, this study aims to investigate how public spaces can be designed to meet these challenges and foster the overall well-being of individuals and communities.

3.2 URBAN EXPERIENCES: EMOTION IN PUBLIC SPACE

At the end of the 1990s, a new perspective emerged, suggesting that the mind is not confined within the boundaries of the brain but extends beyond the body through interaction with the external environment. This view, integrated with recent discoveries on the predictive functioning of the mind in neuroscience, highlights how the human brain essentially operates as a predictive machine, continuously creating and updating internal models of the world to anticipate future states and minimize surprises, thereby guiding behavior and perception.[4] [5] [6]

The predictive brain does not function as a passive information processor but rather as a dynamic and interactive system that constantly adapts to environmental stimuli. This process enhances the ability to interpret and predict events, adjusting to contextual demands. By refining their predictive strategies, individuals can effectively discern relevant information, even in situations of sensory uncertainty.

The predictive brain does not function as a passive information processor but rather as a dynamic and interactive system that constantly adapts to environmental stimuli. This process enhances the ability to interpret and predict events, adjusting to contextual demands. By refining their predictive strategies, individuals can effectively discern relevant information, even in situations of sensory uncertainty.

Perception and action are not separate processes but interconnected aspects of a single computational mechanism based on predictive error minimization. In this continuous cycle, actions shape sensory stimuli, simultaneously testing

4 Shipp, S. (2016)
5 Pezzulo, G., Parr, T., and Friston, K. (2022)
6 Bortolotti, A., Conti, A., Romagnoli, A., Sacco, P.L. (2024)

and responding to signals from the body and the environment. Through active exploration of the world, information from internal and external sources combines, providing a deeper understanding of experiences, emotions, and affective responses.
This continuous flow of perception and action, driven by predictive mechanisms, redefines how we understand perception, intertwining experience, expectations, uncertainty, and action. Adapting to prediction errors and refining generative models, predictive theories build upon earlier studies on artificial neural networks and cognitive science, successfully balancing simplicity and complexity according to different tasks and contexts.

A striking example of this phenomenon is the observation of ambiguous images. Initially, most people perceive only a confusing set of shapes and shadows. However, once the image's meaning is understood, this new interpretation radically alters perception, leading to a lasting change in how the image is perceived in the future.

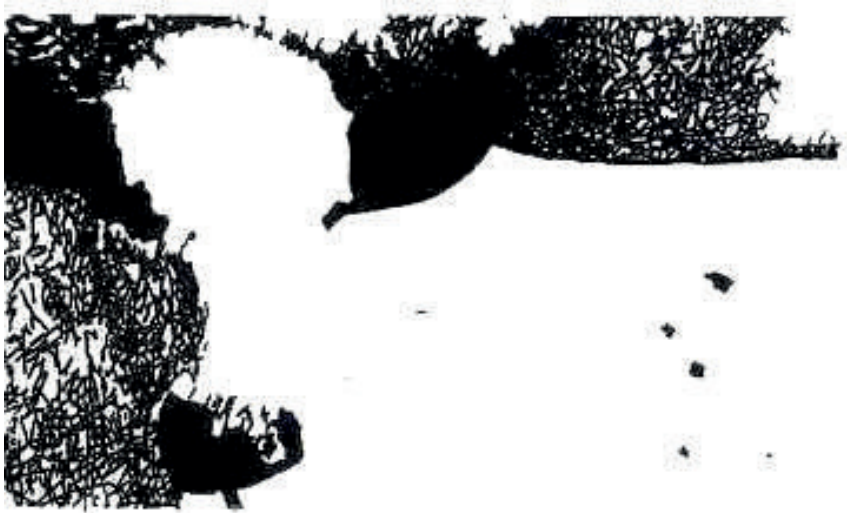


***Figure* 3.01**
Cow lluson made by John McCrone (1990)

In these cases, pre-existing beliefs, encoded through the brain's predictive models, play a fundamental role in shaping perception. These mechanisms often operate outside conscious awareness, emerging as sub-personal states

expressed in probabilistic rather than absolute terms.

It is essential to recognize that the mind is not an isolated entity but rather part of a broader system that includes the environment and the tools we use daily.

The 4Es-4As theory offers an intriguing perspective on the relationship between mind, body, and environment, highlighting how cognition is not an isolated process within the brain but rather a dynamic and distributed phenomenon. This perspective integrates two fundamental frameworks:

- ***The 4E model*** (Embodied, Embedded, Enacted, Extended cognition).
- ***The 4A model*** (Agency, Affect, Affordance, Autonomy).

Together, these frameworks provide a lens through which to understand how the spaces we inhabit influence our perceptions, emotions, and behaviors. This dynamic interaction between individuals and their environment suggests that urban design should prioritize functionality, psychological well-being, and social interaction.[7] [8]

The 4E model was developed as an alternative approach to classical cognitivist theories, which traditionally view the mind as an abstract entity separate from the environment.[9] Below, the four types of cognition are explained in relation to the environment.

The concept of ***Embodied Cognition*** is based on the premise that thought and perception are deeply connected to the body and its senses. Cognition is not merely an abstract process occurring in the brain but a lived experience shaped by movement, touch, posture, and bodily sensitivity.

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7 Gallagher, S. (2017)

8 Boxenbaum, E., Jones, C., Meyer, R. E., & Svejenova, S. (2018)

9 Rowlands, M. J. (2010)

«*I experience myself in the city, and the city exists through my embodied experience.*»[10]
This means that architecture and spatial design influence us visually and through the physical sensations they evoke. Walking on a soft or hard surface, feeling the warmth or coldness of a material—all of these factors contribute to shaping the cognitive experience of a place.

At the same time, ***Embedded Cognition*** highlights how thought is shaped by the context in which it takes place. The built environment—its structures, open or enclosed spaces, geometries, and colors—influences how we perceive the world and make decisions. Spacious and well-lit environments can stimulate feelings of openness and freedom, whereas confined and oppressive spaces may induce a sense of restriction. The arrangement of architectural elements affects spatial navigation and social interactions, demonstrating the strong connection between environment and cognition.

Enacted Cognition shifts the focus from passive perception to active interaction with the world. Perception is not merely the reception of stimuli but also an exploratory and discovery process. As we move through an environment, we understand and interpret it through action, testing its possibilities and responding to its stimuli. This concept is fundamental to understanding how urban spaces facilitate or hinder specific experiences, shaping how we engage with buildings and public spaces.

Closing this perspective is ***Extended Cognition***, a theory developed by Andy Clark and David Chalmers, which further contributes to understanding how the environment influences cognition and behavior. This theory suggests that

10 Pallasmaa, J. (2005)

the mind is not confined to the brain or body but extends into the surrounding environment, the objects we use, and the people we interact with. This principle is particularly evident in the digital era, where technological tools function as extensions of our thought and memory. However, it is equally relevant in architecture, where buildings, cities, and designed spaces can function as cognitive prostheses, enhancing our ability to navigate and socialize.

The integrated 4E perspective combines these approaches into a coherent theory that is strongly embodied, radically enactive, and part of the third-wave extended cognition paradigm, with significant contributions from ecological psychology.[11]
Applying the 4E model to architecture means designing spaces that recognize the active role of the environment in shaping human experiences. Well-designed public spaces can facilitate cognition by distributing information effectively, encouraging movement, and promoting multisensory perception.[12] [13]

Parallel to this view of cognition, the 4A model introduces a further level of analysis, emphasizing the qualities of the environment and how these influence our experience and behavior. This complementary perspective emphasizes the relational aspects of cognition.[14]

Below, the 4A model is explained in relation to the environment.

The concept of ***agency*** refers to the ability to act intentionally within an environment. Urban and architectural spaces can either facilitate or restrict this freedom of action: a

11 Gallagher, S. (2021)
12 Spence, C. (2020
13 Higuera-Trujillo, J. L., Llinares, C., & Macagno, E. (2021)
14 Gallagher, S. (2021)

well-designed environment encourages movement and interaction, whereas a chaotic or inaccessible space can hinder our sense of control and autonomy.

Another fundamental aspect is ***affect***, which refers to the emotional impact of environments on individuals. The perception of a space is never neutral; it is always infused with emotions and moods. Colors, shapes, materials, and lighting contribute to creating atmospheres that can stimulate well-being, calm, excitement, or even anxiety and discomfort. Architecture, therefore, plays a crucial role in shaping our daily emotions, influencing quality of life through design choices that directly affect our affective sphere.

Gibson (1979) introduced the concept of ***affordance***, which describes the action possibilities an environment offers its inhabitants. Every architectural element implicitly suggests a function: a bench invites people to sit, a ramp facilitates movement, or a narrow corridor encourages walking in a single file. These spatial cues are not neutral but guide our choices and behavior, shaping our interaction with space in ways we are often unaware of.

Finally, ***autonomy*** is related to the ability to make independent decisions within an environment. A space designed to foster autonomy provides opportunities for exploration and choice, allowing individuals to navigate confidently and adapt to their needs. Conversely, overly regulated or stimulus-deprived environments can diminish one's sense of control, negatively impacting well-being perception.

The ***4Es-4As theory*** provides a framework for understanding how mind and body are deeply connected to the spaces we inhabit. It highlights the role of architecture in shaping cognitive and emotional experiences. From this perspecti-

ve, it becomes evident that designed environments are not merely neutral containers but active agents that shape how we think, move, and feel in the world.
Integrating these factors into architectural design allows for the creation of functional public spaces that facilitate active participation, emotional engagement, and meaningful connections between people and their environment.[15]
The integration of the 4Es model with the 4As model offers a new theoretical framework for understanding how public spaces can support human behavior and well-being. Affordances, in particular, play a crucial role in linking these two models as they emerge from the interaction between body, environment, and agency.

A historical example of this integration can be found in ancient Greek theaters, designed to stimulate active engagement from the audience[16]. Similarly, today's urban architecture can be designed to foster dynamic interactions between space and cognition, moving beyond the concept of a passive spectator and encouraging active participation[17].

Integrating the 4Es and 4As models into public space design presents an innovative approach that merges cognitive neuroscience, architectural theory, and urban planning. This unified model transforms urban space into an active element of human cognition, promoting environments that support functionality and aesthetics and encourage social participation, inclusion, and psychological well-being.

> «We will eventually enjoy talking about architecture after so many silos, workshops, machines and skyscrapers. Architecture is a fact of art, a phenomenon that arouses emotion, outside the problems of construction, beyond them. Construction is to hold up: architecture is to move.»[18]

15 Latour, B. (2005)
16 Meineck, P. (2017)
17 Jones, M. (2024)
18 Le Corbusier (2003)

This reflection encapsulates the emotional value of the built environment, emphasizing that architecture is not merely a technical exercise but an experience that profoundly influences our being. The relationship between public space and emotion is crucial to contemporary urban design. Cities are not just aggregations of buildings and infrastructure; they are living, dynamic environments that deeply affect our moods, behavior, and perceptions.

In recent decades, a growing awareness has challenged the purely visual approach to architecture, highlighting the importance of sensory experience and bodily interaction with the built environment. Architecture should not be limited to aesthetic representation but should engage all the senses, creating spaces that stimulate touch, hearing, smell, and kinesthetic perception. From this perspective, space is not an abstract entity to be contemplated but a lived place explored through movement and bodily sensations.

«*The privileging of the sense of sight over the other senses is an inarguable theme in Western thought*».[19]
The architecture of the past, from vernacular constructions to the works of great civilizations, was shaped to respond to the body's needs, using materials, proportions, and textures capable of creating deep connections with its inhabitants. Today, rethinking architecture in this direction means designing spaces as tactile and atmospheric experiences capable of evoking emotions and embedding themselves in memory.

In the mid-1950s, the avant-garde movement of the Lettrists developed a new method of investigating urban space known as "psychogeography." The aim of this new discipline was to merge the psyche with the surrounding environ-

19 Pallasmaa, J. (2005)

ment, described as a «*Study of the precise effects of the geographical environment, consciously organized or not, acting directly on the affective behavior of individuals.*»[20]
This approach examines the impact of the urban context on individuals' affective and psychological behavior. Psychogeography seeks to unify the psyche with the surrounding environment, exploring how places influence our perceptions and emotions. The sea, monuments, and landscapes can generate an "experiential and emotional map" capable of directly shaping individual behavior and perception.[21]
Colin Ellard has conducted several studies and measurements related to psychogeography. In one of these, he investigated the impact of the urban environment on psychophysiological well-being by placing groups of pedestrians at busy intersections and directly measuring their physiological responses. Using psychological questionnaires, he found that participants did not report any particular discomfort compared to their experience in a nearby garden, and their self-reported arousal levels appeared standard, consistent with their subjective descriptions. However, physiological measurements revealed a very different reality: sweat gland activity was significantly elevated, suggesting that the body exhibited a strong stress response despite their conscious perception of an ordinary, not particularly stressful, situation.[22]

In Merleau-Ponty's own words,
«*Our own body is in the world as the heart is in the organism: it keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly, and with it forms a system*»[23]; and «*[s]ensory experience is unstable and alien to natural perception, which we achieve with our whole body all*

20 Debord, G. (1956)
21 Di Cinzio, A. (2024)
22 Ellard, C. (2015)
23 Merleau-Ponty, M. (1992)

at once, and which opens on a world of interacting senses.»[24]
This experiment demonstrates how the urban environment can generate physiological effects that individuals do not consciously recognize yet still influence psychophysical well-being.

Human adaptability allows individuals to cope with a wide range of environmental conditions, including potentially stressful ones. However, the fact that participants did not report significant discomfort does not mean their bodies were not under strain. As demonstrated by Ellard's experiment, the autonomic nervous system continues to operate silently, triggering physiological responses such as increased blood pressure and cortisol release into the bloodstream. If prolonged over time, these processes can heighten vulnerability to physical and psychological disorders.
This experiment highlights a crucial aspect of urban design: the necessity to consider subjective perceptions of well-being and the underlying physiological responses to urban experiences to ensure that spaces are designed to minimize the stress burden on citizens.

A comprehensive study on neighborhood cohesion, analyzing variables such as mobility within the neighborhood, the presence of single-parent families, and household size, revealed that neighborhoods with higher social cohesion tend to report lower levels of anxiety and depression. These findings are particularly significant as they suggest that urban planning interventions can modulate the factors influencing the prevalence of such disorders.[25]
One particularly noteworthy aspect concerns the impact of natural spaces within urban environments: their presence appears to reduce the risk of psychiatric disorders among

24 Ibidem.
25 McKenzie, K., Murray, A., and Booth, T. (2013)

urban populations. This reinforces the idea that architects and urban planners can play a crucial role in mitigating the adverse effects of urban life on mental well-being by implementing strategic design approaches aimed at creating healthier and more restorative environments.

This research has selected and analyzed 18 open-air public spaces in New York City to deepen the understanding of the impact of public spaces on psychological and sensory well-being. Additionally, these case studies have been examined through the theoretical lens of the 4Es-4As model, allowing an investigation into how embodied, embedded, enactive, and extended cognition, along with agency, affect, affordance, and autonomy, influence urban experience and quality of life in the selected contexts.

These projects were chosen based on typological diversity, integration with the surrounding urban fabric, and their ability to elicit emotional and cognitive responses from users. They fit within a broader reflection on the archetypes of urban public space, such as the street, the square, the playground, the park, the waterfront, and the greenway. These archetypes reflect the variety and richness of New York's urban design and provide a reference framework for understanding how each of these spaces responds to the needs of contemporary urban life.

Furthermore, their study aligns with the principles outlined in the *Charter of Public Space*, which promotes sustainability, inclusion, and quality of life through mindful urban design. Subsequently, these projects will be subjected to environmental psychology and neuroscience analysis to assess their impact on perception, behavior, and users' emotions.

The analysis of these spaces will focus on how architectural and landscape elements interact with the senses, stimulating various bodily and cognitive experiences. Each case study's morphological, material, and atmospheric characte-

ristics will be examined, with particular attention to their ability to generate comfort, safety, social connection, and aesthetic inspiration. These spaces are not merely conceived as places of transit or gathering but as authentic emotional and sensory landscapes capable of modulating urban experience through the conscious design of atmospheres and relationships between individuals and the built environment.

If the urban environment can profoundly influence emotions and cognition, it becomes essential to question how to design cities that foster psychological well-being. Research in neuroarchitecture and environmental psychology suggests that urban spaces should be designed to positively stimulate the senses, encourage socialization, and provide a balance between stimulation and mental relaxation. Factors such as the presence of green spaces, architectural aesthetic quality, accessibility, and safety are key determinants in creating environments that promote well-being and emotional connection with space.
Rethinking cities from this perspective means creating more humane, inclusive environments that can respond to their inhabitants' emotional and cognitive needs.

3.3 NEW YORK AS A FIELD OF APPLICATION

New York is a multifaceted and dense territory, rich in history and contemporaneity. A «*mosaic of episodes*»[26], where the past intertwines with ongoing urban and architectural experimentation.
Setting aside its discovery[27] in 1609 by the explorer and navigator Henry Hudson and the subsequent development of New Amsterdam, it was in 1807 that the famous matrix that still defines the Big Apple today was born: the Manhattan

[26] Koolhaas, R. (2001)

[27] For further information pertaining to the birth and discovery, please refer to page 14 of the publication Delirious in New York, authored by Rem Koolhaas.

grid. This rigorous and geometric urban layout, composed of 2,028 blocks, features 12 longitudinal Avenues that cross the entire peninsula, intersecting with 155 transverse Streets.

A rational and ambitious design, conceived by Simeon deWitt, Gouverneur Morris, and John Rutherford, has shaped New York's spatial identity and influenced its growth, fostering order, density, and endless possibilities for transformation. While this rigid structure left little open land, the vision behind the orthogonal plan differed.



Figure 3.02
Re-drafting of the Castello Plan, 1913 by John Wolcott Adams (1874–1925) and I.N. Phelps Stokes (1867–1944)

> «Many may be surprised by how few spaces have been left free and by the fact that those remaining are too small to allow for the circulation of air and its benefits on health. Certainly, if New York's fate had been to stand along the banks of a small waterway like the Seine or the Thames, a large amount of wide open spaces would have been necessary; however, the broad arms of the sea surrounding the island of Manhattan make its situation particularly fortunate in terms of health and well-being.»[28]

Its conditions undoubtedly benefited from the prosperity of early 19th-century America, but today, the limited availability of open spaces and contemporary challenges find their expression in public space. In Manhattan, public space emerges as a fundamental, multi-scale, and multi-level are-

28 Ibidem.

na capable of improving social, climatic, and psychological well-being.

The issue of mental health represents a crucial concern in contemporary American society. While riding the subway, boarding buses, or simply walking through the city streets, one frequently encounters billboards encouraging citizens to care for their mental health or offering support to those in distress. These messages are not merely awareness campaigns but clear indicators of a widespread need, a collective reflection of a shared social condition.

The sheer volume of these public initiatives highlights not only the urgency of addressing mental health issues but also the growing awareness among institutions and communities of their impact on overall well-being.

This phenomenon suggests a dual level of interpretation: on the one hand, an increased demand for psychological support and adequate services; on the other, a greater focus on designing urban environments that foster psychological and physical balance.



Figure 3.03
Mental health advertisement in a new york bus line © Andrea Di Cinzio

In this context, it becomes essential to question how public and architectural spaces can contribute to fostering better mental health—not only through the design of welcoming

and stimulating places but also by encouraging social connection, enhancing the perception of safety, and reducing stress.

New York City, and particularly the island of Manhattan, is depicted in Oswald Mathias Ungers' vision as a remarkable metaphor, simultaneously comparing it to both a human body and a machine. This dual analogy allows for a deeper understanding of the city's functional complexity, weaving together the languages of biology and mechanics.

The surface streets represent the bones and structural framework, providing stability and orientation; the sewer system embodies the digestive and waste disposal system, essential for eliminating urban waste; the vast subway network functions as a cardiovascular and fluid mechanics system, transporting people and resources with uninterrupted fluidity. Finally, the city's electrical and energy systems operate as its nervous system, ensuring vitality and continuity both day and night.

Like a living organism or a highly sophisticated machine, Manhattan is the product of relentless evolution, a continuous process of adaptation and enhancement. This dynamic transformation generates new possibilities, capabilities, and connections, which not only optimize its urban performance but also promote both collective and individual well-being.

Ungers' metaphor prompts a profound reflection on the essence of the city as a living entity. In this sense, Manhattan is not merely a machine for production and movement, but also an environment striving to balance efficiency, sustainability, and quality of life.

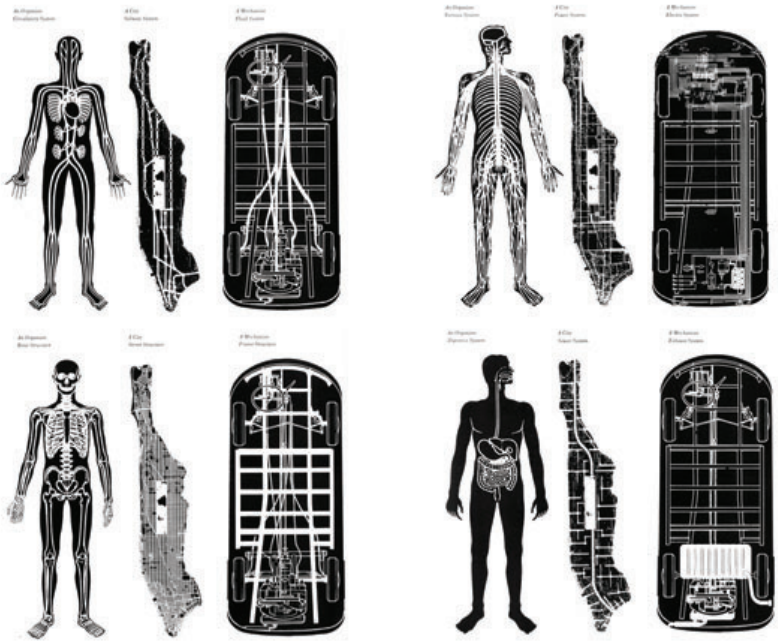


***Figure* 3.04**
Mathias Ungers,
City Metaphors (1976)

An essential element is missing from this intricate urban system, which I would add to complete the metaphor of the human body and the machine: the skin and the outer shell. The system of urban public spaces plays this role, representing the city's vital fabric, its sensitive surface, and the point of contact between architecture and everyday life.

Public spaces are places of urban vitality: exchange, passage, leisure, rest, demonstration, and encounter. They are spaces of constructed absence, where architecture withdraws to make room for the construction of human relationships. Here, material absence transforms into immaterial presence, enabling connections, exchanges, and interactions that define the deepest essence of city life.
People inhabit and transform these spaces, attributing to them a dynamism that makes them alive and in constant evolution. It is precisely from this condition of "emptiness" that these places lend themselves to adaptation and enrichment, allowing for a multiplicity of transformations and installations: cultural, recreational, artistic, institutional, commercial, religious, environmental, and more—a kaleido-

scope of forms and functions.[29]

A significant part of New York City's urban void across its five boroughs (Manhattan, Brooklyn, Queens, the Bronx, and Staten Island) is occupied by parks. In 1934, the New York City Department of Parks and Recreation (NYC Parks) was established, managing 1,700 parks, 1,000 playgrounds, 800 sports fields, and countless other green spaces. This program is a cornerstone in enhancing urban life promoting equitable access to well-designed, safe, and engaging public spaces.

In the quality and opportunities offered by public space, New York City emerges as an ideal laboratory for observing and analyzing the dynamics of contemporary open-air public spaces. The city provides a unique setting to study the variables influencing human behavior and psycho-physical well-being in complex and highly diverse urban contexts.

Building on the articulated definition of public space, an archipelago of projects has been developed, outlining a taxonomy of the main types of open-air public spaces in Manhattan. This taxonomy is structured around six spatial archetypes, representing the different forms and functions of public space within the New York City context: the street, the square, the playground, the park, the waterfront, and the greenway.

These archetypes not only reflect the diversity and richness of New York's urban design but also provide a framework for understanding how each space responds to the needs of contemporary urban life.

The street is the nervous system of the city, a linear axis that not only connects but also creates opportunities for encounters and dynamism. The street transforms into a rigid space within Manhattan's grid, a network of cardines

[29] Palestini, C., Di Cinzio, A., Pellegrini, L., Minischetti, A. (2022)

and decumani regulating the urban fabric, accommodating vehicular, pedestrian, and cycling flows. It is a place of shared mobility, human interaction, and accessibility but also a space to be reconfigured through temporary or permanent interventions that enhance social engagement and sustainability. In this fast-paced transitional space, natural and architectural elements can provide moments of pause and well-being.

The square is the archetype of social interaction, sharing, and public space. It is an open and symbolic environment that catalyzes collective activities and represents a neighborhood's identity. In Manhattan, squares are reimagined in contemporary forms: pedestrian areas, waterfront plazas, digital squares, and historical public spaces. These dynamic places are designed to foster inclusion, psychological well-being, and climate resilience through thoughtful urban design.

The playground is a space of playful experimentation designed to stimulate creativity, movement, and social interaction. In Manhattan, these spaces evolve beyond children's play areas, integrating adults and the elderly in an intergenerational approach. Equipped with sustainable structures, playgrounds become micro-laboratories for learning and psychophysical well-being, strengthening connections with nature and place.

The park is the green lung of the city, an oasis of tranquility that offers spaces for contemplation and relaxation. While Manhattan is home to iconic parks, it also features smaller-scale green spaces designed to meet climatic and social needs. These spaces promote urban biodiversity, enhance the human-nature connection, and are strategically planned to maximize mental and physical health benefits.

The waterfront is the dynamic threshold between land and water, an interface that, in Manhattan, has evolved into a multifunctional public space. Once simple embankments, waterfronts have transformed into vibrant gathering places, offering sports, culture, and environmental protection. Manhattan's waterfronts exemplify how design can address climate change challenges, incorporating water management and resilience strategies while ensuring livable and welcoming spaces.

The greenway is the green corridor connecting key urban nodes, creating continuous pathways for pedestrians and cyclists. In Manhattan, these infrastructures are designed to improve air quality, reduce traffic, and offer unique sensory experiences. More than just a pathway, the greenway represents a contemporary reinvention of urban infrastructure, encouraging an active, sustainable lifestyle in harmony with the urban environment.

However, beyond the typological classification, the analyzed projects are distributed according to two primary geographical contexts:

- ***Waterfront:*** areas that develop along the perimeter of Manhattan, Brooklyn, or Queens, serving as a dynamic interface between the city and the water.
- ***Inland:*** public spaces embedded within the urban fabric, surrounded by buildings and infrastructure that shape the city's daily life.

This dual perspective—typological and geographical—allows for an understanding of how New York City, through its mosaic of public spaces, responds to the needs of a constantly evolving metropolis, balancing the dynamics of the inner urban fabric with those of its natural and landscape frontiers.

The analysis of these spatial archetypes reveals that public space is not merely a physical component of the city but a complex entity shaped by human interactions and social, cultural, and economic transformations. Its ability to adapt to new uses, needs, and urban dynamics makes it a living laboratory where architecture, landscape, and infrastructure continuously interact with citizens' daily lives.
However, the relationship between individuals and public space is not limited to physical and functional dimensions but extends to the perceptual and emotional sphere. Each place, with its morphological, material, and environmental characteristics, has the power to evoke emotions, activate memories, influence moods, and impact its users' psychological and physical well-being.

Thus, it is crucial to explore how public spaces generate emotions and the role of subjective experience in the perception and use of the city. How can architecture and urban design stimulate positive emotions? Which elements enhance the sense of belonging, safety, wonder, or well-being?
The following section analyzes and describes the 18 case studies/projects that are part of my doctoral research. I aim to deepen these questions and investigate the relationships between space, emotions, and urban perception.

3.3.1 $6^{1/2}$ AVENUE

In the heart of Midtown Manhattan, between 51st and 57th Street, a hidden pedestrian pathway remains unnoticed for years, traversed daily by thousands of people without a true urban identity. Today, this route has an official name: 6 ½ Avenue. It is a pedestrian corridor connecting a sequence of *Privately Owned Public Spaces* (POPS), which, thanks to the intervention of the *New York City Department of Transportation* (NYCDOT), has now been formally recognized and integrated into the urban network.

The idea to enhance this path originated from the efforts of the *Friends of Privately Owned Public Spaces* (F-POPS), a group of activists and urbanists who promoted the initiative Holly Whyte Way, named after William H. Whyte, a well-known urbanist and advocate for public spaces. Their campaign brought the project to the attention of Community Board 5 and NYCDOT, ultimately leading to its official recognition as a pedestrian street in 2012.

To transform 6 ½ Avenue into a fully integrated urban street, the city installed street signs, pedestrian crossings with white stripes, traffic signals, and dedicated signage indicating the Avenue's name and cross-street addresses. This intervention marked one of the first modifications to Manhattan's grid in decades, aimed at enhancing pedestrian mobility and safety.

Stretching approximately 400 meters across seven blocks, the Street functions as an urban corridor, connecting a diverse sequence of privately owned public spaces, including open-air lobbies, arcades, and daytime-access areas. The pathway weaves through environments with different spatial and material characteristics, stimulating a multisensory perception of the urban setting.

The journey begins in a green space enriched with trees and seating areas that encourage rest and relaxation. Moving forward, it transitions into the atrium of a café and

restaurant, a semi-public space that accentuates the pathway's social character. Shortly after, the passage leads to a plaza with exposed concrete surfaces, defined by illuminated installations and a dramatic vertical water cascade, introducing a dynamic and sensory element. This sequence of heterogeneous environments, characterized by diverse materials, colors, sounds, and spatial configurations, constantly stimulates the senses, creating an immersive and dynamic urban experience. The axis was designed based on slow mobility principles, aiming to reduce interference with vehicular traffic and promote a safe and comfortable pedestrian experience. To ensure accessibility and security, the pathway features sidewalks with ramps for individuals with reduced mobility, tactile surfaces for enhanced spatial awareness, and flexible barriers to prevent unauthorized vehicle parking in pedestrian zones.



***Figure* 3.05**
Junction of $6^{1/2}$ Avenue and W 55 st and City Center Street
© Andrea Di Cinzio

One of the most innovative aspects of 6 ½ Avenue is its fractional name, an unusual element within New York's numbered street system. This naming choice emphasizes its interstitial nature within the urban fabric and makes it a unique case in the city's landscape. Additionally, as a route composed of privately owned spaces with public access,

operating hours are restricted, which may limit continuous use of this urban corridor.



Figure 3.06
Part of the 6½ Avenue covered route
© Andrea Di Cinzio

Sensory features

The experience of urban space significantly impacts sensory perception and the psychophysical well-being of users. The diverse environments along 6 ½ Avenue stimulate continuous interaction with the surrounding space, influencing cognitive and sensory processes. The presence of natural, architectural, and artistic elements creates a multisensory urban experience that positively affects behavior and enhances the quality of life of its users. 6 ½ Avenue offers a compelling case study through five sensory dimensions:

Sight. The succession of diverse spatial environments, such as green spaces, commercial atriums, and plazas with light installations, creates continuous visual stimulation. The contrast between reflective surfaces, textured materials, and light effects enriches the perceptual experience, improving spatial orientation and encouraging longer stays in the space.

Hearing. The contrast between quieter areas, such as green spaces and the soothing sound of the vertical waterfall, and livelier zones, like the atrium of cafés and restaurants along the route, creates a varied soundscape that enhances environmental awareness and reduces stress. Reducing urban noise pollution allows natural sounds to emerge, fostering a more relaxed perception of space and a less stressful experience.

Touch. The variety of tactile surfaces along the pathway,

from smooth pavements in arcades to the rougher textures of exposed concrete, stimulates a dynamic bodily perception of space. The presence of wooden benches and urban furniture in green areas enhances contact with natural elements, reinforcing comfort and sensory engagement.

Smell. The presence of vegetation along the route, combined with a lower concentration of air pollutants compared to nearby roads, enhances the perception of natural scents, such as the fragrance of plants and damp earth after rain. The olfactory environment also shifts near the restaurant atrium, where food aromas emerge, intensifying sensory engagement with the space.

Taste. The presence of dining areas along the path, particularly near the café and restaurant atrium, encourages convivial experiences and social interaction.

The relaxed urban setting, removed from the chaos of vehicular traffic, enhances the pleasure of outdoor dining and contributes to psychological well-being.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The alternation of materials and spatial configurations stimulates a continuous and varied sensory perception.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The sequence of public and private spaces creates a fluid experience that alters the perception of the urban environment.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Users actively interact with the space through the integration of visual, tactile, and acoustic elements.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Light installations, reflective surfaces, and the waterfall act as cognitive extensions that enrich the urban experience.

Table 3.01
4E Cognition and Spatial Experience in $6^{1/2}$ Avenue: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Users can move through and pause freely in a safe and protected pathway.
AFFECT	The emotional impact of the environment on people.	The variation of sounds, materials, and lighting creates a welcoming and relaxing atmosphere.
AFFORDANCE	Spatial elements suggest specific behaviors.	Furnishings and pedestrian areas encourage movement, exploration, and socialization.
AUTONOMY	Ability to choose and move freely.	Signage and accessibility design ensure a smooth and safe use of the pathway.

Table 3.02
4A Framework: Agency, Affect, Affordance, and Autonomy in $6^{1/2}$ Avenue

Impact on Human Flourishing

The integration of 6 ½ Avenue into the urban fabric of Manhattan represents an innovative model of design focused on human well-being. The alternation between natural, commercial, and artistic environments promotes sustainable mobility, social interaction, and a sense of belonging to public space. The opportunity to traverse a diverse and stimulating pathway encourages physical movement and exploratory curiosity, which are fundamental to enhancing quality of life. The heterogeneity of spaces along the route allows for continuous adaptation to users' needs, offering rest areas, social gathering points, and sensory discovery zones. This urban design model demonstrates how enhancing interstitial spaces can contribute to a more inclusive and livable city, fostering human flourishing—a state of well-being that emerges from the harmonious interaction between body and mind.

The once-hidden Street of Manhattan is no longer a secret; today, it is a recognized piece of the city, an example of how urban planning can uncover new possibilities within the metropolitan palimpsest. Establishing 6 ½ Avenue serves as a virtuous example of urban space revitalization. It demonstrates how the recognition and enhancement of pedestrian pathways in high-density cities like New York can significantly impact urban quality of life. The project has proven that even small-scale interventions can create a profound urban impact, transforming marginal spaces into valuable community assets. This experience offers a framework for other cities looking to optimize pedestrian mobility by redefining overlooked urban spaces and seamlessly incorporating them into the existing cityscape. What was once an unnoticed corridor has become a recognized and celebrated urban feature, exemplifying how urban planning can reveal and activate new spatial potentials within the contemporary metropolis.



***Figure* 3.07**
Part of the 6$^{1/2}$ Avenue covered route.
© Andrea Di Cinzio

3.3.2 34TH AVENUE

During the SARS-CoV-19 pandemic, the world stopped, but New Yorkers' desire to reclaim urban spaces and take back the streets never ceased. From this need emerged the *Open Streets* (OP) program, promoted by the *Department of Transportation* (DOT)—an initiative aimed at temporarily closing certain streets to vehicular traffic in favor of pedestrians and cyclists. The goal of OP was to stimulate economic development through local services, support schools, and foster cultural and community programs.

The OP program introduced various street closure models based on local needs. Some streets were subject to partial vehicle restrictions, allowing access only to residents, emergency vehicles, and deliveries, thus reducing traffic without compromising essential mobility needs. In other cases, streets were completely closed to automobile circulation, transforming them into pedestrian and cycling zones while supporting outdoor dining and community programs. Special attention was given to streets adjacent to schools, where closures provided a safe environment for student drop-off and pick-up, recreation, and outdoor learning.

One of the most representative examples of this initiative is 34th Avenue in Jackson Heights, a major urban corridor converted into a pedestrian and cycling path. The 1.3-mile-long street, spanning 26 blocks, was closed to traffic daily from 7:00 AM to 8:00 PM. The project was developed in collaboration with the community coalition 34th Avenue Open Street, which promoted initiatives such as bicycle helmet distribution and educational activities.



Figure 3.08
The 78th Street turns into a plaza.
© Andrea Di Cinzio

This urban corridor runs through one of the most culturally diverse neighborhoods in New York, often recognized as one of the most heterogeneous in the city. However, Jackson Heights also faces a significant shortage of green spaces, making the transformation of 34th Avenue into a pedestrian area even more relevant for residents' quality of life.
This street conversion has turned the Avenue into a multifunctional space with significant impacts on various aspects of urban life. Regarding traffic safety, the absence of vehicles has led to a 42% reduction in accidents compared to the three years before the project's implementation. Additionally, the improved accessibility for pedestrians and cyclists has encouraged active mobility, promoting sustainable transportation.
At the environmental level, the intervention has resulted in tangible benefits, including a significant decrease in air and noise pollution, making the neighborhood more livable and healthier for residents.
Beyond mobility improvements, 34th Avenue has become a hub for community activities. It now hosts dance classes, gardening events, yoga sessions, and recreational programs for children, transforming the street into a valid extension of the neighborhood's social fabric.



Figure 3.09
Through works of tactical urbanism and colourful urban furniture, the street is transformed into a space for socialising.
© Andrea Di Cinzio

Sensory features

The redevelopment project of 34th Avenue has significantly impacted users' sensory experience, enhancing quality of life by stimulating and relaxing the five senses.

Sight. The absence of vehicles and the transformation of the street into a pedestrian and cycling-friendly environment have created visually open and harmonious spaces. The uncluttered view, free from chaotic elements such as traffic and parked cars, allows for a better appreciation of the urban space's continuity and surrounding details. Aesthetic enhancements, such as well-maintained greenery and thoughtfully placed street furniture, improve visual perception, fostering feelings of calmness and well-being.

Hearing. The drastic reduction of urban noise, such as honking and engine sounds, has allowed natural sounds to emerge. Users can now hear birds singing, children playing, and the rustling of the wind through the trees, creating a relaxing soundscape that contrasts with the typical hustle and bustle of the American metropolis. This restorative auditory environment contributes to stress reduction and supports mental relaxation.

Touch. The transformation of 34th Avenue has introduced a variety of tactile experiences, such as the feel of natural materials in street furniture, grassy areas, and benches. Walking or running on safe even surfaces—without the need to navigate broken sidewalks or vehicle traffic—creates a smooth, uninterrupted physical experience. This enhanced accessibility strengthens the body-environment connection and promotes psychophysical well-being.

Smell. Reducing vehicle emissions has improved air quality, allowing users to perceive natural scents, such as the fresh aroma of soil after rain, the fragrance of trees, and the scent of surrounding plants. These olfactory stimuli contribute to a stronger connection with nature, fostering sensations of freshness and tranquility.

Taste. Although taste is not directly related to urban design, community activities along 34th Avenue, such as local markets and food events, provide residents with opportunities to engage in culinary experiences in a relaxed, stress-free setting. The presence of picnic areas encourages families and locals to share outdoor meals, creating convivial and enjoyable moments.

This rich multisensory experience demonstrates how urban planning can positively influence psychological and physical well-being, promoting a human-centered approach to public space design.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The possibility of walking, running, and cycling safely promotes a multisensory experience that reduces stress.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The absence of traffic and the presence of greenery influence the perception of urban space, making it more welcoming and relaxing.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Users actively participate in the transformation of space through events, sports activities, and social interactions.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Natural elements, pedestrian and cycling paths, and community spaces enhance users' cognitive and social abilities.

Table 3.03
4E Cognition and Spatial Experience in 34th Avenue: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Users can walk, stop, and socialize without the limitations imposed by traffic.
AFFECT	The emotional impact of the environment on people.	The absence of noise and smog, combined with green spaces and urban amenities, improves psychological well-being.
AFFORDANCE	Spatial elements suggest specific behaviors.	Pedestrian spaces, cycling paths, and community areas encourage socialization and active mobility.
AUTONOMY	Ability to choose and move freely.	Wide accessibility ensures greater freedom of use of urban space, adapting to all age groups.

Table 3.04
4A Framework: Agency, Affect, Affordance, and Autonomy in 34th Avenue

Impact on Human Flourishing

34th Avenue is an exemplary case of public space transformation aimed at human flourishing, understood as overall well-being emerging from the interaction between the urban environment's physical, psychological, and social dimensions. The project has redefined the concept of public space, tran-

sforming it into a dynamic infrastructure capable of meeting community needs by creating a more resilient and inclusive urban ecosystem. The implementation of traffic closures has fostered socialization and inclusion, expanding opportunities for interaction among residents of different age groups and cultural backgrounds. From a physical and mental health perspective, traffic reduction has encouraged active mobility, significantly increasing pedestrians and cyclists along the route. Walking and cycling daily along 34th Avenue has improved cardiovascular health, reducing sedentary lifestyles. At the same time, the absence of vehicular traffic and a more harmonious urban environment have lowered stress and anxiety levels, providing residents with a safe and restorative space. Another significant benefit has been observed in environmental terms, with a significant decrease in air and noise pollution. The absence of vehicle exhaust emissions has improved air quality, contributing to a healthier urban environment. Additionally, reducing city noise has fostered a more relaxed atmosphere, improving sleep quality and the overall well-being of residents. Moreover, the future vision for 34th Avenue includes further transformation: the goal is to convert this urban stretch into a permanent park, "Paseo Park." This project aims to replace part of the asphalt with permeable pavements and rain gardens, increasing green spaces and further enhancing the neighborhood's environmental resilience. The transformation of 34th Avenue demonstrates how human-centered urban design can positively impact urban life quality. The success of this initiative provides a replicable model for other cities seeking to rehabilitate public spaces sustainably and inclusively, contributing to a more human-centric urban planning approach. The integration of sustainable mobility, environmental quality, and social well-being represents an essential direction for the future of cities, making 34th Avenue an example of an adaptable, resilient public space that actively promotes human flourishing.



Figure 3.10
Tactical urbanism in 34th Avenue.
© Andrea Di Cinzio

3.3.3 BATTERY PARK - THE PLAYSCAPE

The Battery, formerly known as Battery Park, is a 25-acre (10-hectare) public park overlooking the city's harbor at the southern tip of Manhattan. This historic space is home to major attractions, including the 19th-century fortress *Castle Clinton*, numerous commemorative monuments, and the striking *SeaGlass Carousel*. The surrounding area, known as South Ferry, hosts several ferry terminals, including the *Whitehall Terminal* for the *Staten Island Ferry* and docks serving the *Statue of Liberty* and Governors Island. The park's name derives from the artillery batteries built in the 17th century to defend the colonial settlement. In the 19th century, the park became a major leisure destination and, until 1892, was the primary entry point for immigrants before operations were moved to Ellis Island.

During the 20th century, *Battery Park* underwent a decline and subsequent redevelopment. In the 1940s, the construction of the Brooklyn-Battery Tunnel and Battery Park Underpass led to the park's closure for twelve years. In the 1970s and 1980s, the development of the *Battery Park City* residential neighborhood brought new investments to the area, culminating in a $100 million redevelopment plan that led to the creation of new parks, a residential district, and waterfront improvements. In 1994, the *Battery Conservancy* launched a $46 million restoration project, introducing new gardens and public spaces, including the Battery Bosque and the Battery Oval, inaugurated in 2016.

In the early 1990s, Battery Park was severely neglected, with damaged infrastructure, poor maintenance, and an unappealing environment for visitors. In 1994, the nonprofit *Battery Conservancy*, led by Warrie Price, initiated an extensive redevelopment plan, securing private and public funding totaling $46 million over twenty-two years. Restoration efforts included reorganizing statues, enhancing *Castle Clinton*, and creating new gardens and gathering spaces, such as the *Bat-*

tery Bosque and *Battery Ova*l, which opened in 2016.

The most recent addition to the park is the *Battery Playscape*. Designed as a flexible and open system, this project encourages free play and discovery through an immersive experience in nature. Spanning 1.5 acres, it offers various landscapes, blending natural and educational elements to connect children with local ecology and contemporary environmental challenges. Opened in December 2021, Battery Playscape was designed in response to Hurricane Sandy to be flood-resistant and adaptable to climate change.

Situated in the southernmost part of Manhattan, where the Hudson River meets New York Harbor, Battery Playscape was designed with a strong focus on climate resilience. Much of the park is located on reclaimed land prone to flooding, making adaptive design essential for withstanding extreme weather conditions. The project incorporates best practices in resilient design to mitigate climate change effects, integrating advanced drainage systems and landscapes capable of absorbing and redistributing water sustainably.

The park is divided into five interconnected ecosystems, each offering educational and sensory experiences:

Bluff: Featuring Adirondack granite slides among perennial gardens and rocky surfaces, encouraging motor skills and balance.

- ***Riverbed*:** An area with water and sand play spaces inspired by Manhattan's river courses, introducing children to erosion and sedimentation dynamics. Integrated with the urban drainage system, it offers an educational experience in water management.
- ***Marsh*:** Home to accessible treehouses and role-play spaces that foster creativity and peer interaction while connecting children with nature.
- ***Dune*:** Equipped with climbing structures and the Show-Box, New York's first improvisational puppet theater, promoting artistic expression and children's creative en-

gagement.

- ***Meadow*:** A clearing with native vegetation, a habitat for insects and migratory birds, emphasizing biodiversity and offering a tranquil refuge for nature observation.



Figure 3.11
A Playhouse in the Marsh ecosystem.
© Andrea Di Cinzio

Plants play a central role in the site's resilience and sensory experience. The landscape design includes a variety of aromatic and tactile seasonal species selected for their resistance to salinity and drought. This encourages visitors to connect more deeply with the natural environment and understand its importance to the city.

The area integrates environmental sustainability solutions, such as bioswales and a reservoir capable of collecting 30,000 gallons of rainwater, reducing flood risks and supporting biodiversity. Additionally, interactive art installations like Shade Clouds provide sun protection while creating light reflections that enrich users' sensory experiences.

Beyond its ecological and educational value, Battery Playscape stimulates children's imagination and creativity through a series of interactive experiences. The play areas are designed to encourage movement, exploration, and learning through sensory play, making it a model of urban design that harmonizes environment, play, and climate adaptability.

Sensory Features

The sensory experience within The Battery Playscape is designed to stimulate perception and interaction with the environment through a multisensory approach that fosters cognitive development and spatial awareness in children and visitors.

Sight. The park offers a dynamic visual experience through various colors, shapes, and reflective surfaces. The Shade Clouds create shifting light effects, while the water surfaces in the Riverbed produce continuously changing reflections. Additionally, the layering of different ecosystems—from the deep green of the Meadow to the rough texture of the rocks in the Bluff—provides visual stimuli that enhance spatial orientation and depth perception.

Hearing. Battery Playscape's sound environment is enriched by a combination of natural and artificial sounds. The flowing water in the Riverbed and the rustling plants in the Meadow create a relaxing atmosphere. At the same time, the materials used in play surfaces help dampen loud noises, offering a more harmonious environment compared to the bustling city surroundings.

Touch. The diversity of tactile surfaces—from the sand in the Riverbed to the granite rocks in the Bluff and the wooden structures in the Marsh—encourages exploration and recognition of different textures. This direct contact with natural materials supports experiential learning and motor skill development, promoting active play and sensory experimentation.

Smell. The park's landscape design incorporates aromatic plants and seasonal flowers, creating an immersive olfactory experience. The scent of wood and native vegetation in the Meadow, combined with the fresh water in the drainage systems, makes Battery Playscape an environment where the sense of smell is continuously engaged, strengthening emotional connections with nature.

Taste. Although not directly related to the park's design elements, picnic and social areas create an environment where food becomes part of the multisensory experience. The outdoor spaces encourage convivial moments and reinforce the connection between eating and the surrounding environment, promoting overall well-being.

The Battery Playscape represents an innovative model of urban design that enhances sensory and cognitive experiences through a harmonious integration of nature, play, and environmental resilience.

Table 3.05
4E Cognition and Spatial Experience in Battery Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	Contact with natural surfaces such as sand, rocks, and vegetation stimulates experiential learning in children.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The different interconnected ecosystems influence spatial perception and the sense of orientation.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Free play activities and interaction with water elements and tactile structures enhance active learning.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Interactive installations and adaptive design function as cognitive extensions that strengthen the connection with the natural environment.

Table 3.06
4A Framework: Agency, Affect, Affordance, and Autonomy in Battery Park

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Children can freely explore the park and interact with various natural and architectural elements.
AFFECT	The emotional impact of the environment on people.	The multisensory landscape generates a positive impact, reducing stress and increasing connection with nature.
AFFORDANCE	Spatial elements suggest specific behaviors.	Play spaces and tactile surfaces suggest specific movements such as climbing, sliding, and building.
AUTONOMY	Ability to choose and move freely.	Inclusive design allows access and use of the space for users of all ages and abilities.

Impact on Human Flourishing

The *Battery Playscape* is an exemplary urban space designed to enhance users' physical, psychological, and social well-being and actively contribute to human flourishing. Its focus on sustainability, climate resilience, and sensory integration makes it a model for the future of urban design.

One key aspect of flourishing is connection with the na-

tural environment, which is highly encouraged at Battery Playscape through the extensive presence of vegetation and the multisensory experiences provided by its five interconnected ecosystems. Using natural materials and interactive artistic installations fosters exploration and creative play, promoting children's and adults' cognitive development and emotional well-being.

The park also promotes social well-being by offering spaces designed for inclusivity and shared experiences. The accessible play areas and interactive structures facilitate interaction among children of different ages and abilities, strengthening the sense of community. Picnic areas and seating spaces allow visitors to experience social gatherings in a relaxed and stimulating environment.

From a mental health perspective, Battery Playscape's design contributes to stress reduction through harmonious interaction with nature. Using calming colors, natural sounds, and the absence of intrusive urban noise supports psychological regeneration, improving overall quality of life.



Figure 3.12
The Riverbad playscape during the winter season without water.
© Andrea Di Cinzio

Furthermore, integrating sustainable water management systems, such as bioswales and permeable surfaces, demonstrates how urban design can adapt to environmental challenges, creating safer and more resilient spaces. The park's

ability to withstand extreme climate conditions establishes it as a model for future city planning aimed at sustainability and livability.

Ultimately, *Battery Playscape* is not just a recreational area but an educational space that teaches younger generations about coexistence with nature and the need for innovative urban solutions. This combination of accessibility, social interaction, and resilient design makes Battery Playscape a tangible example of how public spaces can catalyze human flourishing, promoting collective well-being through play, discovery, and deep connections with nature.



Figure 3.13
The Bluff zone.
© Andrea Di Cinzio

3.3.4 BROOKLYN BRIDGE PARK

Brooklyn Bridge Park, an unprecedented urban transformation project, has redefined the interface between New York City and its waterfront, converting a former industrial port into an 85-acre public park that now welcomes over five million visitors annually. Designed by Michael Van Valkenburgh Associates (MVVA), the project stands out for its innovative approach, seamlessly integrating the site's industrial heritage with a sustainable and resilient public space. Extending 1.3 miles along the East River, the park was conceived through a planning process spanning over 20 years, completed in phases until its final realization in December 2021.

A key feature of the project is its ability to combine spatial diversity, material complexity, and functional variety, offering an experience that ranges from contemplative spaces to natural landscapes, sports areas, panoramic viewpoints, and recreational infrastructure. This transformation was made possible through adaptive reuse strategies, preserving elements of the historic port infrastructure and repurposing them into architectural and functional components of the park. The complex functions as a dynamic and layered system, intertwining historical memory with forward-thinking design.

The Brooklyn Bridge Park design is distinguished by its ability to adapt the landscape to urban needs, creating a dialogue between nature and the city by enhancing historical and environmental contexts. The design encompasses multiple levels of intervention, focusing on material diversity, spatial organization, and activity distribution.

One of the most innovative aspects of this transformation is the adaptive reuse of existing port infrastructure. The use of reclaimed materials is a defining feature of the entire project: Timber from the National Cold Storage Warehouse was repurposed into benches and picnic tables; Stone extracted from the reconstruction of two New York brid-

ges was used to create terraces and seating areas and the Old port warehouses were transformed into contemporary pavilions, repurposed as sports facilities and multipurpose spaces.



Figure 3.14
A beach along the East River and in the background Pier 3 of Brooklyn Bridge Park.
© Andrea Di Cinzio

A Park Structured Around Six Revitalized Piers

The park is divided into six large piers, each with a distinct identity and function:

- ***Pier 1:*** Main entrance with a waterfront promenade and panoramic terrace.
- ***Pier 2:*** Dedicated to sports activities, including basketball courts, roller skating, and climbing walls.
- ***Pier 3:*** A natural area featuring relaxation spaces and an urban forest.
- ***Pier 4:*** An artificial beach that doubles as a wildlife habitat.
- ***Pier 5:*** Home to soccer fields and picnic areas.
- ***Pier 6:*** Designed for families, featuring playgrounds and thematic gardens.

A significant design feature of Brooklyn Bridge Park is the implementing of a green noise barrier strategically placed to shield the park from the Brooklyn-Queens Expressway (BQE). This intervention transformed an excessively noisy and less inviting area into a vibrant, green, and restorative environment, significantly enhancing the visitor experience. Brooklyn Bridge Park is a global reference for urban regeneration, demonstrating how historic infrastructure can be transformed into sustainable, inclusive, and dynamic public spaces that enhance environmental quality, community well-being, and urban resilience.

Sensory Features

Brooklyn Bridge Park has been designed to provide a dynamic and stimulating spatial experience, leveraging principles of environmental neuroscience to enhance cognitive and sensory well-being. The park's design incorporates topographical variations, tactile materials, and visual contrasts to create an engaging environment that fosters emotional and psychological connections with the space.

Sight. The park offers a stunning mix of panoramic views of the Manhattan skyline, seamlessly integrated with more intimate areas shielded by trees and lush vegetation. The contrast between open and enclosed spaces enhances spatial perception and fosters a sense of exploration and discovery.

Hearing. The presence of vegetative barriers helps to reduce urban noise, allowing visitors to experience natural sounds such as the rustling of wind through trees, birdsong, and the gentle waves along the shoreline. This acoustic environment enhances relaxation and contributes to a sense of calm and well-being.

Touch. A diverse range of materials, including wood, stone, and grassy surfaces, offers varied tactile experiences, enriching the sensorial engagement and deepening the connection with the natural surroundings.

Smell. The diverse selection of plant species and green spaces stimulates the sense of smell, with seasonal fragrances ranging from spring blossoms to the salty scent of the river, enhancing the immersive sensory experience.

Taste. The dedicated dining areas and picnic zones provide opportunities for social interaction and sensory engagement through food, completing the park's multisensory experience.

Brooklyn Bridge Park exemplifies how urban design can activate and enhance sensory experiences, creating a restorative and engaging environment that promotes human flourishing through an enriched connection with nature.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	Visitors interact with different surfaces, walk along the waterfront, and use sports areas, enhancing both physical and mental well-being.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The park's design, with open spaces and areas screened by vegetation, guides spatial perception and stimulates a sense of exploration and relaxation.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The park is dynamically experienced thanks to the variety of activities offered, from sports to cultural events, strengthening the sense of community belonging.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The layout of spaces and the integration of natural elements support emotional regulation and users' cognitive well-being.

Table 3.07
4E Cognition and Spatial Experience in Brooklyn Bridge Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Users can choose from a variety of paths and activities, promoting self-determination in the use of public space.
AFFECT	The emotional impact of the environment on people.	The park's design generates a strong emotional impact, with panoramic views, contact with water, and resting areas immersed in greenery.
AFFORDANCE	Spatial elements suggest specific behaviors.	The organization of the park encourages exploration, sports, and socialization, promoting a diversified use of space.
AUTONOMY	Ability to choose and move freely.	Barrier-free accessibility and the variety of environments allow users to tailor their experience based on their needs.

Table 3.08
4A Framework: Agency, Affect, Affordance, and Autonomy in Brooklyn Bridge Park

Impact on Human Flourishing

Brooklyn Bridge Park is an emblematic example of how public space can promote individual and collective well-being by fostering social interaction and connection with nature. The concept of human flourishing is reflected in creating an

environment that stimulates active engagement and a sense of community belonging.

The park's functional diversity encourages physical, social, and recreational activities for users of all ages. Sports fields, pedestrian pathways, community gardens, and relaxation areas make the park accessible and inclusive. A flexible landscape allows visitors to personalize their experience, choosing between moments of tranquility or more dynamic activities.

The park's aesthetic and sensory dimension is another key element in supporting human flourishing. Green spaces and panoramic views provide psychological benefits, reducing anxiety and improving mood. Studies show that open landscapes with natural elements can enhance the production of serotonin and dopamine, neurotransmitters associated with happiness and personal satisfaction.

Finally, Brooklyn Bridge Park's environmental resilience ensures long-term sustainability, making it a model of regenerative public space that not only meets current needs but also adapts to future changes in the city and climate. The park thus establishes itself as an urban landmark, where nature, architecture, and well-being merge to create an environment capable of inspiring and enriching the lives of its visitors.



***Figure* 3.15**
Pier 2 dedicated to physical activity and sport.
© Andrea Di Cinzio



Figure 3.16
A space for resting in Pier 3
© Andrea Di Cinzio

3.3.5 CENTRAL PARK

Central Park, located in the heart of Manhattan, is more than just an urban park—it is a cultural icon, a natural refuge, and one of the most renowned public spaces in the world. Designed by Frederick Law Olmsted and Calvert Vaux in 1857, the park spans 341 hectares, stretching from W 59th St to Central Park North, between Central Park West and 5th Avenue. Welcoming approximately 42 million visitors annually is a perfect example of landscape design, featuring a complex and layered composition of natural and artificial spaces. The integration of open landscapes, woodlands, watercourses, lakes, hills, and architectural structures makes Central Park a place that significantly influences human well-being. Its design was not only a response to the need for an accessible public space for New Yorkers but also aimed to enhance citizens' mental and physical health in an era of rapid urbanization.

Olmsted himself described Central Park's purpose, stating, «*the enjoyment of scenery employs the mind without fatigue and yet exercises it, tranquilizes it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system.*»[30] This reflects his deep belief in the park's importance for human well-being.

By the 1850s, New York City was experiencing rapid demographic and industrial growth, with an increasing population needing recreational spaces to escape urban chaos. Social tensions, coupled with environmental degradation, pushed city authorities to promote the creation of a vast public park to improve environmental health. In 1857, a competition was launched to design what would become Central Park, attracting numerous architects and landscape designers.

The winning proposal was the Greensward Plan, submitted by Frederick Law Olmsted—already known for his work

30 Olmsted, F.L. (1952)

in green space management—and British architect Calvert Vaux, an expert in landscape design. Their collaboration combined artistic vision with a practical understanding of the terrain, resulting in an innovative and harmonious project.

One of the park's most distinctive elements is the variety of landscapes it offers. Areas like The Ramble, a densely wooded section, provide a sense of exploration and seclusion, while open spaces such as the *Great Lawn* and *Sheep Meadow* encourage social and recreational activities. The Jacqueline Kennedy Onassis Reservoir, once a key water distribution system for the city and now repurposed, remains one of the most frequented areas for physical activity.

Despite being entirely man-made, the park is designed to resemble a natural landscape. It features carefully arranged hills, open meadows, lakes, and forests, offering a diverse array of scenery and sensations.



Figure 3.17
Gapstow Bridge in Central Park.
© Andrea Di Cinzio

A key aspect of the project was its accessibility to all social classes. Central Park was intended as a democratic space, with pedestrian paths, playgrounds, and relaxation areas that fostered interaction and a sense of community.

One of its most significant innovations was the separation of pedestrian and vehicular traffic. Through bridges and tunnels, Olmsted and Vaux ensured a safe and uninterrupted experience for visitors on foot, preventing disruptions caused by carriages.

Central Park remains a timeless example of how landscape architecture can shape urban life, offering a space that blends nature, design, and well-being in one of the world's most dynamic cities.



Figure 3.18
People look up in central park during solar eclipse on 8 April 2024
© Andrea Di Cinzio

Sensory Features

The design of Central Park was selected for its vast complexity, allowing it to embody a mixed taxonomy in which the park element stands out prominently. However, its scale enables it to function as a vast green infrastructure, integrating pedestrian and vehicular roads, plazas, and playgrounds. Central Park's ability to stimulate the senses through this diverse range of designed spaces is multifaceted and extensive.

Sight. Sight plays a central role in Central Park's design. The project creates an immersive green environment that isolates visitors from urban chaos while maintaining visual contact with the New York City skyline. The park offers a variety of landscapes capable of altering the atmosphere and emotional perception of different spaces. Open meadows and scenic viewpoints provide sensations of freedom and expansiveness, while wooded and secluded areas create more intimate and contemplative settings. The park's visual experience is enriched by the changing natural color palette throughout the seasons—from the vibrant greens of spring to the warm reds and golds of autumn—positively influencing mood, as demonstrated by studies linking natural colors to psychological relaxation.

Hearing. Auditory experiences in Central Park contribute to its restorative ambiance, forming a stark contrast to the urban noise that surrounds it. The rustling of leaves in the wind creates a dynamic soundscape, while artificial waterfalls—such as The Ravine's stream—produce soothing white noise that masks city sounds. The park's soundscape is further enhanced by the chirping of birds and the cheerful laughter of children, fostering a sense of tranquility and joy.

Touch. Central Park's vast scale allows for a rich variety of tactile experiences. Visitors encounter diverse walking surfaces, from dirt trails to soft grassy fields. Resting areas include large dark stones warm in the sun and expansive meadows offering a cushioned, natural seating experience. The tactile diversity extends beyond natural elements to the park's architectural features, such as fountains, bridges, and balustrades, each offering distinct textures that add complexity to the overall sensory experience.

Smell. Often overlooked, the sense of smell significantly enhances Central Park's sensory experience. The park's aromas shift with the seasons, creating an emotional and natural connection to the environment. In spring, the air is filled

with the sweet fragrances of lilacs, magnolias, and cherry blossoms. Summer brings the fresh scent of cut grass and flourishing plants, while wooded areas exude earthy, damp notes typical of an understory ecosystem. Bodies of water, such as the Reservoir, introduce subtle aquatic breezes. In autumn, the scent of fallen leaves evokes the natural cycle of the seasons, while winter's crisp, cold air offers a refreshing and tranquil sensory contrast. These varying scents deepen the perception of immersion in nature, contributing to a relaxed and meditative state of mind.

Taste. While taste is less directly connected to the park's design, Central Park provides spaces for culinary experiences. Expansive picnic areas, such as the Great Lawn and Sheep Meadow, offer opportunities for outdoor dining, with food available from various kiosks and food carts scattered throughout the park. Additionally, restaurants within the park allow visitors to enjoy a warm meal in an enclosed setting.

Table 3.09
4E Cognition and Spatial Experience in Central Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The interaction with natural surfaces and movement within the park stimulate both physical and mental well-being.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The diverse and accessible landscape encourages social behaviors and regenerative activities.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Active use of the park for sports, events, and walks fosters a connection between body, mind, and environment.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The park's natural and artificial elements help visitors orient themselves and develop a sense of belonging.

Table 3.10
4A Framework: Agency, Affect, Affordance, and Autonomy in Central Park

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Citizens can explore the park on foot, by bicycle, or by boat, personalizing their own experience.
AFFECT	The emotional impact of the environment on people.	Natural landscapes and harmonious design evoke positive emotions and promote relaxation.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park's facilities invite a range of activities, from physical exercise to socializing.
AUTONOMY	Ability to choose and move freely.	The network of pathways and the park's accessibility allow visitors of all ages to move about freely.

Impact on Human Flourishing

Central Park is a prime example of how public space can influence human flourishing—that is, individuals' overall well-being and personal fulfillment. Its design integrates elements of neuroscience, environmental psychology, and urban planning, shaping a sensory ecosystem that positively impacts its visitors' mental and physical health.

Interaction with nature within the park stimulates cognitive and emotional processes essential for psychological well-being. Exposure to natural settings enhances attention capacity and short-term memory while reducing stress and supporting cognitive recovery. Moreover, the green environment promotes relaxation, lowers cortisol levels, and fosters a sense of connection with the surrounding space.

From a social perspective, Central Park functions as a relational infrastructure. Expansive open spaces such as the Great Lawn and Sheep Meadow encourage spontaneous interaction and a sense of community, counteracting the isolation often associated with metropolitan life. Its accessibility and diverse range of experiences—from woodland trails to playgrounds and relaxation areas—make the park an inclusive space that welcomes and connects people of all ages and backgrounds.



***Figure* 3.19**
A child plays on the big rocks in Central Park
© Andrea Di Cinzio

Finally, the park's diverse environments stimulate the mind, offering spaces suited for individual reflection, creativity, collective engagement, and shared growth. The ability to immerse oneself in ever-changing landscapes, which shi-ft with the seasons and weather conditions, enriches the sensory experience and fosters a deep connection between people and the natural environment. In this sense, Central Park is not merely a green refuge within the urban frenzy—it is an urban mechanism for well-being, actively promoting human flourishing in all its dimensions.



***Figure* 3.20**
The sunsettat The Pond at Central Park
© Andrea Di Cinzio

3.3.6 EAST MIDTOWN GREENWAY

The East Midtown Greenway (EMG) represents a significant transformation of Manhattan's waterfront, addressing one of the last remaining gaps along the East River. This new urban infrastructure, stretching approximately half a mile between East 53rd and East 61st Street, is part of a broader initiative to complete the Manhattan Waterfront Greenway, a pedestrian and cycling route designed to ensure uninterrupted connectivity along the island's perimeter. Its development responds to the growing demand for accessible and sustainable public spaces, promoting an urban design model that integrates infrastructure, environmental resilience, and spatial quality.

Designed by Stantec in collaboration with NYC Parks and NYCDOT, the EMG is conceived as a functional connector and a proper public space elevated over the water, offering new urban perspectives and unique views of the East River. The project incorporates advanced sustainability and climate adaptation strategies, including stormwater management systems and salt-resistant vegetation, contributing to the ecological regeneration of the waterfront. Special attention has been given to users' sensory experience, with landscape and architectural elements carefully designed to enhance psychophysical well-being and social interaction.



Figure 3.21
The East Midtown Greenway Watefront the view at 56th Steet
© Andrea Di Cinzio

The elevated pathway features a pedestrian and cycling promenade with a distinctive hexagonal pavement pattern in white and black, ensuring both safety and spatial continuity while creating a visually striking design. The route connects neighborhoods such as Turtle Bay, Kips Bay, Sutton Place, Tudor City, and Murray Hill, enhancing urban mobility and encouraging a more sustainable use of the waterfront. The highly resilient infrastructure is built on a floating platform, elevated above sea-level projections for 2100, ensuring protection against climate change effects. A passive irrigation system uses rainwater to maintain urban greenery, further reinforcing the project's sustainability.

A distinctive element of the Greenway is Diatom Lace, an environmental artwork by Stacy Levy created in 2023. This installation, featuring microscopic diatoms sculpted in concrete relief, makes an otherwise invisible world perceptible, highlighting the crucial role of these organisms in oxygen production and marine biodiversity. Beyond its symbolic identity, the artwork encourages visitors to reflect on the intricate relationship between the river ecosystem and the urban environment.



Figure 3.22
A detail of the shapes and colours of East Midtown Greenway Waterfront.
© Andrea Di Cinzio

Along the pathway, the project includes multiple rest areas equipped with benches and green spaces for relaxation and social interaction. Scenic viewpoints with ergonomic seating provide a comfortable and immersive visual experience of the river. The infrastructure features a low-impact, energy-efficient lighting system to enhance safety and ambiance during evening hours, creating a welcoming and secure environment.

As a whole, the East Midtown Greenway stands as a model of contemporary urban design. The integration of infrastructure, ecology, and public space quality sets a new standard for waterfront enjoyment. Its development strengthens the city's connection to the river landscape and exemplifies a growing commitment to sustainability and urban well-being.



***Figure* 3.23**
A detail of geometry and shapes of staircase.
© Andrea Di Cinzio

Sensory Features

The East Midtown Greenway exemplifies a design approach that integrates cognitive and sensory dynamics, creating an environment that enhances perception, spatial memory, and overall well-being.

Sight. The interplay of contrasts between the black-and-white hexagonal pavement, the open river views, and the

integration of urban greenery provides visual stimulation that aids wayfinding and fosters an emotional connection with the landscape.

Hearing. The absence of city traffic and the presence of natural sounds—such as the wind, water, and birds—create a calming acoustic environment, reducing stress and improving concentration.

Touch. The materials used, including the textured concrete of Diatom Lace and the wooden seating areas, offer a variety of tactile experiences that enrich the space's sensory perception.

Smell. Including salt-tolerant vegetation, such as trees and shrubs adapted to the waterfront environment, contributes to an olfactory experience connected to nature and the river's marine atmosphere.

Taste. The Greenway's proximity to markets and dining areas allows visitors to complement their journey with food and beverages, enhancing the overall sense of well-being.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The sensory experience of the Greenway is enriched by the presence of water, urban greenery, and tactile materials along the route.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The continuity of the pedestrian and cycling path promotes sustainable mobility, reducing reliance on urban traffic.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The spatial design encourages active use for walking, cycling, and social interaction.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The Greenway offers a seamless and intuitive experience that enhances interaction with the urban and natural environment.

Table 3.11
4E Cognition and Spatial Experience in East Midtown Greenway: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	The Greenway's open design allows users to move freely and choose their own path.
AFFECT	The emotional impact of the environment on people.	The integration of water, greenery, and sustainable design creates a relaxing and rejuvenating atmosphere.
AFFORDANCE	Spatial elements suggest specific behaviors.	The Greenway's design invites people to walk, pause, and socialize in a safe environment.
AUTONOMY	Ability to choose and move freely.	The absence of architectural barriers ensures a smooth experience for users of all abilities.

Table 3.12
4A Framework: Agency, Affect, Affordance, and Autonomy in East Midtown Greenway

Impact on Human Flourishing

The East Midtown Greenway is a model of urban infrastructure that promotes individual and collective well-being by creating spaces that encourage socialization, movement, and a connection with nature. Designed to be accessible for pedestrians and cyclists of all ages, the Greenway ensures high accessibility and sustainable mobility, serving as an alternative to public and private transportation.

One of the project's key elements is its stress-reducing and mental health-enhancing design, achieved through the presence of green spaces, panoramic views, and dedicated movement paths that facilitate the release of endorphins and help reduce anxiety. At the same time, the infrastructure encourages physical activity through its continuous connection to the Manhattan Waterfront Greenway, promoting an active lifestyle and improving urban quality of life.

The Greenway also emphasizes its cultural and environmental value, integrating Diatom Lace into the urban design. This artwork not only enriches the space with public art but also provides an opportunity for environmental education and awareness of marine biodiversity. Additionally, the project fosters a deeper connection with nature by incorporating native vegetation, which strengthens the sense of belonging and positively impacts psychological well-being.

Spaces dedicated to contemplation and social interaction, such as benches, relaxation areas, and scenic viewpoints, are strategically designed to provide opportunities for rest and social engagement, enhancing the area's sense of community and livability.

Ultimately, the East Midtown Greenway is not just an infrastructural innovation—it is a true urban well-being space, enriching the quality of life for city residents and contributing to a more sustainable, inclusive, and resilient city.



***Figure* 3.24**
The East Midtown Greenway Waterfront.
© Andrea Di Cinzio

3.3.7 FOUR FREEDOM PARK

When Louis Kahn was found lifeless in New York's Penn Station in the spring of 1974, he was carrying the final drawings for what would be his last project: the Four Freedoms Park, a memorial dedicated to Franklin D. Roosevelt. This would become the only work of the architect to be built posthumously, completed in 2012, thirty-eight years after his passing.

Situated at the southern tip of Roosevelt Island, the park spans four acres along the East River, offering spectacular views of the Manhattan skyline and the surrounding urban landscape of New York City. The project was conceived as a tribute to Roosevelt's famous 1941 Four Freedoms speech, in which he outlined four fundamental human rights: Freedom of speech, Freedom of worship, Freedom from want and, Freedom from fear.

Kahn envisioned the memorial through a simple yet powerful idea: «*I had this thought that a memorial should be a room and a garden.*»[31] The design revolves around two elements. A garden embodies the human desire to shape and harmonize with nature, while an open room recalls the very origins of architecture— a place designed for contemplation, where individuals can reflect and engage with the shared memories of a community.

The Four Freedoms Park exemplifies Kahn's architectural philosophy, blending monumentality, geometric clarity, and material simplicity. The design follows a strong axial composition, guiding visitors through a choreographed spatial sequence that unfolds with great mastery.

At the entrance, a grand granite staircase introduces visitors to the park's monumental dimension. The journey continues through a trapezoidal lawn framed by two parallel rows of 120 linden trees. This carefully structured vegetal element creates a rhythmic progression, directing the gaze toward

31 Lecture at Pratt nstitute (1973)

the island's southernmost tip, where the memorial's most symbolic space awaits.

The spatial sequence culminates in an open-air room of 27 massive white granite blocks, each separated by a narrow gap of a few centimeters. This space serves as a place of contemplation and remembrance, reinforcing the connection between the individual and the landscape. The granite walls are engraved with excerpts from Roosevelt's historic speech. In contrast, a bronze bust of the president, embedded in a solid granite monolith, presides over the scene with an austere presence.



***Figure* 3.25**
Franklin Delano Roosevelt Statue.
© Andrea Di Cinzio

One of the most striking features of the project is its balance between rigid geometry and fluid nature. The contrast between the organic presence of trees and the solidity of granite, between the vast emptiness of the lawn and the enclosed space of the memorial, creates a continuous dialogue between artifice and landscape. The forced perspective, achieved through the narrowing effect of the lawn and the alignment of trees, enhances the sense of depth and spatial progression.

The Four Freedoms Park is a rare example of a memorial that transcends its commemorative function, transforming into an experiential and timeless space. Louis Kahn's posthu-

mous masterpiece reaffirms his ability to create spaces that resonate with the present and the future, offering an architectural lesson extending beyond physical construction to touch the deepest chords of the human spirit.

As Anthony Vidler observed, for Kahn, «*architecture was above all, and always, an art of the commemorative monument.*»[32]

The Four Freedoms Park is not just a tribute to Roosevelt—it stands as a testament to Kahn's legacy, demonstrating the expressive power of architecture in shaping collective memory and public space.



Figure 3.26
The entrance of Four Freedom Park
© Andrea Di Cinzio

Sensory Features

The Four Freedoms Park is designed to stimulate sensory perception and spatial cognition, offering an immersive experience that engages both body and mind.

Sight. The park's rigorous geometry naturally guides the eye, creating a strong perspectival effect emphasizing the spatial sequence. Light filtering through the granite blocks produces a striking chiaroscuro effect, enhancing the monumentality of the architecture.

Hearing. The sound of the East River's waters, combined with the rustling of the wind through the trees, fosters a meditative atmosphere, reinforcing the sense of isolation from urban noise.

[32] https://www.domusweb.it/it/opinion/2013/03/21/un-parco-per-roosevelt-40-anni-dopo.html

Touch. The smooth, cold surface of the granite contrasts with the softness of the lawn and the delicate texture of the linden leaves, providing a wide variety of tactile experiences that deepen the connection to the space.

Smell. The presence of trees and vegetation introduces an olfactory dimension that shifts with the changing seasons, enriching the park's multisensory experience.

Taste. Located at the heart of the city, the park allows visitors to complement their visit with a culinary exploration of local gastronomy, enhancing the overall experience of the place.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The axial path of the park guides the visitor's movement, fostering an immersive and contemplative spatial experience.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The rigorous and symmetrical design structures the way the visitor explores the space, emphasizing the connection with historical memory.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The experience of the memorial evolves with movement through different sections, from the initial threshold to the open chamber.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Architecture and landscape function as instruments of reflection and collective memory, extending the visitor's experience beyond the physicality of the place.

Table 3.13
4E Cognition and Spatial Experience in Four Freedom Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	The visitor can choose the pace and mode of engagement, alternating between walking, pausing, and contemplation.
AFFECT	The emotional impact of the environment on people.	The monumentality of the design and the contrast between granite and nature evoke a sense of respect, reflection, and connection with historical memory.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park's design invites contemplation, meditative pauses, and the reading of historical inscriptions.
AUTONOMY	Ability to choose and move freely.	The absence of physical barriers allows for free and accessible engagement for all, fostering a fluid interaction with the landscape.

Table 3.14
4A Framework: Agency, Affect, Affordance, and Autonomy in Four Freedom Park

Impact on Human Flourishing

The Four Freedoms Park is not merely a memorial; it stands out as a space that fosters individual and collective well-being through a spatial experience that stimulates reflection, connection with nature, and historical memory. Louis Kahn's design unfolds in a carefully orchestrated se-

quence, inviting visitors on a journey of introspection and contemplation. This spatial progression encourages deep reflection on freedom, history, and the human condition.

The interaction between landscape and architecture has a fundamental role in shaping visitors' sensory and psychological experiences. The balance between natural and artificial elements creates an immersive atmosphere, reducing stress levels and fostering a sense of well-being. Aligned with principles of inclusivity and accessibility, the design meets modern standards, ensuring that the experience remains barrier-free for a diverse audience, both physically and perceptually.

From an urban perspective, Four Freedoms Park serves as a contemporary icon within the New York City landscape, establishing itself as a new landmark that interprets collective memory and deepens the relationship between architecture and the urban community. Its spatial arrangement and natural elements significantly contribute to mental health, offering a setting of tranquility and harmony that helps alleviate stress and promote psychological well-being.

Beyond the individual experience, the park holds social significance, fostering interaction and a sense of community. Open spaces and rest areas encourage meetings and shared experiences, strengthening a sense of belonging and human connection.

Lastly, the Four Freedoms Park serves as a cultural and educational environment, where the memorial and historical inscriptions are tools for knowledge and reflection. This dialogue between past and future stimulates collective awareness, encouraging intergenerational interaction that enriches the shared cultural heritage.



***Figure* 3.27**
Four Freedom Park
© Andrea Di Cinzio

3.3.8 GANTRY PLAZA STATE PARK

Gantry Plaza State Park, located along the East River in the Hunters Point neighborhood of Long Island City (Queens, New York), serves as a landmark project in urban regeneration, transforming a post-industrial waterfront into a public infrastructure of high environmental and social value. Spanning 12 acres (4.9 hectares), the park was built on a site once occupied by shipyards, manufacturing plants, and railroad facilities, elements that continue to define its identity and architectural language.

Opened in 1998 and expanded in 2009, the park was developed in multiple phases by collaborating with renowned landscape architecture firms, including Thomas Balsley Associates and Abel Bainnson Butz (ABB). Its creation is part of the Queens West Development Plan, an ambitious urban renewal initiative to transform the industrial waterfront into a dynamic residential and cultural district.

One of Gantry Plaza State Park's defining characteristics is its strong connection to the site's industrial past. Key historic elements, such as the iconic gantries—large metal transfer structures once used to load railcars onto barges—have been preserved and restored, seamlessly integrated into the park's design. These towering structures now frame the Midtown Manhattan skyline, creating a striking urban panorama.



Figure 3.28
Gantry Plaza State Park view from the Queens Public Library
© Andrea Di Cinzio

Another symbolic landmark is the Pepsi-Cola Sign, a 120-foot (37-meter) long and 60-foot (18-meter) high neon installation originally built in 1939 above the former PepsiCo bottling plant. When the factory closed in 1999, the sign was dismantled and later permanently relocated to the park in 2009. It was officially designated as a New York City landmark in 2016.

The design of Gantry Plaza State Park consists of distinct spaces carefully crafted to enhance the riverfront experience while offering a wide range of urban activities. The park successfully integrates its industrial legacy with natural landscapes and modern infrastructure, creating a multifunctional environment catering to solitude and collective engagement.

The Promontory features a large lawn and a natural shoreline, offering panoramic views of Manhattan's skyline, making it an ideal space for relaxation and social gatherings. North Gantry Plaza is framed by the restored gantries and includes a spacious urban plaza, outdoor cafés, a fog fountain, and game tables. This area serves as a venue for large-scale public events, such as the 4th of July fireworks, accommodating up to 30,000 visitors. South Gantry Interpretive Garden provides a more intimate and contemplative setting, where stone blocks emerge from the water, evoking the site's industrial past and fostering a direct connection to the river. Peninsula Park, with its willow trees and naturalistic vegetation, offers a tranquil retreat designed for light recreational activities and an immersive nature experience. The Waterfront Esplanade extends for 2,100 linear feet, ensuring continuous access to the riverfront while offering a sensory engagement with the aquatic landscape.

In addition to its scenic and contemplative spaces, Gantry Plaza State Park features a sports complex, including a 40,000-square-foot synthetic turf field equipped with bleachers, restrooms, and adjacent picnic areas. This infra-

structure supports outdoor sports and promotes the collective enjoyment of public space.

Through its innovative blend of industrial memory, ecological restoration, and contemporary design, Gantry Plaza State Park has become a model for waterfront revitalization. It fosters community engagement, sustainable mobility, and a dynamic relationship between the city and its riverfront.



Figure 3.29
Pepsi Cola Sign at the Grantry Plaza State Park
© Andrea Di Cinzio

Sensory Features

The spatial experience of Gantry Plaza State Park is strongly influenced by the integration of natural and industrial elements, creating a stimulating environment rich in sensory contrasts.

Sight. The park offers breathtaking views of the Manhattan skyline, framed by restored industrial structures, establishing a visual dialogue between past and present. The arrangement of architectural and landscape elements encourages a layered reading of the space, enhancing the perception of depth and historical memory.

Hearing. The sound of water lapping against the structures, the rustling of the wind through the willows, and the murmur of visitors blend with the distant urban noise, creating a dynamic soundscape that alternates between moments of tranquility and social interaction.

Touch. The variety of surfaces—from the wooden pedestrian paths to the metal of industrial structures and the stone of

the emerging water blocks—offers a diverse range of tactile experiences, enriching spatial perception.

Smell. Natural vegetation and exposure to the river environment create a mix of scents typical of coastal ecosystems, fostering a sense of connection with nature and the site's history.

Taste. The proximity to restaurants and cafés along the esplanade enhances the park experience, allowing visitors to enjoy food and beverages in a scenic and relaxing setting.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The contact with different surfaces, such as wood, stone, and metal, enriches the sensory and physical experience of the space.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The integration of natural landscapes and industrial remnants guides the perception of the site's history and sense of belonging.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Users are encouraged to explore the park, interact with its distinctive elements, and engage in social and recreational activities.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Architectural and natural elements amplify spatial perception and strengthen the connection to historical memory and the river landscape.

Table 3.15
4E Cognition and Spatial Experience in Gantry Plaza State Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can freely explore the park, engaging with both architectural and natural elements.
AFFECT	The emotional impact of the environment on people.	The contrast between industrial structures and the river landscape evokes emotions ranging from contemplation to sensory stimulation.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park's various areas invite socialization, reflection, and physical activity.
AUTONOMY	Ability to choose and move freely.	Seamless accessibility and diverse environments allow for an inclusive experience for visitors of all ages.

Table 3.16
4A Framework: Agency, Affect, Affordance, and Autonomy in Gantry Plaza State Park

Impact on Human Flourishing

Gantry Plaza State Park is an exemplary case of urban regeneration focused on collective well-being. It transformed a former industrial site into a public space of high environmental, social, and cultural value.

From a social perspective, the park has strengthened community bonds, creating a gathering space that welcomes residents and visitors, fosters social cohesion, and promo-

tes cultural and educational activities. The inclusion of public event areas and recreational spaces has established the park as a neighborhood landmark and a model for inclusive public spaces.

From an environmental perspective, the project has reintroduced natural landscape elements, enhancing local biodiversity and improving air and water quality by integrating wetlands and a sustainable drainage system. The area's redevelopment has also reduced flood risks, promoting greater climate resilience.

On a psychological level, the quality of the environment and the diversity of spaces contribute to mental well-being and stress reduction. Open spaces, panoramic views, and the presence of water have been shown to positively affect relaxation and cognitive stimulation, offering visitors an immersive and restorative experience.

In conclusion, Gantry Plaza State Park stands out as a sustainable urban planning project. It successfully combines historical identity, innovative design, and collective well-being, providing a replicable model for the redevelopment of post-industrial urban spaces.

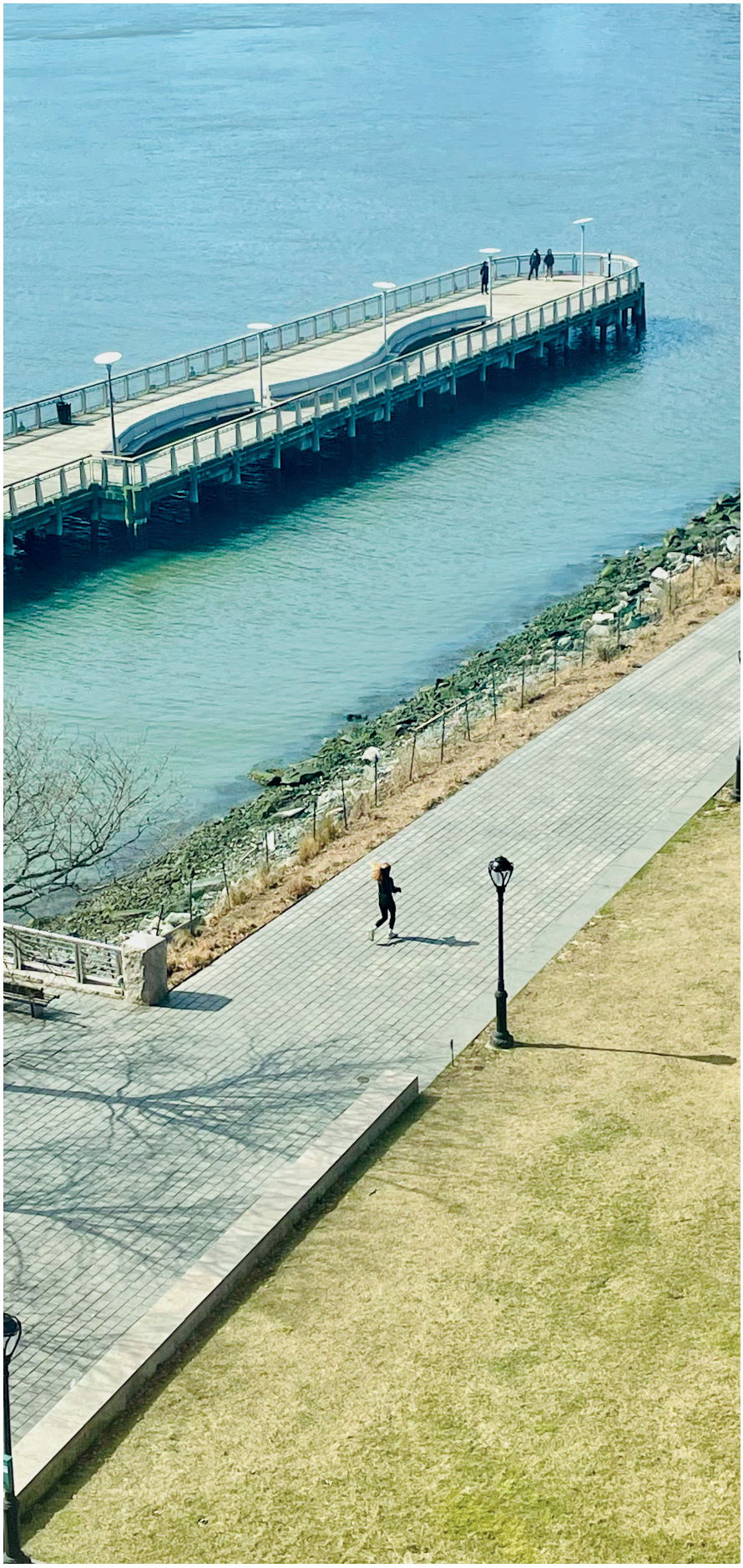


***Figure* 3.30**
A Pier of Gantry Plaza State Park view from the Queens Public Library
© Andrea Di Cinzio

3.3.9 GREENACRE PARK

When thinking of New York, the image often emerges as a chaotic and hyperactive metropolis characterized by a dense urban fabric and continuous sensory stimulation. However, hidden among the skyscrapers of Midtown Manhattan lies a green gem: Greenacre Park, a paradigmatic example of a vest-pocket park designed by Hideo Sasaki in collaboration with *Harmon Goldstone for the Greenacre Foundation* of Abby Rockefeller Mauzé. This biophilic urban acupuncture project demonstrates how small green spaces can significantly impact urban life, providing a sanctuary from the city's frenzy.

Located between 51st Street and Second Avenue, Greenacre Park was inaugurated in 1971 and covers an area of 600 square meters. Despite its small size, it welcomes over 200,000 visitors annually, confirming its status as one of New York's most beloved spaces. Its intelligent and layered design makes it a haven of tranquility and contemplation, effectively shielding visitors from noise, odors, and urban heat through a strategic combination of natural elements such as water, vegetation, and stone.

One of the park's most distinctive features is its ability to offer a hierarchy of environments, each designed to balance prospect (visibility of the environment) and refuge (a sense of protection). The discreet entrance, free from intrusive signage, enhances the element of surprise, inviting visitors into a space of discovery[33]. The park unfolds across three main levels, each with unique characteristics:

The central platform, the largest and most social area, is defined by small tables shaded by a canopy of honey locust trees, which filter natural light. This space encourages social interactions and provides a gentle transition between the urban and natural environments.

Along the ivy-covered western wall, the intermediate level

[33] Appleton, J. (1975).

features a raised wooden deck with a weathered steel pergola. This area offers a greater sense of refuge and a privileged view of the entire park.

The lower level, the park's contemplative heart, is dominated by a 7.6-meter (25-foot) waterfall. Stone seating areas provide a direct view of the cascading water, while lush vegetation and a textured stone relief wall transform the spatial experience into a moment of introspection and tranquility.

Water is the focal point of the design, appearing in various forms and flows. Its path begins with an abstract sculpture at the entrance, where a gentle stream emerges, joining a runnel along the eastern wall, before culminating in the multi-tiered waterfall at the park's northern end. This system creates an aesthetic and auditory impact and regulates the microclimate, lowering surrounding temperatures and generating a natural cooling effect through evaporation.

The sensory experience of Greenacre Park is further enhanced by its non-visual connections to nature: the soothing sound of water, the fragrance of plants, the fresh air from water features, and the rough texture of stone surfaces create a fully immersive and multi-sensory perception.



Figure 3.31
A person relaxes in front of the waterfall at Greenacre Park.
© Andrea Di Cinzio

The park has received numerous awards for its design and social impact, including the BSLA Merit Award in 1986 and

the Landscape Award from the American Association of Nurserymen in 1972. In 2018, it was listed on the National Register of Historic Places, recognizing its exceptional contribution to urban quality of life.

In a constantly evolving metropolis, Greenacre Park underscores the importance of designing public spaces that cater to functional needs and deeper human well-being. Its combination of accessible nature, sensory refuge, and layered spatial quality makes it a model of sustainable micro-urbanism capable of transforming everyday urban experiences.

This small pocket of serenity at 217 East 51st Street, between Second and Third Avenue, is a testament to how landscape design can significantly improve the quality of life in modern cities, making nature an essential component of the urban experience.



Figure 3.32
The raised part of the park with the roof
© Andrea Di Cinzio

Sensory Features

Greenacre Park is an outstanding example of neuroarchitecture-focused design, integrating elements that stimulate the senses and enhance psychophysical well-being.

Sight. The interplay of light and shadow created by the tree canopy and the reflection of water on stone walls adds a sense of dynamism and depth, reducing the visual stress

typical of the urban environment.

Hearing. The continuous sound of the waterfall acts as acoustic masking, softening traffic noise and enhancing the perception of tranquility.

Touch. The variety of surfaces—from the rough stone seating to the weathered steel pergola—provides tactile stimulation, enriching the sensory experience.

Smell. The freshness of water, the aroma of honey locust trees, and the scent of understory plants create an immediate connection to nature.

Taste. Small tables and seating areas allow visitors to enjoy a convivial break, strengthening the positive association between the space and moments of relaxation.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The sensory experience is enhanced by the presence of water, vegetation, and diverse tactile surfaces.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The multi-level structure and natural elements encourage a sense of protection and discovery.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The park promotes dynamic use, offering spaces for both relaxation and social interaction.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The fluid orientation between spatial levels allows for an intuitive and immersive experience.

Table 3.17
4E Cognition and Spatial Experience in Greenacre Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can choose between open areas for socialization and more secluded spaces for relaxation.
AFFECT	The emotional impact of the environment on people.	The combination of water, vegetation, and natural materials creates a calming and regenerative atmosphere.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park's elements suggest specific interactions: the waterfall for contemplation, the seating areas for conversation, and the terraces for rest.
AUTONOMY	Ability to choose and move freely.	The layered design provides a diverse and accessible experience for all.

Table 3.18
4A Framework: Agency, Affect, Affordance, and Autonomy in Greenacre Park

Impact on Human Flourishing

Greenacre Park is not just a green space in the heart of Midtown Manhattan—it is a carefully designed environment that promotes human flourishing, fostering personal

growth and psychophysical well-being. The spatial configuration and integrationintegration of natural elements such as water, vegetation, and stone create an immersive refuge, relieving stress and urban chaos. The constant flow of the waterfall drowns out city noise and creates a calming atmosphere, inviting contemplation and mental restoration.

Beyond promoting relaxation, Greenacre Park enhances productivity and creativity, providing an environment conducive to focus and reflection. The combination of open spaces and more secluded areas allows visitors to adapt their experience to their needs, making it an ideal place for reading, writing, or both individual and collaborative work. The seating distribution and the variety of spatial levels balance stimulation and tranquility, fostering cognitive regeneration.

The park also serves as a hub for social interaction and community cohesion. Its design accommodates diverse uses, enabling both spontaneous encounters and individual retreats. The layout encourages social interaction, while more intimate areas provide opportunities for personal reflection, balancing connection and solitude.

Ultimately, Greenacre Park is a therapeutic environment where the harmonious combination of natural sounds, shaded areas, and tactile surfaces contributes to a holistic sense of well-being. The interplay between refuge and openness, protection and discovery makes this small park a model of public space designed not only to meet urban functional needs but also to address deeper human necessities, offering an experience that intertwines nature, beauty, and quality of life.

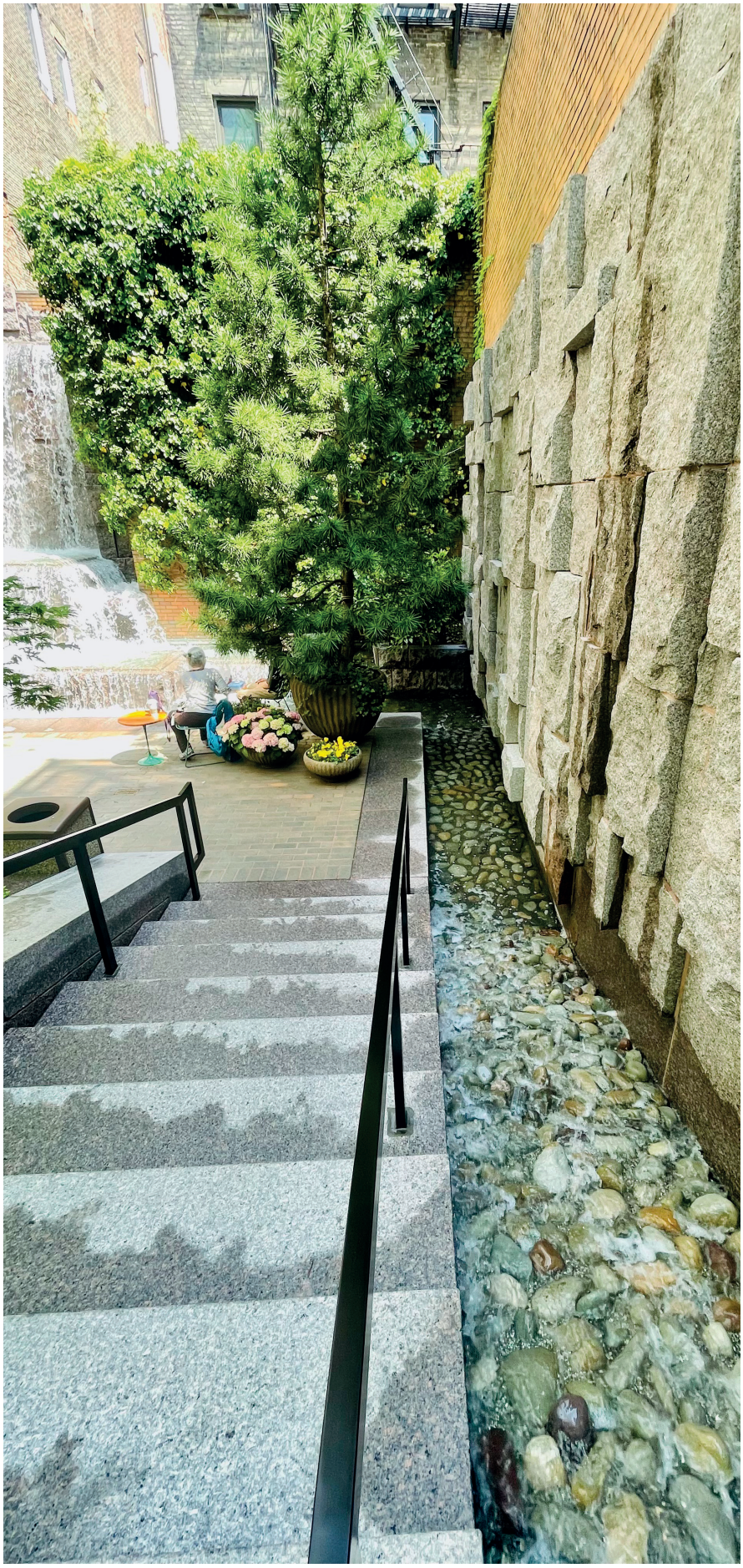


***Figure* 3.33**
The stairs leading to the lower level of the park with the stream
© Andrea Di Cinzio

3.3.10 HUNTER'S POINT SOUTH PARK

Hunter's Point South Park, located along the East River in Long Island City, Queens, is one of the most significant examples of sustainable urban regeneration and climate adaptation. This 30-acre park has transformed a former industrial site into a multifunctional public space, seamlessly integrating environmental resilience, social accessibility, and innovative landscape design.

The project is part of the broader Queens West Development Plan and was completed in two phases. The first phase, completed in 2013, introduced an 11-acre green space with recreational areas and pedestrian pathways. The second phase, inaugurated in 2018, expanded the park with new water management infrastructures and natural refuge areas.

Hunter's Point South Park serves as a recreational and cultural space for the community and a coastal protection system against flooding. Designed by SWA/Balsley and Weiss/Manfredi, in collaboration with ARUP for infrastructure planning, the park integrates flood risk mitigation strategies with a design language that strengthens the connection between the city and its riverine landscape.

Extending along the East River waterfront, the park provides diverse experiences that blend urban and natural elements, addressing the needs of a growing community. Special attention was given to creating gathering spaces, engagement with nature, and flood protection.

At the heart of the park, the Central Green is a versatile open space designed to absorb and manage floodwaters. During extreme weather events, it transforms into a temporary retention basin. In normal conditions, it functions as a public event space and an outdoor recreational area.

The Waterfront Promenade provides a continuous pedestrian route, linking different park sections while maintaining visual and physical connectivity with the East River and

the Manhattan skyline. Along the promenade, rest areas and scenic viewpoints allow visitors to appreciate the landscape and engage with the water's edge.

The park also features the Beach Front and Rail Garden, designed for recreational activities and interaction with the coastal environment. The urban beach offers a relaxing and playful space, while the elevated gardens provide a sensory and educational experience through a curated selection of plant species.



***Figure* 3.34**
A view of a path along the river in Hunter's Point South Park.
© Andrea Di Cinzio

The Wetlands and Causeway play a strategic role in stormwater filtration and biodiversity enhancement. An elevated pedestrian walkway crosses these areas, offering an immersive experience and a unique perspective on the park's wetland ecosystem.

Another defining feature is the Cantilevered Overlook, a suspended platform above the wetlands that offers breathtaking panoramic views of the Manhattan skyline and the river. This architectural element underscores the dialogue between urban space and nature, providing a memorable visual experience.

The park also includes sports and recreational areas, such as athletic fields, jogging paths, a dog park, and children's playgrounds, all designed to promote social interaction and physical well-being.

Beyond its recreational and aesthetic functions, the park is

a model of advanced sustainability, incorporating bioswales, permeable pavements, stormwater filtration zones, and a separate sewer system. These measures mitigate the impact of heavy rainfall and rising sea levels, significantly enhancing the urban area's resilience.



***Figure* 3.35**
A view of a path along the river in Hunter's Point South Park.
© Andrea Di Cinzio

Sensory Features

Hunter's Point South Park offers a rich spectrum of sensory experiences, integrating natural, architectural, and landscape elements that enhance the perception of the urban environment.

Sight. The park's design emphasizes visual connectivity with the river and city, offering a sequence of panoramic perspectives that change based on elevation and pathway orientation. The vegetation, wetlands, and rolling meadows create a sense of depth and visual continuity.

Hearing. The interaction between natural and artificial elements generates a balanced soundscape. The rustling of the wind through trees, the gentle lapping of waves against the shore, and birdsong blend with the distant urban hum, offering a multisensory immersive experience.

Touch. The park provides a variety of tactile surfaces, from the wooden walkways to the stones in the wetland areas

and the sand of the urban beach. This mix of textures encourages direct physical interaction with the surrounding environment.

Smell. The presence of coastal-adapted plant species contributes to various seasonal fragrances, enhancing the sense of relaxation and well-being.

Taste. A café and scenic picnic areas integrate culinary experiences with the landscape, reinforcing a sense of belonging and conviviality.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	Exploring natural and architectural elements fosters a physical connection with the environment.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The organization of spaces and landscape design influence spatial orientation and well-being.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Elevated walkways, wetlands, and riverfront paths encourage active interaction and spatial discovery.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The integration of natural and urban spaces enhances sensory and cognitive perception of the coastal and city environment.

Table 3.19
4E Cognition and Spatial Experience in Hunter's Point South Park: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can choose from various activities, ranging from contemplation to sports.
AFFECT	The emotional impact of the environment on people.	The natural environment and urban landscape provide stimuli that range from relaxation to sensory engagement.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park's spaces invite exploration, social interaction, and engagement with nature trails.
AUTONOMY	Ability to choose and move freely.	Inclusive accessibility and a variety of spaces allow for a flexible and autonomous visitor experience.

Table 3.20
4A Framework: Agency, Affect, Affordance, and Autonomy in Hunter's Point South Park

Impact on Human Flourishing

Hunter's Point South Park is an exemplary public space designed to enhance urban quality of life and provide social, environmental, and psychological benefits.

From a social perspective, the park has strengthened community ties, offering an inclusive and accessible gathering space for residents and visitors. The integration of public event spaces, sports facilities, and relaxation areas has en-

couraged active participation, fostering a stronger social cohesion.

On an environmental level, the ecological urban design has created a resilient system capable of mitigating climate change effects, improving water management, and enhancing local biodiversity. The wetlands and sustainable drainage systems have positively impacted air and water quality.

From a psychological perspective, the park promotes mental and physical well-being. It offers a regenerative environment where nature and architecture merge to create a relaxing, immersive experience. Access to water, green spaces, and panoramic views has been shown to reduce stress levels and improve urban life quality.

In conclusion, Hunter's Point South Park serves as a model for resilient and sustainable public space. It successfully integrates design innovation, climate adaptation, and social inclusion, offering a progressive vision for the future of urban planning.



***Figure* 3.36**
View from under the cover of the bar in the park.
© Andrea Di Cinzio

3.3.11 KOSCIUSZKO POOL

Kosciuszko Pool, located in the heart of Bedford-Stuyvesant, Brooklyn, is a public outdoor pool used during the summer as part of the NYC Parks program. It serves as a vital space for sports and social interaction within the community. Built in 1971 and designed by architect Morris Lapidus, this 230' x 100' x 4' Olympic-size pool, accompanied by a 42' x 52' x 1.5' children's pool, is a significant example of urban sports infrastructure serving local residents for decades.

The pool is named after Thaddeus Kosciuszko (1746–1817), a Polish general and statesman known for his contributions to the American and Polish wars of independence. A trained military engineer, Kosciuszko was recognized for his commitment to freedom and equality. Associating his name with this public pool highlights its role as an inclusive space for the community.

From an architectural perspective, Lapidus designed the Kosciuszko Pool as a comprehensive recreational facility, incorporating swimming and diving pools, children's areas, water sculptures, and a playground. Locals affectionately refer to it as "The People's Pool," reflecting its role as an accessible and welcoming public space.



Figure 3.37
Kosciuszko Pool during the summer.
© Anna Morgowicz

The original design featured a semi-subterranean structure with gradual platforms for water flow, tiered seating leading to a rooftop playground, a sculptural fountain, and tall lighting fixtures to deter vandalism. Many of the construction materials were sourced from the Brooklyn Navy Yard. The

main pool spans 230 feet in length and 100 feet in width and can accommodate up to 3,000 people.

In 2023, the architectural firm Only If proposed extending the pool's usability beyond the summer season. The proposal included a retractable roof, a new indoor aquatic and recreation center on an adjacent lot, landscaping, shading devices, and lighting improvements. The goal was to transform the Kosciuszko Pool into a year-round recreational and social space.



Figure 3.38
Kosciuszko Pool during the summer.
© Anna Morgowicz

Lapidus' design language is characterized by bold aesthetics, featuring vibrant colors like bright yellow and sky blue, which enhance the dynamic atmosphere and make the space visually distinctive. The geometry of the structure, defined by linear and angular forms, is a signature of Lapidus' modernist approach, seen in his other iconic projects. This configuration creates a visual and spatial dialogue between the fluidity of water and the rigidity of architectural forms, establishing a morphological and chromatic continuity between the pool and its surrounding environment.

Sensory Features

The Kosciuszko Pool provides a rich sensory experience shaped by color, form, and sound, creating a public environment dedicated to leisure and sports.

Sight. The vibrant yellow and sky blue colors create a visually stimulating atmosphere, evoking energy and vitality.

The reflective surfaces of the water amplify brightness, generating a dynamic environment that enhances social interaction and psychological well-being.

Hearing. The movement of water, the swimmer's voice, and the surrounding city noise create an active yet rhythmic soundscape. The pool is a decompression space, contrasting the urban chaos and fostering a sense of freedom and sensory immersion.

Touch. The temperature of the water, the smooth surfaces of the pools, and the contrast between the warmth of the concrete and the coolness of the water provide a variety of tactile stimuli, reinforcing bodily perception and connection to the environment.

Smell. The distinctive scent of chlorine, characteristic of aquatic environments, blends with fresh air, trees, and asphalt, creating an olfactory experience that defines the pool as a unique urban recreational space.

Taste. Although the pool does not directly provide taste-related stimuli, nearby food kiosks enhance the overall experience, allowing visitors to enjoy meals and beverages in a setting conducive to socialization and relaxation.



Figure 3.39
Kosciuszko Pool during the summer.
© Anna Morgowicz

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The experience of water, movement through swimming, and interaction with the pool's tactile elements enhance bodily perception.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The use of vibrant colors, geometric layout, and visible surfaces influence sensory experience and spatial orientation.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Swimming, play, and social interaction encourage active engagement with the space.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Free accessibility and inclusive design amplify the pool's role as a social and community hub.

Table 3.21
4E Cognition and Spatial Experience in Kosciuszko Pool: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Water provides an immersive experience that facilitates movement and socialization among users of all ages.
AFFECT	The emotional impact of the environment on people.	The use of bright colors and the multisensory experience of the pool evoke feelings of energy, relaxation, and enjoyment.
AFFORDANCE	Spatial elements suggest specific behaviors.	Different pool areas and gathering spaces encourage play, recreation, and physical well-being.
AUTONOMY	Ability to choose and move freely.	Free access and barrier-free spatial design ensure an autonomous and inclusive user experience.

Table 3.22
4A Framework: Agency, Affect, Affordance, and Autonomy in Kosciuszko Pool

Impact on Human Flourishing

The Kosciuszko Pool is more than just a sports facility; it is a community anchor where social interaction, inclusion, and physical well-being converge. By offering a free and accessible alternative to private recreational spaces, the pool improves residents' quality of life and promotes a healthier lifestyle.

Its public and inclusive nature fosters social cohesion, providing a safe space for people of all ages and cultural backgrounds to interact. Water serves as a medium for connection, breaking down physical and psychological barriers between users.

From a psychological and cognitive perspective, swimming and aquatic activities trigger the release of endorphins, reducing stress levels and enhancing mental health. The vibrant color palette and open spatial configuration encourage exploration and play, making the pool ideal for relaxation

and physical activity.

On an environmental level, a well-designed public facility like the Kosciuszko Pool enhances neighborhood identity, increasing the sense of belonging and improving perceptions of urban space quality. The bold colors and geometric layout reinforce its visual identity, making it a recognizable and iconic landmark.

The Kosciuszko Pool exemplifies how a public space can transcend its functional role, becoming a catalyst for collective well-being and a model for urban design that integrates functionality, aesthetics, and social impact.

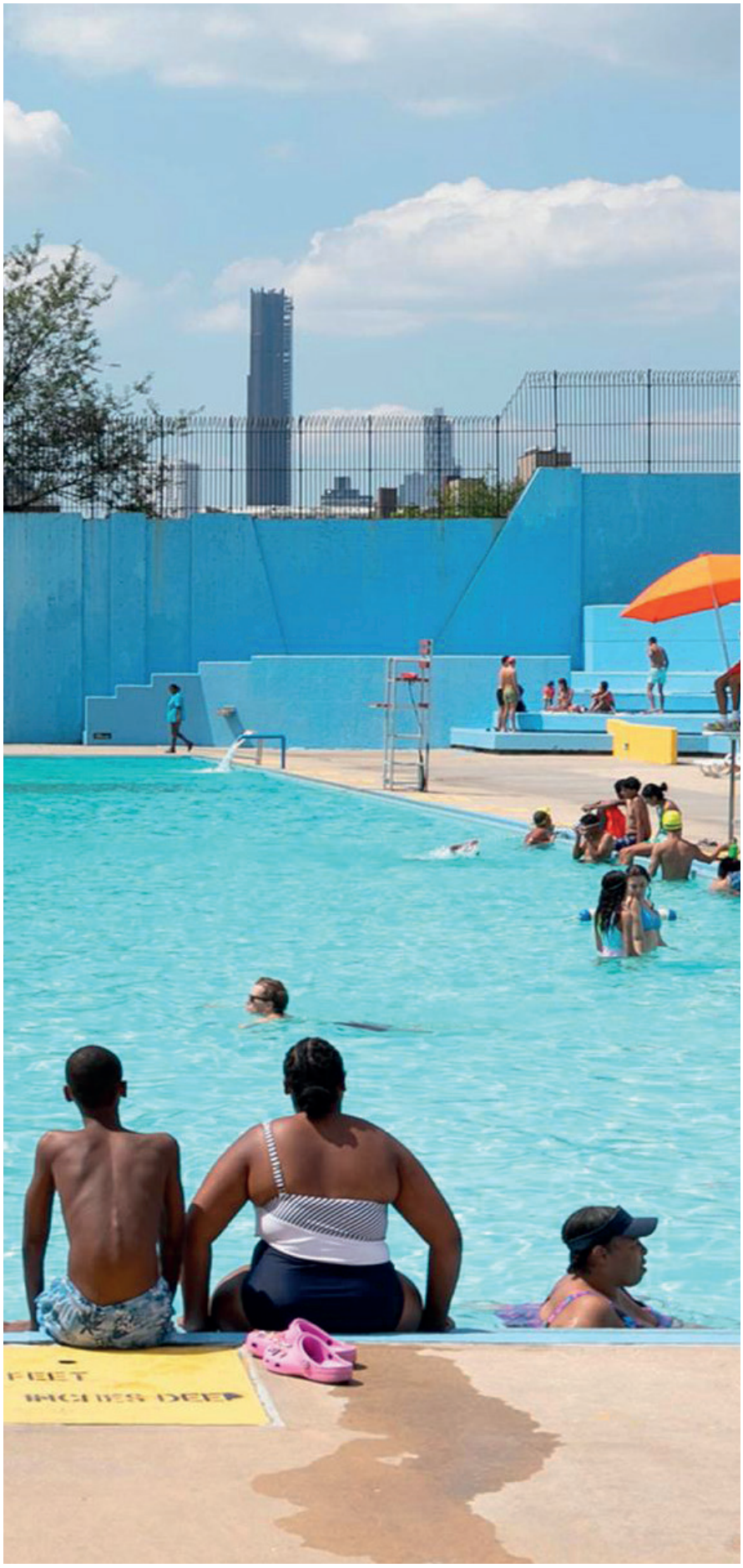


***Figure* 3.40**
Kosciuszko Pool during the summer.
© Anna Morgowicz

3.3.12 LITTLE ISLAND

Little Island, located along the Hudson River in the Chelsea neighborhood of Manhattan, New York City, represents an innovative model of urban regeneration and landscape design. Opened in May 2021, this 2.4-acre artificial island was developed to offer residents and visitors a unique public space that integrates nature, culture, and architecture within a highly dynamic urban environment.

The project was a collaboration between the Hudson River Park Trust and the Diller-von Furstenberg Family Foundation, with Heatherwick Studio leading the design. The goal was to create a public park and outdoor performance space, replacing Pier 54, a historic dock damaged by Hurricane Sandy in 2012. Inspired by the structural remnants of old piers and the wooden pilings emerging from the water, the design reinterprets these elements through 132 prefabricated concrete structures supported by 280 pilings, rising from the Hudson River to form an undulating, immersive landscape.



Figure 3.41
Little Island viewed from the rooftop of Pier 57
© Andrea Di Cinzio

Little Island is distinguished by its unique morphology, blending organic architecture and advanced engineering to create a diverse spatial experience. The island rises between 4.5 and 19 meters above water level at varying elevations, forming a topographically rich environment that defines different park zones. The landscape was designed to evoke

a natural setting, with over 350 plant species, including trees, shrubs, and wildflowers, ensuring seasonal bloom cycles while promoting biodiversity.

The park features winding and curvilinear paths that allow visitors to explore the entire island, offering panoramic viewpoints and moments of discovery. Secondary stone block pathways provide alternative routes, allowing visitors to ascend artificial hills, further enhancing the variety of spatial and perceptual experiences.

Little Island hosts three primary performance spaces:

The Amph: A 687-seat amphitheater designed for concerts, theater performances, and dance shows, with a breathtaking view of the Hudson River and the Manhattan skyline.

The Playground: A central plaza featuring an inclined hill designed for outdoor events and informal performances, accommodating large audiences.

The Glade: An intimate venue with a 200-person capacity, ideal for small-scale performances, interactive shows, and artistic gatherings.



Figure 3.42
Little Island from one of his little hills.
© Andrea Di Cinzio

The park's interactive sound and art installations enhance the sensory experience, encouraging visitor engagement with the surrounding environment. These elements transform a simple walk through Little Island into an immersive journey stimulating perception and creativity.

The nighttime lighting design, developed to minimize light pollution while accentuating the landscape's morphology, also creates a welcoming and atmospheric environment.



***Figure* 3.43**
A little girl plays with the sound installations present in the project
© Andrea Di Cinzio

Sensory Features

Little Island is designed to engage the senses and promote psychophysical well-being through an immersive experience.

Sight. The park's varying elevations provide breathtaking panoramic views of the Hudson River and the Manhattan skyline. The seasonal color variation of the plants and natural light interplay enhance spatial perception, fostering a visual connection between the urban and natural environments.

Hearing. The undulating topography helps buffer urban noise, creating a relaxing soundscape. The rustling of wind through trees, the movement of water, and the calls of birds contribute to a calming and restorative atmosphere. Addi-

tionally, interactive sound installations along the pathways enrich the auditory experience, making the park a dynamic and multisensory environment.

Touch. The variety of materials used in pathways—including wooden surfaces, gravel, and stone—enhances the tactile experience and encourages direct sensory interaction with the surroundings. The stone blocks along secondary trails provide an added layer of physical exploration, allowing visitors to engage with the park's topography more hands-only.

Smell. The abundance of coastal-adapted plant species generates a rich palette of seasonal fragrances, elevating the olfactory experience. The diversity of floral essences creates a continuously evolving scent environment throughout the year.

Taste. Integrated dining areas allow visitors to enjoy food and beverages in an immersive setting, enhancing the convivial and multisensory aspect of the public space.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	Exploring artificial hills, stone pathways, and organic structures fosters direct physical interaction with the space.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The organization of green areas, amphitheaters, and panoramic views influences sensory perception and engagement.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Curved pathways and interactive installations encourage discovery and dynamic exploration of the space.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Architectural elements and landscape solutions enhance the cognitive and sensory experience of the city and the river.

***Table* 3.23**
4E Cognition and Spatial Experience in Little Island: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can move freely between green areas, pathways, and performance spaces.
AFFECT	The emotional impact of the environment on people.	The organic design and panoramic views evoke a sense of well-being and connection with nature.
AFFORDANCE	Spatial elements suggest specific behaviors.	Architectural structures and pathways stimulate social interaction and spontaneous use of the space.
AUTONOMY	Ability to choose and move freely.	Inclusive accessibility and a variety of routes allow for a personalized park experience.

***Table* 3.24**
4A Framework: Agency, Affect, Affordance, and Autonomy in Little Island

Impact on Human Flourishing

Little Island serves as an advanced model of a regenerative public space, enhancing both individual and collective well-being by merging nature, culture, and social interaction. This floating green oasis offers a retreat from the dense urban fabric, allowing visitors to relax, explore, and participate in cultural activities within an engaging and stimulating setting.

From a social perspective, the park promotes inclusivity and accessibility, providing spaces for diverse communities and open cultural programs. The Community Ticketing Programme, developed in collaboration with local educational organizations, distributed over 40,000 free tickets for cultural events in its first year, making Little Island a catalyst for social cohesion and integration.

The project showcases how innovative design and sustainability can coexist on an environmental level. Using durable materials, ecological drainage strategies, and biodiversity-friendly landscaping reflects a commitment to environmental resilience. By elevating the structure above water, sunlight can reach the riverbed, supporting marine flora growth and restoring the river ecosystem.

From a psychological perspective, Little Island's immersive experience fosters mental and physical well-being, reducing stress and enhancing urban life quality. The organic design and diverse spatial configurations offer a flexible environment adaptable to individual needs, from active exploration to contemplative relaxation.

In conclusion, Little Island is an innovative expression of landscape architecture and multifunctional public space, demonstrating how urban design can foster ecological resilience, social inclusion, and human flourishing.

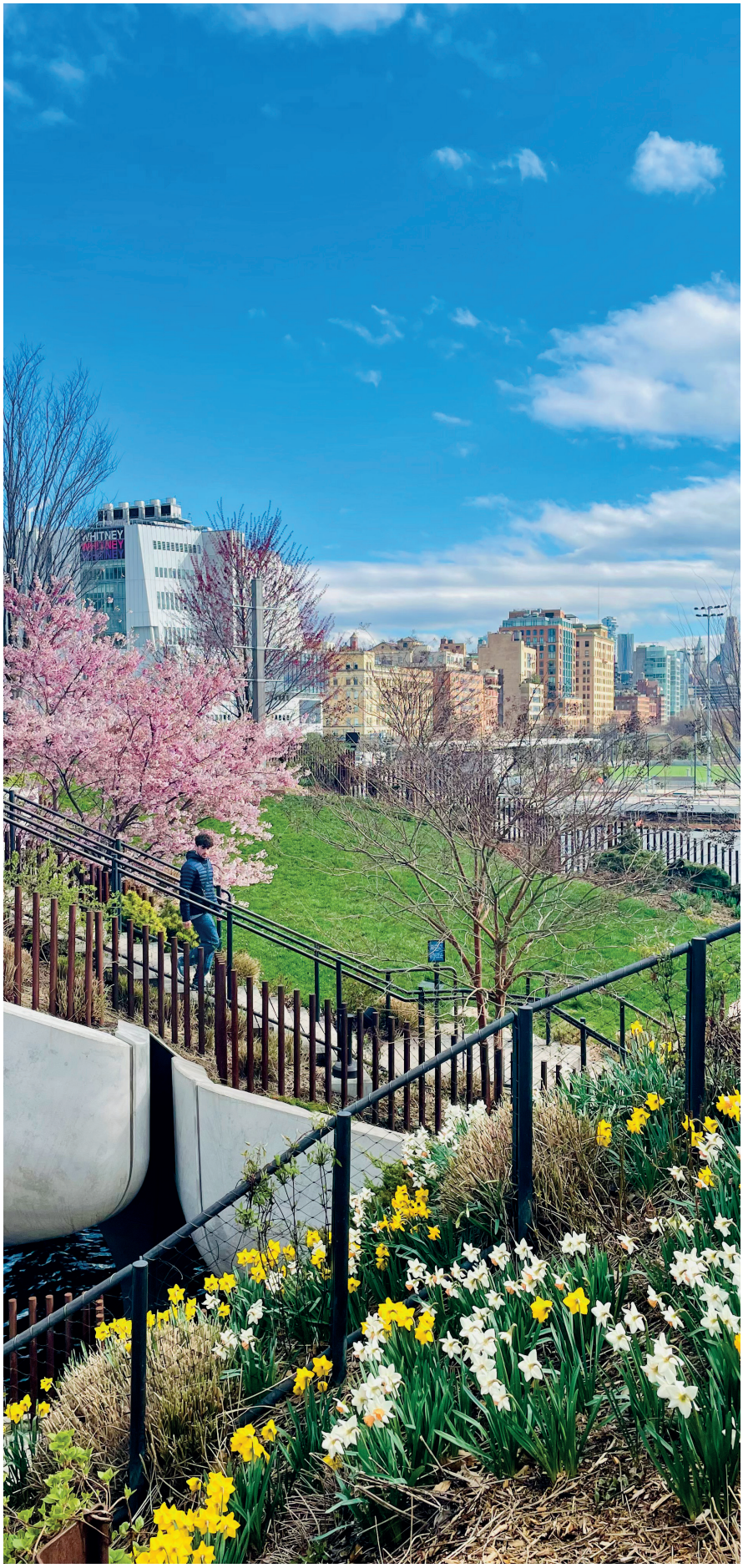


***Figure* 3.44**
Little Island during Spring.
© Andrea Di Cinzio

3.3.13 PIER 26

Pier 26, located in the Tribeca neighborhood of New York City, represents an innovative model of urban redevelopment focused on enhancing native ecosystems and promoting environmental awareness. This 2.5-acre structure, completed in 2020, stands out for its ecological design, which aims to recreate and interpret the region's natural landscape before human intervention. The initiative was developed by the Hudson River Park Trust and designed by the landscape architecture firm OLIN, with the clear objective of providing an immersive experience highlighting the importance of the Hudson River Estuary, one of the world's most ecologically rich environments.

The pier is situated within the Hudson River Estuary, where freshwater from surrounding rivers merges with the ocean's saltwater, creating a dynamic and diverse ecosystem. Pier 26 seeks to interpret this natural environment through a landscape sequence that reflects the original conditions of Manhattan's coastline. The entire project is designed as both an educational and recreational experience, integrating learning pathways, spaces for sports and leisure, and various elements that encourage direct interaction with the riverine environment.

The design of Pier 26 functions as an ecological transect, guiding visitors through five distinct native ecosystems that once characterized Manhattan's shores: the Woodland Forest, the Coastal Grassland, the Maritime Scrub, the Rocky Tidal Zone, and the Hudson River itself. This sequential structure allows visitors to explore the ecological gradient historically defining the city's coastline, offering a unique sensory and educational experience.

Access to the pier begins through the Woodland Forest, a native deciduous forest that provides shade and a welcoming atmosphere, featuring benches and winding paths ideal for a contemplative stroll. Moving forward, the Coastal

Grassland opens up as a breezy expanse filled with herbaceous vegetation and areas designed for recreational activities. The Maritime Scrub introduces a more arid and resilient landscape, with shrubs and conifers adapted to sandy soils and the harsh coastal climate.



Figure 3.45
The Rocky Tidal Zone.
© Andrea Di Cinzio

The Rocky Tidal Zone stands out as one of the most innovative aspects of the project. Located more than 700 feet from the shoreline, this area comprises over 1,300 granite boulders designed to recreate the estuarine habitat, providing shelter for numerous aquatic species. Here, tidal pools have been engineered to retain water throughout tidal cycles, creating micro-habitats for algae, mollusks, and crustaceans. Overlooking this area is the Tide Deck, an elevated wooden walkway that allows visitors to observe the shifting tides and participate in guided tours organized by the park. A defining element of Pier 26 is the Social Deck, an 850-foot-long wooden platform extending beyond the original pier line. Constructed with sustainable Kebony wood, the Social Deck serves as both a scenic walkway and a communal gathering space, incorporating a variety of seating arrangements, from traditional benches to innovative chaise-style seats. The path gradually ascends, offering stunning views of the Hudson River and Lower Manhattan, culminating in

the Viewing Deck, a suspended terrace positioned 13 feet above the water.

At the heart of the project lies a basketball court, distinguished by a vibrant blue net that integrates harmoniously with the pier's aesthetic. Throughout the space, multiple seating areas provide opportunities to relax in the warm spring sun, creating a calming experience for visitors. The pier also includes a multi-use sports field, a large event space, a relaxation zone with hammocks and panoramic seating, and two pavilion structures equipped with swings facing the river.

Future developments include creating an educational estuary and an interactive playground inspired by local river habitats. Through its ecologically driven design, Pier 26 establishes itself as a landmark for sustainable urban recreation, reconnecting New Yorkers with the region's natural heritage while fostering community engagement and environmental stewardship.



Figure 3.46
Sunset on New Jersey from Pier 26
© Andrea Di Cinzio

Sensory Features

Pier 26's spatial experience is designed to engage the senses and foster a direct connection with the natural environment.

Sight. The park's ecological gradient provides a constantly evolving visual experience. From the shaded woodland to the open grasslands and the river's edge, visitors can enjoy diverse landscapes that shift with the seasons. The Viewing Deck offers a privileged vantage point to admire the city and the river in a setting of peace and contemplation.

Hearing. The sound of water breaking against the boulders in the Rocky Tidal Zone, the rustling of the wind through the Coastal Grassland, and the calls of local wildlife create a natural soundscape that contrasts with the surrounding urban noise.

Touch. The variety of materials, from the Social Deck's wooden pathways to the intertidal zone's rocky surfaces, enhances the tactile experience. Contact with natural elements such as water, sand, and stone strengthens the sense of connection with the environment.

Smell. The aroma of native vegetation changes throughout the year, offering an olfactory experience that ranges from spring floral fragrances to the salty estuarine scents of the river ecosystem.

Taste. Although not directly integrated into the pier's design, City Vineyard, a riverside restaurant, allows visitors to complete their multisensory experience with culinary and wine tastings.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The multisensory experience is enhanced by immersion in local ecosystems, allowing visitors to perceive the ecological gradient of the park.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The use of landscape for environmental education fosters more sustainable and conscious behaviors.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Exploration activities and educational installations enable experiential learning related to local ecosystems.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Pier 26 serves as an interface between the urban and natural environment, offering spaces that facilitate reflection and contemplation.

Table 3.25
4E Cognition and Spatial Experience in Pier 26: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can choose how to interact with the environment, from immersive walks to observing aquatic wildlife.
AFFECT	The emotional impact of the environment on people.	The design of the pier evokes a sense of wonder and connection with nature through a sequence of unique landscapes.
AFFORDANCE	Spatial elements suggest specific behaviors.	The park encourages relaxation, exploration, and learning through the diversity of functions and environments.
AUTONOMY	Ability to choose and move freely.	The variety of pathways and spaces allows for a personalized and inclusive experience for visitors of all ages and

Table 3.26
4A Framework: Agency, Affect, Affordance, and Autonomy in Pier 26

Impact on Human Flourishing

Pier 26 is not just an urban park but an ecological laboratory that promotes psychological, social, and environmental well-being. The integration of nature with spaces for social interaction encourages relaxation, creativity, and community connection. The opportunity to explore multiple ecosystems within a single journey increases ecological awareness, educating visitors on the importance of environmental conservation.

From a social perspective, Pier 26 is designed to be accessible and inclusive, providing spaces for people of all ages and mobility levels. Educational events and guided tours enhance the visitor experience, offering opportunities for active learning.

At an environmental level, the park represents a model for ecological restoration, demonstrating how natural habitats can be reintroduced within an urban context. The project has already shown positive effects on the river's ecosystem, with the return of native species and improved water quality due to the recreated habitats.



***Figure* 3.47**
Pier 26 blue basketball court and stairs.
© Andrea Di Cinzio

3.3.14 NATIONAL SEPTEMBER 11 MEMORIAL

The National September 11 Memorial & Museum, located in the heart of Lower Manhattan, stands as one of the most significant contemporary memorials, dedicated to honoring the victims of the September 11, 2001, terrorist attacks and the 1993 World Trade Center bombing. Situated within the World Trade Center Complex, the memorial is a powerful symbol of loss, remembrance, and rebirth while embodying values of resilience and democracy.

The memorial was conceived to commemorate the 2,983 victims, providing a space for reflection and remembrance in a densely populated urban environment. The idea emerged from the World Trade Center Site Memorial Competition, an international design contest launched in 2003 by the Lower Manhattan Development Corporation. Among 5,201 proposals from 63 countries, the winning design was "Reflecting Absence" by architect Michael Arad in collaboration with landscape architect Peter Walker. The project integrates a strong visual impact with a universal symbolic language, effectively conveying the profound sense of loss and collective memory.

The memorial covers an 8-acre plaza embedded within the urban fabric of Lower Manhattan, creating a visual and spatial interruption in the city's landscape. At the heart of its design are two large reflecting pools occupying the original footprints of the Twin Towers. These pools, 9 meters deep, feature the largest artificial waterfalls in the United States, symbolizing the void left by the towers' collapse. The waterfalls create a visually striking effect and generate an immersive soundscape, buffering the urban noise and enhancing the contemplative atmosphere.

Surrounding the pools are 152 bronze panels engraved with the victims' names arranged according to an algorithm called "meaningful adjacencies." This system ensures that names are grouped based on personal and professio-

nal connections, creating a human-centered and collective narrative of the tragedy.

The memorial plaza is enriched by a forest of approximately 400 swamp white oak trees, carefully planted to foster a regenerative and symbolic environment. These trees, selected for their longevity and resilience, transform the memorial into a living landscape, evolving and reflecting the natural cycle of renewal and remembrance.



***Figure* 3.48**
One of the two fountains in memory of the Twin Towers.
© Andrea Di Cinzio

A particularly significant feature of the site is the "Survivor Tree," a Callery pear tree that survived the attacks, was rescued, nurtured, and later replanted in the memorial. This tree has since become a symbol of resilience, representing the capacity for renewal in the face of adversity.

The National September 11 Museum, inaugurated in 2014, is integrated within the complex. Located beneath the memorial plaza, the museum blends seamlessly into the site without disrupting its spatial perception. Its exhibitions include original artifacts from the Twin Towers, audiovisual testimonies, and interactive installations, offering a comprehensive account of September 11 and its global impact.



Figure 3.49
The park of The 11 September Memorial
© Andrea Di Cinzio

Sensory Features

The National September 11 Memorial & Museum was designed to provide an immersive and deeply emotional experience, engaging various aspects of sensory perception.

Sight. The pools' spatial arrangement, the water's reflection, and the vegetation's seasonal variation create a constantly evolving visual landscape, fostering a sense of connection between the past and present. The cascading waterfalls and the contrast between the inscriptions' dark bronze and the water's brightness enhance the perception of depth and absence.

Hearing. The continuous sound of the waterfalls muffles the city's noise, creating a muted, almost meditative environment. The acoustics of the reflecting pools amplify the experience of silence, an essential element for fostering reflection and contemplation.

Touch. The smooth surface of the bronze panels engraved with the victims' names offers a tactile experience, inviting visitors to interact with the memorial physically. The contact with trees and stone surfaces strengthens the connection to the place.

Smell. The presence of diverse vegetation creates a rich

olfactory environment, with fragrances that change with the seasons. In autumn, the golden leaves of the white oaks emit a distinctive scent, while in spring, the memorial is filled with the aromas of blooming plants.

Taste. Although not directly related to the memorial's design, the surrounding areas offer spaces for dining and socialization, allowing visitors to process their experience in a broader urban context.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The tactile surfaces of bronze and stone, along with the arrangement of trees, stimulate physical interaction with the memorial.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The spatial organization of the reflecting pools and greenery influences the perception of memory and contemplation.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The path through the memorial guides a narrative and sensory experience that activates reflection and remembrance.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Symbolic elements, such as the Survivor Tree and the waterfalls, amplify the emotional and cognitive experience of the place.

Table 3.27
4E Cognition and Spatial Experience in National 11 September Memorial & Museum: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can move freely between the reflecting pools, inscriptions, and tree-lined areas.
AFFECT	The emotional impact of the environment on people.	The use of water and greenery creates a meditative atmosphere that evokes deep emotions.
AFFORDANCE	Spatial elements suggest specific behaviors.	The tactile surfaces, waterfalls, and inscriptions encourage physical contact with the memorial.
AUTONOMY	Ability to choose and move freely.	The spatial arrangement allows for both individual and collective experiences of reflection and remembrance.

Table 3.28
4A Framework: Agency, Affect, Affordance, and Autonomy in National 11 September Memorial & Museum

Impact on Human Flourishing

The National September 11 Memorial & Museum is a profound example of a public memorial space where architectural and landscape design become tools for collective mourning and shared remembrance.

From a social perspective, the memorial plays a crucial role in the community's healing process. Its design encourages gathering and public participation, transforming a site of tragedy into a place of resilience and hope.

The spatial arrangement invites reflection, fostering dialogue and intergenerational commemoration.

From a psychological standpoint, the memorial provides a safe space for processing grief and honoring the victims. The design fosters a sense of continuity between past and present, helping visitors navigate trauma through an experience that is both intellectual and emotional.

On an environmental level, the presence of a green ecosystem in the heart of Lower Manhattan improves air quality and contributes to a favorable microclimate. The memorial is not just a site of memory but also a space that integrates harmoniously into the urban fabric, offering ecological and landscape benefits.

Ultimately, the National September 11 Memorial & Museum is a paradigmatic example of how memorial spaces can enhance human flourishing, transforming pain into an opportunity for reflection, learning, and collective connection. The memorial not only honors the past but also looks toward the future, emphasizing the essential role of memory in building a more conscious and resilient society.

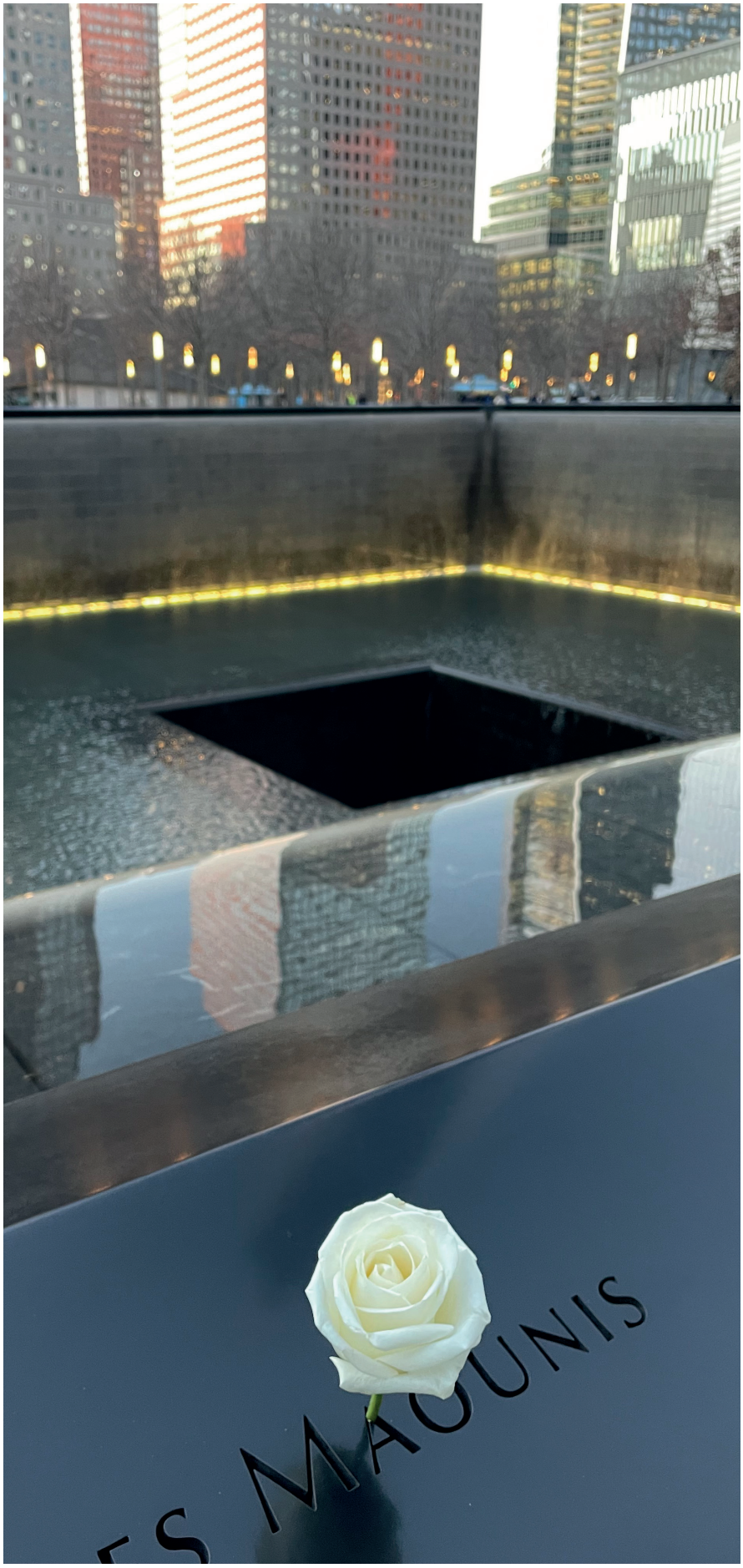


***Figure* 3.50**
A white rose left in memory of one of the victims
© Andrea Di Cinzio

3.3.15 THE HILLS

Governors Island, located in the heart of New York Harbor, has undergone a major urban and landscape transformation that has redefined the concept of public space in a metropolitan setting. As part of the Governors Island Park and Public Space Master Plan, the international firm West 8 designed The Hills, a 10-acre landscape complex introducing a new topography that creates an immersive environment combining recreational functionality, environmental resilience, and aesthetic quality.

The project's goal was to transform a former military base into a place for gathering, reflection, and interaction with the landscape while simultaneously providing natural protection against the effects of climate change. The creation of the hills, which rise to 70 feet above sea level, has radically altered the perception of space, allowing visitors to experience a unique setting within the urban fabric of New York City. The Hills is characterized by an innovative artificial topography that enhances the perception of the landscape, offering 360-degree panoramic views of the Statue of Liberty, the Verrazzano Bridge, the Brooklyn waterfront, and the Manhattan skyline.



Figure 3.51
The view from the Outlook Hill
© Andrea Di Cinzio

The landscape design incorporates sustainable solutions to ensure durability and resilience. The hills were constructed using demolition debris, lightweight pumice, and recycled

materials, reinforced with advanced geotechnical systems to stabilize the terrain and prevent erosion. To complete the project, over 860 trees and 41,000 shrubs were planted, carefully selected for their ability to adapt to the bay's climate conditions and withstand salt exposure.

The space is divided into four thematic hills, each with a distinct identity and purpose:

Grassy Hill is the lowest of The Hills, standing 26 feet (8 meters) high. It serves as a space for relaxation, contemplation, and visual connection with the urban and natural landscape. Strategically located within the park, it offers panoramic views of Governors Island's historic areas and Lower Manhattan's skyline, creating an immersive experience where nature and the city blend. The hill's name reflects its gentle, rolling terrain covered in expansive grassy areas that invite visitors to lie down, unwind, or enjoy social moments in a natural setting. The sloping meadow is designed as a versatile space where visitors can stop to read, have a picnic, or simply relax while enjoying the sea breeze sweeping across the island.

Standing 36 feet high, ***Slide Hill*** is the most playful and dynamic of the four hills. Designed as a space for interaction and movement, it encourages play and active engagement for visitors of all ages. Its defining feature is a set of four slides integrated into the landscape. These slides blend seamlessly with the surrounding greenery, creating a sequence of experiences alternating between moments of physical activity and quiet contemplation.

Discovery Hill, rising 39 feet, is dedicated to contemplation and art. Its defining feature is Cabin, a site-specific installation by British artist Rachel Whiteread, a Turner Prize winner. The artwork, cast in concrete, is a negative imprint of a wooden cabin, evoking the isolated dwellings of New England and the structures of pioneers and explorers. Discovery Hill stands out for its fusion of art and landscape, offe-

ring a space that invites meditation and a deep connection with the surroundings. The pedestrian path that crosses the hill allows visitors to explore the sculpture from different angles, emphasizing the relationship between the artwork and nature. Additionally, the hill serves as a transition point between the park's more dynamic areas and its panoramic observation zones, providing a balanced experience between exploration and quietude.

Outlook Hill, the highest point on the island at 70 feet, offers a unique panoramic experience. Its topography is designed to maximize landscape perception, alternating gentle inclines with scenic stopping points. The layout of curves and paths is designed to create a "conceal and reveal" effect, where the view gradually unfolds as visitors move along the trail. The summit can be reached via two routes:

A gently sloping path that ensures accessibility for all visitors, including those with limited mobility.

Scramble, a hiking-style route made of recycled granite blocks from the island's old seawall. This path encourages visitors to climb the rocks, making the ascent more dynamic and interactive.

One of the project's defining features is the integration of curving and meandering paths, leading visitors on an experiential journey through the park. The combination of main trails and secondary paths allows for a varied exploration of the hills from multiple perspectives. The secondary paths, made of natural stone blocks, provide an alternative route to the summits, offering unexpected viewpoints and angles. The landscape is enriched throughout the journey by interactive sound and art installations designed to enhance sensory engagement and foster a dialogue between nature, art, and urban space. Additionally, several resting areas along the paths provide ideal spots for enjoying the morning sun or simply pausing for reflection in a peaceful natural setting. The design of The Hills incorporates a strong ecological and

climate-conscious component. The elevated terrain helps combat rising sea levels and mitigates the effects of storms, protecting the island's ecosystem and creating a microclimate that supports biodiversity. The vegetation was selected for its resilience to salinity and extreme weather conditions, ensuring the long-term sustainability of a green and adaptable environment.



Figure 3.52
Children climb and play at Slide Hill
© Andrea Di Cinzio

With the completion of The Hills, Governors Island has transformed into an innovative model of urban landscape design, where nature and design merge into a one-of-a-kind experience. The park serves as an open-air laboratory for environmental regeneration, demonstrating how new topographies can redefine the relationship between landscape and public space in a metropolitan context.

Sensory Features

The Hills at Governors Island offers an experience designed to stimulate sensory perceptions and enhance psychophysical well-being through dynamic and engaging spatial design.

Sight. The variety of panoramic viewpoints and the sequence of pathways generate a constantly evolving visual experience. The "design's conceal and reveal" effect guides the gaze toward unexpected vistas, amplifying the sense of discovery.

Hearing. The sound of the wind across the hills, the rustling of leaves, and the movement of water in the bay create a relaxing acoustic environment that contrasts with the city's hustle and bustle. Additionally, interactive sound installations enrich the immersive experience.

Touch. Visitors interact with a variety of natural materials: the roughness of stone, the softness of grass, and the smooth surfaces of wood. Integrating granite climbing blocks and secondary stone pathways invites direct contact with the landscape's elements.

Smell. The vegetation's aromas change throughout the year, offering an olfactory experience that shifts with the seasons, from spring floral scents to the stronger fragrances of resinous plants in summer.

Taste. Rest areas like Grassy Hill encourage convivial activities like picnics and outdoor breaks, strengthening the connection between spatial experience and food-related well-being.



Figure 3.53
The view of Downtown
© Andrea Di Cinzio

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The design of the hills encourages movement, discovery, and direct interaction with natural elements, enhancing psychophysical well-being.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The arrangement of the hills and pathways guides both gaze and movement, creating a gradual and immersive experience of the landscape.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Visitors are encouraged to actively explore the space, play, climb, and engage with artistic installations.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The Hills function as an extension of the perception of the natural landscape, offering an experience that stimulates emotional connection with the environment.

Table 3.29
4E Cognition and Spatial Experience in The Hills: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can choose different paths and ways to interact with the landscape, fostering free exploration.
AFFECT	The emotional impact of the environment on people.	The landscape experience varies between contemplative and active moments, evoking different emotions depending on the hill visited.
AFFORDANCE	Spatial elements suggest specific behaviors.	The hills and pathways invite walking, climbing, sitting, contemplating, or socializing.
AUTONOMY	Ability to choose and move freely.	The design includes accessible routes and more dynamic options, allowing for personalized experiences.

Table 3.30
4A Framework: Agency, Affect, Affordance, and Autonomy in The Hills

Impact on Human Flourishing

The Hills at Governors Island represents an urban well-being model that integrates nature, art, and play to promote human flourishing. The opportunity to explore diverse environments, interact with artistic installations, and enjoy unique panoramic views strengthens the bond between individuals and their surroundings.

From a social perspective, the park has been designed to be inclusive and accessible, offering spaces for people of all ages and abilities. The play areas encourage movement and socialization, while the observation points invite contemplation and relaxation.

On an environmental level, the project demonstrates how landscape design can contribute to urban resilience. The selection of resilient plant species, the landform's ability to mitigate erosion, and sustainable drainage strategies are key elements in ensuring the island's stability in climate change.

Finally, the design of The Hills fosters a multisensory and narrative experience, where movement through space becomes a journey of discovery and connection. This model of regenerative urban landscape represents an innovative example of how landscape architecture can promote human well-being through the fusion of nature, culture, and urban resilience.



***Figure* 3.54**
BIRD MMXXIII, Art Installation by Sheila Berger
© Andrea Di Cinzio

3.3.16 THE HIGH LINE

When rail traffic on the High Line ceased permanently in 1980, the elevated structure became an abandoned infrastructure, suspended between industrial memory and the slow reclaiming power of nature. Nearly thirty years later, this 1.5-mile-long railway viaduct, stretching from the Meatpacking District to the Hudson Rail Yards, was transformed into an icon of urban regeneration—a linear elevated park that has redefined the relationship between decommissioned infrastructure and public space.

Designed by James Corner Field Operations, Diller Scofidio + Renfro, and renowned plant designer Piet Oudolf, the High Line is a model of adaptive reuse that merges landscape, architecture, and environmental sustainability, offering visitors a unique urban crossing experience.

The High Line draws inspiration from the post-industrial atmosphere of its original site, reinterpreting it through an innovative design based on the concept of agri-tecture, a fusion of agriculture and architecture. The project transforms the spontaneous biodiversity that emerged over time into a mosaic of urban microclimates, alternating between sunlit and shaded spaces, wet and dry environments, and windy and sheltered areas.



***Figure* 3.55**
The new High Line extension: the Moynihan Connector
© Andrea Di Cinzio

The paving system consists of prefabricated concrete planks interwoven with patches of spontaneous vegetation, creating a landscape that appears "pathless," allowing visitors to meander freely. The result is a fluid and organic route that responds to the site's characteristics without imposing geometric rigidity.

The entrances to the High Line have been designed to maximize inclusivity and accessibility, with over twelve entry points distributed along the path, some equipped with elevators to ensure universal access. Along the route, visitors encounter several themed areas, including:

The Sundeck and Water Feature (just beyond 14th St.), a relaxation area with wooden lounge chairs and a thin blade of water;

The Open Lawn (23rd St.), a green space designed for leisure and social gatherings;

The Viewing Spur (26th St.) is an elevated platform offering panoramic city views.

The project also has a strong ecological impact: more than 100,000 plants from 1,500 species were carefully selected for their resilience to urban conditions. This suspended garden has become a habitat for numerous species of insects and birds, contributing to the renaturalization of the urban landscape.

One of the High Line's most distinctive aspects is its relationship with public art. The park hosts temporary and permanent installations that enrich the spatial experience and encourage reflection on the intersection of nature, infrastructure, and culture.

One of its most iconic artworks is Old Tree by Pamela Rosenkranz, located at the Plinth at 30th St. and 10th Ave. This 25-foot-tall sculpture, rendered in shades of red and pink, represents a stylized tree, evoking the connection between the human vascular system and the structure of trees. The artwork invites visitors to question the relationship betwe-

en artificial and natural, prompting reflection on the future coexistence of humans and the environment.

These artworks seamlessly integrate into the landscape, making each visit a new experience and strengthening the bond between urban planning, art, and collective memory.

The High Line stands as a sustainable urban regeneration model, demonstrating how an abandoned infrastructure can be transformed into a vital and innovative public space. This intervention reclaimed a neglected area for the city and redefined how we perceive contemporary public spaces. Through its blend of landscape, art, ecology, and social interaction, the High Line inspires cities worldwide, serving as a benchmark for the future of urban design.

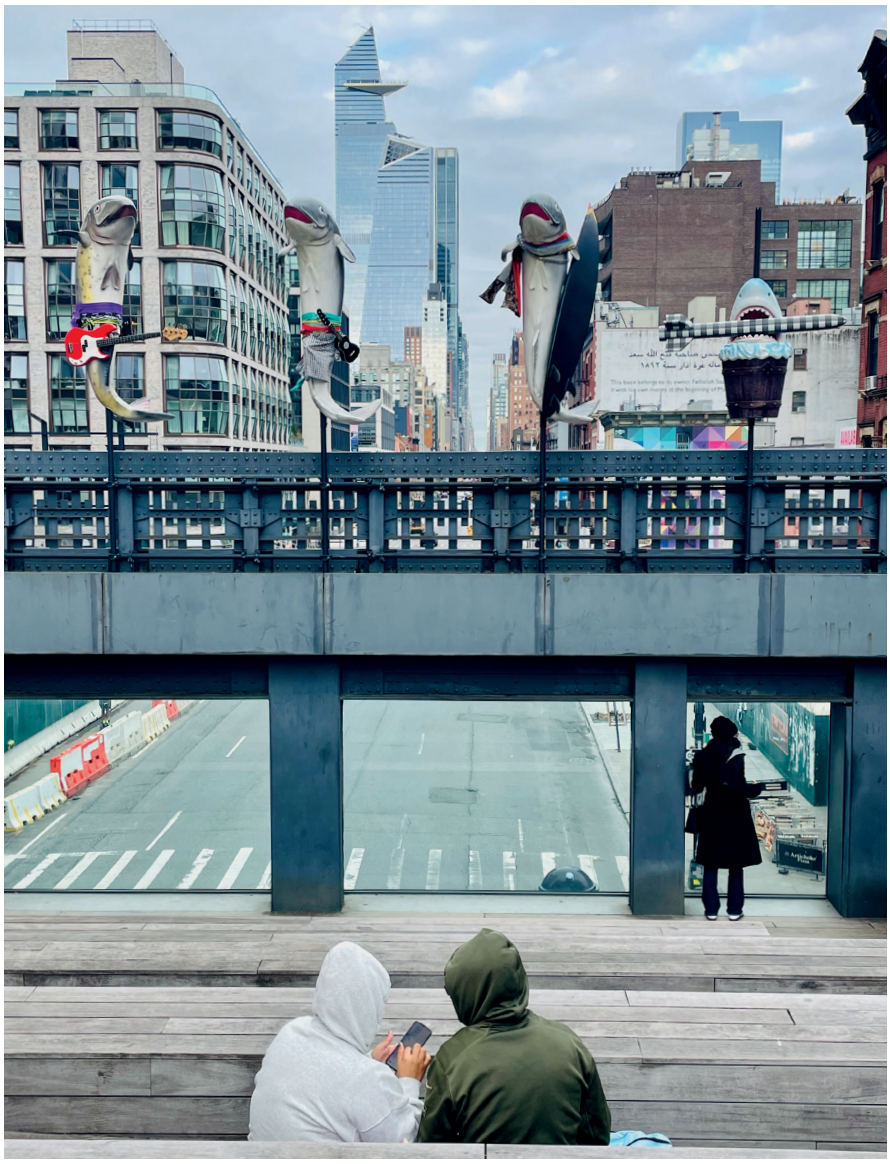


***Figure* 3.56**
Observation deck with an art installation "WHAT IF THEY BARK?" by Cosima von Bonin
© Andrea Di Cinzio

Sensory Features

The High Line offers a deeply immersive experience, stimulating the senses in multiple ways.

Sight. The spontaneous vegetation and the urban skyline create a layered and dynamic landscape. Panoramic views alternate with more intimate glimpses, generating a continuous sense of discovery.

Hearing. The elevated environment minimizes the acoustic impact of street traffic, while the natural sounds of rustling plants and birdsong foster a sense of tranquility.

Touch. The variety of materials, from the pathways' raw concrete to the plants' textures, provides a range of tactile stimuli that make the journey more engaging.

Smell. Aromatic plants and seasonal blooms enhance the sensory experience with fragrances that shift throughout the year.

Taste. Kiosks and food vendors along the route offer local products, contributing to a fully multisensory experience.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The immersive experience of the High Line is enriched by the combination of walking, green perception, and tactile materials.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The elevated pathway reduces the impact of urban traffic, creating a sense of isolation and tranquility within the metropolitan context.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The design of the High Line encourages active exploration through fluid pathways and interactive spaces.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The park serves as an urban decompression space, offering a regenerative pause from the city's hustle and bustle.

Table 3.31
4E Cognition and Spatial Experience in The High Line: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Visitors can choose their own pace and mode of engagement, freely exploring dynamic spaces and observation points.
AFFECT	The emotional impact of the environment on people.	The alternation between urban glimpses and immersion in greenery generates positive emotions, stimulating well-being and creativity.
AFFORDANCE	Spatial elements suggest specific behaviors.	The design invites socialization, contemplation, and exploration through gathering spaces and immersive pathways.
AUTONOMY	Ability to choose and move freely.	The distribution of entrances and the variety of spaces allow for a personalized experience tailored to visitors' needs.

Table 3.32
4A Framework: Agency, Affect, Affordance, and Autonomy in The High Line

Impact on Human Flourishing

The High Line has redefined the relationship between public space and repurposed infrastructure, significantly enhancing individual and collective well-being.

The combination of walking, greenery, and panoramic views reduces stress and elevates mood, fostering a connection with nature in a dense urban environment. The sensation of being elevated above the city's hustle and bustle creates a regenerative sense of detachment, improving daily quality of life.

The park has become a meeting place for residents and tourists, encouraging social interaction and strengthening community cohesion. The variety of spaces, from intimate areas to collective observation points, fosters a sense of belonging and inclusion.

The suspended atmosphere of the High Line, combined with the art installations along the route, promotes reflection and creative thinking. Many visitors describe the experience as a moment of escape and inspiration, even contributing to productivity in their professional lives.

The project has revitalized the surrounding area, attracting new investments and transforming West Chelsea into a cultural and artistic hub. The park's presence has reinforced the local sense of identity, establishing it as a landmark of contemporary urban transformation.

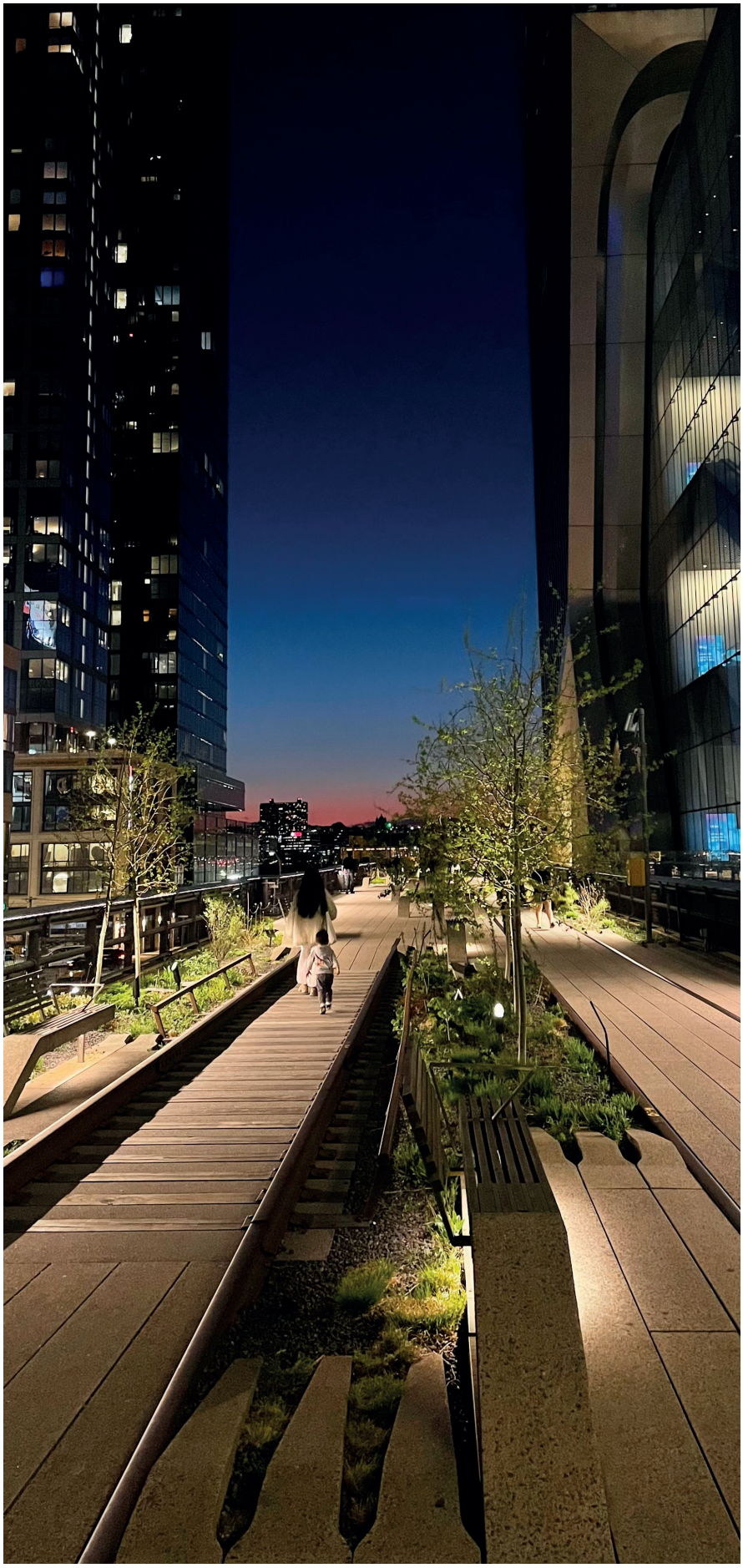


***Figure* 3.57**
The High Line light's system
© Andrea Di Cinzio

3.3.17 TIMES SQUARE

Located in the heart of Manhattan, Times Square is one of the most iconic public spaces in the world. Situated between West 42nd Street and West 47th Street and bordered by Sixth Avenue and Eighth Avenue, this renowned area is known for its massive digital billboards, constant pedestrian flow, and central role in New York City's urban culture. Though smaller than other famous squares like Trafalgar Square or Tiananmen Square, Times Square has gained global recognition over time, becoming a symbol of the city's energy and dynamism.

The history of Times Square dates back to the 18th century when the land belonged to John Morin Scott, a general in George Washington's army. During the 19th century, the area became the property of John Jacob Astor, who leveraged the growing urbanization to develop a significant commercial and hotel district. In 1904, the relocation of The New York Times headquarters to 42nd Street led to officially renaming the square as "Times Square," cementing its status as a hub for information and entertainment.

Throughout the 20th century, Times Square became a focal point of popular culture, home to theaters, concert halls, and luxury hotels. However, from the Great Depression of the 1930s through the urban decline of the 1960s to the 1980s, the square became synonymous with decay and insecurity. In the 1990s, Mayor Rudolph Giuliani initiated a major revitalization plan, eliminating illicit activities, promoting the restoration of historic theaters, and boosting tourism. These efforts transformed Times Square into a safer, more accessible public space.

One of the most significant recent interventions in Times Square's evolution is the urban redevelopment project led by the architecture firm Snøhetta—the project aimed at radically transforming the public space by improving pedestrian accessibility and reducing traffic congestion. The

project doubled the public and pedestrian space, creating a seamless, obstacle-free area from building façade to façade. Snøhetta's approach followed a principle of "selection and subtraction," removing obsolete infrastructure and enhancing the quality of urban space without introducing disruptive elements. The uniform paving and elimination of curbs facilitated pedestrian mobility, while ten 15-meter-long granite benches were strategically placed to manage pedestrian flows and create gathering spaces.

The project also led to significant improvements in safety, with a 40% reduction in pedestrian accidents, a 15% decrease in overall traffic incidents, and a 20% drop in the crime rate in the area. These results demonstrate the effectiveness of pedestrianization and the optimization of public spaces in enhancing urban life quality.



***Figure* 3.58**
The roof of the TKTS ticket office transforming into a space to observe Times Square from above
© Andrea Di Cinzio

Completed in 2017, the project aimed to restore a safer and more accessible pedestrian dimension to Times Square, reducing congestion and improving user experience. The redevelopment plan eliminated raised sidewalks and created a continuous urban surface, removing architectural barriers and ensuring smoother access. Additionally, 2.5 acres of extra pedestrian space were introduced, transforming the famous "Bowtie" – the area between Broadway and 7th Avenue – into a true open-air stage. The integration of 15-meter-long granite benches contributed to managing pedestrian circulation and reducing the overlap between tourists and residents.

According to data collected after the intervention, air pollution decreased, pedestrian accidents dropped by 40%, total traffic incidents declined by 15%, and the crime rate in the area fell by 20%.

Sensory Features

The sensory experience of Times Square is defined by extreme visual and auditory stimulation, significantly impacting users' neurocognitive perceptions. The redevelopment project aimed to balance this perceptual intensity with solutions that enhance the usability of public space.

Sight. Highly intense visual stimuli dominate Times Square. Bright advertising billboards, constant movement of people, and spatial configuration create a dynamic environment that captures attention almost overwhelmingly. Snøhetta's project introduced uniform paving and rest areas to help mitigate visual overload, offering more neutral and restful spaces.

Hearing. The soundscape of Times Square is equally intense, characterized by a constant urban hum, honking horns, and sounds from digital displays. Removing architectural barriers and creating new gathering areas have improved the acoustic experience, allowing users to find slightly more

sheltered areas from the relentless noise.

Touch. The new granite pavement provides a uniform and safe surface for pedestrians, reducing the risk of tripping and falling. The stone benches were designed to offer resting points and enhance the tactile experience of the environment, creating stable surfaces resistant to urban wear.

Smell. The smells of Times Square primarily come from commercial activities and the constant presence of traffic. However, reducing vehicular circulation has improved air quality, decreasing the negative impact of smog and exhaust fumes. Additionally, resting areas allow for greater separation from the most intense emission points.

Taste. The square is surrounded by many restaurants, fast food chains, and food stalls, making the gastronomic experience an integral part of the public space. The improvement of pedestrian areas has made it easier to consume food comfortably without the congestion of vehicles and crowded sidewalks.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The constant movement and pedestrian density create an intense and immersive sensory experience.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The visual and auditory overstimulation influences spatial perception and navigation choices.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	Users are constantly engaged in a dynamic interaction with public space, between digital screens and pedestrian flows.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	Architectural elements and digital media amplify spatial cognition and urban experience.

***Table* 3.33**
4E Cognition and Spatial Experience in Times Sqaure: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Users can move freely and interact with the environment thanks to the pedestrianization of the space.
AFFECT	The emotional impact of the environment on people.	The hyper-stimulating atmosphere generates a strong emotional response, ranging from excitement to sensory stress.
AFFORDANCE	Spatial elements suggest specific behaviors.	Pedestrian surfaces and rest areas invite people to pause and interact with the environment.
AUTONOMY	Ability to choose and move freely.	The removal of physical obstacles allows for smoother and more inclusive access.

***Table* 3.34**
4A Framework: Agency, Affect, Affordance, and Autonomy in Times Sqaure

Impact on Human Flourishing

The intervention in Times Square represents an innovative model for redeveloping hyper-stimulating urban spaces, focusing on quality of life and user well-being. The creation of a continuous pedestrian surface has improved accessibility and safety, making the square a more inclusive and enjoyable place for all demographics.

The project has reinforced Times Square's role as a social gathering space, transforming a congested area into a place where people can consciously pause, observe, and interact with their surroundings. Introducing resting areas and removing disruptive elements have helped reduce sensory overload, improving the overall user experience.

From a psychological and cognitive perspective, the spatial design has facilitated a more natural interaction between visitors and the environment, allowing for moments of pause and recovery from the city's frenzy. The reduction in traffic has also contributed to improved air quality, positively impacting the physical health of frequent visitors.

Finally, the project has demonstrated how an urban area can be reimagined to maximize human flourishing by combining safety, accessibility, and sensory well-being. The success of this redevelopment provides a replicable model for other metropolises, showing how urban design can transform a congested space into a dynamic stage for city life while preserving its historical identity and function.



***Figure* 3.59**
the new Times Square paving
© Andrea Di Cinzio

3.3.18 UNION SQUARE

Located in the heart of Manhattan, Union Square serves as a convergence point for the city's main thoroughfares and a symbol of urban evolution, political activism, and social renewal. This public space, named after the union of two significant roads on the island—Bloomingdale Road (now Broadway) and Bowery Road (now Park Avenue)—has transformed over the centuries into a cultural epicenter and an icon of city life.

Bounded by 14th Street to the south, Union Square West to the west, 17th Street to the north, and Union Square East to the east, the square is home to numerous commemorative statues and monuments, including the famous equestrian statue of George Washington (1856) by Henry Kirke Brown—the first public sculpture erected in New York after American independence—and the Abraham Lincoln monument (1870). The James Fountain (1881) and the Mahatma Gandhi statue (1986) reflect the historical and social character of the space. In addition to being a site of memory, Union Square has served as a focal point for major political movements, from 19th-century labor protests to recent civil rights demonstrations.



Figure 3.60
Union Sqaure
© Andrea Di Cinzio

The history of the square dates back to 1815, when it was conceived as Union Place and later transformed into a park in 1839. In 1871, Frederick Law Olmsted and Calvert Vaux—the designers of Central Park—redesigned the area with a focus on public usability, removing fences and expanding pedestrian pathways to encourage social gatherings. Throughout the 20th century, Union Square underwent several interventions, including the demolition and reconstruction of its southern section in the 1920s to accommodate the construction of the 14th Street subway station. In 1985, the New York City Parks Department developed a new plaza in the park's southern section, while between 2003 and 2009, the northern area was redesigned by Michael Van Valkenburgh Associates to improve accessibility and urban usability.

One of the most significant projects in Union Square's recent transformation is the Union Square North redevelopment, aimed at completing a renewal program initiated in the 1980s by the New York City Parks Department. The park's northern section was elevated and repaved to create a continuous, open surface ideal for gatherings and events. The pavement features asphalt hexagons in two tones, echoing the vertical facades of surrounding buildings and adding dynamism to the square.



Figure 3.61
Evelyn's Playground
© Andrea Di Cinzio

The design also includes two playgrounds divided by age group, ensuring safety and inclusivity for children, with special attention to those with disabilities. Additionally, the area previously occupied by a seasonal food concession has been repurposed into a safe and accessible space, strengthening the connection between nature, social interaction, and recreational activities.

Today, Union Square stands as a model of a continuously evolving public space, capable of adapting to the needs of the city's residents through revitalization projects that enhance its social, political, and cultural functions.

The combination of historical memory and urban innovation makes Union Square an exemplary case study in the design of adaptable, resilient, and community-oriented public spaces.

Sensory Features

Union Square's sensory impact is closely tied to its ability to stimulate the senses and promote an immersive experience. The square's variety of spaces and functions positively influence users' psychological and cognitive well-being.

Sight. The space's openness, the combination of historical and modern elements, and the presence of vegetation create a dynamic visual experience. Geometric paving patterns, building facades, and the park's greenery enhance attention and spatial orientation. Natural light shifts the perception of the square, creating different atmospheres throughout the day and fostering an emotional connection with the environment.

Hearing. Union Square is a complex auditory environment where urban noise blends with the natural sounds of the park. Crowd chatter, street performers' music, and bird calls form a unique soundscape that encourages social interaction. However, traffic from adjacent streets can generate sensory overload, which can be balanced by the possibility

of finding quieter areas within the park.

Touch. The variety of tactile surfaces enriches users' sensory experiences. Stone benches, wooden play structures, and grassy areas provide diverse textures, encouraging physical engagement with the environment. The new paving of Union Square North improves the area's usability, ensuring a safe and accessible surface.

Smell. The square's scents range from urban elements like traffic and market aromas to natural fragrances from the park's flower beds and trees.

This olfactory diversity enhances the multisensory experience, emphasizing the connection between nature and the city.

Taste. The area surrounding Union Square is renowned for its restaurants, food stands, and the iconic Union Square Greenmarket, which offers fresh, local produce. The market plays a key role in the square's sensory experience, integrating taste into the public space's enjoyment.

MODEL	DEFINITION	APPLICATION
EMBODIED COGNITION	The mind and body interact with space through the senses and movement.	The large pedestrian area and the diverse tactile surfaces stimulate movement and body perception.
EMBEDDED COGNITION	The spatial context shapes perceptions and decisions.	The combination of history, modern architecture, and nature influences perception and the sense of orientation.
ENACTED COGNITION	Cognition develops through active interaction with the environment.	The interaction between citizens, events, and markets enhances the experience of active participation in public space.
EXTENDED COGNITION	The environment acts as an extension of the mind and body.	The diversified functions of the square, from green areas to markets, amplify the role of public space as a cognitive and social

Table 3.35
4E Cognition and Spatial Experience in Union Sqaure: The Role of the Environment in Cognitive Processes

MODEL	DEFINITION	APPLICATION
AGENCY	Ability to act intentionally in space.	Citizens can move, pause, and actively engage in urban life thanks to the inclusive configuration of the space.
AFFECT	The emotional impact of the environment on people.	The social energy of the square, combined with green spaces and urban dynamism, positively impacts emotional well-being.
AFFORDANCE	Spatial elements suggest specific behaviors.	Pedestrian areas, markets, and social spaces encourage spontaneous interactions and a sense of community.
AUTONOMY	Ability to choose and move freely.	The flexible design of the square allows freedom of movement and usability for users with different needs.

Table 3.36
4A Framework: Agency, Affect, Affordance, and Autonomy in Union Sqaure

Impact on Human Flourishing

Union Square is an example of a public space that fosters human flourishing. It creates an environment that enhances individuals' overall well-being through multiple dimensions. The square catalyzes social connections, hosting cultural events, political protests, markets, and recreational activities that strengthen the sense of community. The spontaneous interaction between people from different social and cultural backgrounds fosters a sense of belonging and urban solidarity.

The Union Square Greenmarket, for example, is not just an economic and food resource but also a gathering point that encourages dialogue and interaction between producers and consumers. From a mental health perspective, the presence of greenery and the ability to immerse oneself in a more relaxing environment at the heart of the city provides a restorative break from the fast pace of metropolitan life. Studies have shown that green spaces reduce stress, improve concentration, and enhance psychological well-being, making Union Square a strategic location for mental regeneration.

Additionally, the availability of pedestrian areas and playgrounds contributes to physical health, promoting active mobility and spontaneous physical activity. The inclusive design of the square, such as accessible playgrounds, makes Union Square a model of urban equity, ensuring that people of all abilities can actively engage with the space. The adaptability of the space and its continuous transformations demonstrate how urban planning can effectively respond to contemporary social needs, balancing historical memory and innovation.

The evolution of Union Square showcases how a historic area can be transformed to meet modern needs without losing its identity.



***Figure* 3.62**
Tactical Urbanism in Union Square
© Andrea Di Cinzio

4 | PART FOUR
ENVIRONMENTAL PSYCHOLOGY

The chapter Environmental Psychology presents the first of two experiments conducted in this research. It focuses on analyzing the perception of the restorative capacity of public spaces designed by contemporary architects in New York City. The study is based on the principles of environmental psychology, a discipline that examines the interaction between human beings and the built environment, with particular attention to the psychophysical well-being generated by urban settings.

After an overview of the main theories on environmental restoration—Roger Ulrich's Stress Reduction Theory (SRT) and Rachel and Stephen Kaplan's Attention Restoration Theory (ART)—the study introduces the experimental methodology adopted to assess the restorative quality of public spaces. The experiment was based on the Perceived Restorativeness Scale (PRS/IT), a psychometric tool developed to measure the perceived restorative potential of environments.
The analysis involved a sample of 99 Italian participants, who evaluated 18 public spaces in New York City, divided into six typological categories: squares, parks, waterfronts, streets, greenways, and playgrounds. Participants watched immersive videos of each location, featuring images and sounds recorded on-site. Subsequently, they completed the PRS/IT questionnaire, which measures four key factors of restorativeness: Fascination, Being-away, Coherence, and Compatibility.

The study highlights the importance of integrating natural elements into public space design and demonstrates that well-conceived urban spaces can generate restorative effects comparable to those of natural environments. The findings provide valuable insights for future design strategies aimed at enhancing users' psychophysical well-being.

4.1 MIND REACTS TO THE ENVIRONMENT

Imagine you are out with a group of friends in a place you are unfamiliar with—a new city or neighborhood—and looking for a public space to relax and spend some time outdoors. If you are in an area with multiple public spaces, you will likely choose the one that appears the most inviting: it might look more pleasant, have more greenery, offer more benches to sit on, or be located near an area where you can grab a bite to eat.

As you enter the chosen public space, you begin to notice sensory details that shape your experience: the scent of flowers and aromatic plants filling the air, the sound of leaves rustling in the wind, and the chirping of birds hidden among the branches. You realize how these elements influence your mood and perception of the place, making it feel more welcoming and enjoyable.

As you walk through the space, you and your friends start sharing observations: "This place is so relaxing," "I love the sound of the water," or "I really like the combination of nature and architecture." The presence of light and shade, the arrangement of pathways and seating areas, and the interaction between natural and artificial elements all contribute to your evaluation of the place. If the environment is particularly well-designed and well-maintained, you might even feel a sense of belonging or identification with it.

This experience reflects a common process in decisions about staying in public spaces: environmental perception influences our decision to linger there, and sensory stimuli, spatial quality, and opportunities for social interaction play a fundamental role in determining the level of well-being that results from it.

The role of Environmental Psychology is precisely to study the interaction between humans and the built and natural environment, analyzing how spaces impact behavior,

emotions, and psychophysical well-being. This discipline officially emerged in the 1960s as a subfield of psychology, responding to increasing urbanization and concerns about the negative effects of urban environments on mental health. The first studies in this field were conducted by psychologists such as Egon Brunswik[1] and Kurt Lewin[2], who explored the role of environmental context in human perception and behavior. Later, scholars like Roger Ulrich and Stephen Kaplan developed key theories emphasizing the restorative value of nature in enhancing attention and reducing stress.
In recent decades, scientific interest in the effects of the urban environment on mental health has grown exponentially. Recent studies have shown that contact with nature can positively impact psychological well-being, reducing stress levels and improving cognitive abilities[3] [4].
Research conducted by the *Max Planck Institute for Human Development* has demonstrated that walking in a natural environment can reduce brain activity associated with stress compared to walking in a high-traffic urban setting.[5] Elements such as parks, vertical gardens, and public spaces incorporating natural features could provide opportunities for cognitive restoration and stress reduction[6]. Recent studies have also demonstrated that well-designed public spaces integrating natural elements can have restorative effects comparable to those of natural environments[7], reinforcing the importance of an interdisciplinary approach that combines architecture, environmental psychology, and neuroscience.

1 Brunswik, E. (1943) Brunswik introdusse il concetto di "probabilità ecologica" e l'importanza del contesto ambientale nel comportamento umano.
2 Lewin, K. (1951) Lewin sviluppò la teoria del campo, sottolineando come l'ambiente fisico e sociale influenzi il comportamento umano.
3 Bratman, G. N., Daily, G. C., Levy, B. J., & Gross, J. J. (2015)
4 Bortolotti, A., Cannito, L., Anzani, S., Rossi, M., & Palumbo, R. (2022)
5 Sudimac, S., Sale, V. & Kühn, S. (2022)
6 Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014)
7 Stigsdotter, U. K., Corazon, S. S., Sidenius, U., Kristiansen, J., & Grahn, P. (2017)

4.2 KAPLAN VS. ULRICH

When referring to theories on the restorative capacity of spaces in psychology, it is essential to mention the contrast between the scientific methodologies of the two main theories on the restorative capacity of green spaces: the Stress Reduction Theory (SRT) by Roger Ulrich and the Attention Restoration Theory (ART) by Rachel and Stephen Kaplan. Both theories are based on an evolutionary premise, suggesting that humans, having evolved in natural environments, are more adapted to contact with nature than urban settings.

Stress Recovery Theory

The Stress Reduction Theory (SRT), developed by Roger Ulrich in 1991, is based on the idea that exposure to natural environments can reduce psychophysiological stress. According to this theory, viewing natural landscapes induces an automatic stress-reduction response, improving mood and lowering anxiety and tension levels. Ulrich argues that exposure to natural elements positively stimulates the autonomic nervous system, reducing blood pressure, heart rate, and cortisol levels[8]. Ulrich conducted numerous studies, particularly in hospital settings, demonstrating that patients with views of green spaces recover faster than those with views of urban environments[9].

The mechanisms through which the natural environment influences psychophysiological well-being are interrelated. Nature triggers an automatic relaxation response, generating an immediate and unconscious state of psychophysical relief. This phenomenon is supported by the Biophilia Theory[10], which suggests humans have an innate predisposition to respond positively to natural environments. Exposure to natural settings significantly reduces stress, promoting mood improvement and decreasing anxiety and emotional

8 Ulrich, R. (1983)
9 Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991)
10 Wilson, E.O. (1984)

tension. This effect is extensively documented in the Stress Reduction Theory[11], which argues that natural environments facilitate psychological recovery by lowering cortisol levels, the hormone associated with stress responses. The presence of natural elements produces measurable physiological effects, such as lower blood pressure and heart rate. Studies in environmental psychophysiology have demonstrated that spending time in green spaces regulates autonomic nervous system activity, increasing parasympathetic activity and reducing physiological activation linked to stress[12] [13]. These mechanisms highlight the crucial role of nature in promoting psychophysical well-being, emphasizing the importance of integrating natural elements into urban design to foster restorative experiences in public spaces.

Attention Restoration Theory

The Attention Restoration Theory[14] (ART), developed by Rachel and Stephen Kaplan in the 1980s, proposes that exposure to nature helps restore people's attention capacity. The theory is based on the distinction between involuntary attention (captivated by intrinsically interesting stimuli) and voluntary attention (directed by cognitive processes). Through its "soft fascinations" (e.g., clouds, rustling leaves), nature allows for the recovery of directed attention, which becomes fatigued through daily activities, thereby reducing cognitive fatigue.

The processes through which natural environments promote cognitive recovery are interconnected. The concept of soft fascination refers to natural stimuli that capture attention spontaneously and non-intrusively. Elements such as leaves moving in the wind, the sound of water, or variations in landscape colors create gentle sensory engagement, whi-

11 Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991)
12 Kaplan, R. & Kaplan, S (1989)
13 Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014)
14 Kaplan, S. (1995)

ch does not overload cognitive resources and allows for a fluid and restorative perceptual experience. This process facilitates attentional recovery, helping restore cognitive abilities and regenerate concentration. In particular, natural environments provide distance from highly directive and cognitively demanding urban stimuli, offering a setting where the mind can rest and regain energy. Exposure to natural spaces facilitates transitions through different cognitive states, stimulating reflection and mental recovery. This process shifts individuals from direct and effortful attention to a state of more spontaneous and immersive attention, promoting cognitive restoration, enhanced introspection, and creative thinking.

These mechanisms confirm the essential role of green spaces in improving cognitive functioning, suggesting the need to strategically integrate them into urban planning to support mental well-being and enhance the quality of user experience.

	ATTENTION RESTORATION THEORY (ART)	STRESS RECOVERY THEORY (SRT)
MAIN MECHANISM	Recovery of fatigued attention	Automatic relaxation response
KEY FACTOR	Cognitive fatigue	Psychophysiological stress
RESPONSE TYPE	Progressive and requires prolonged exposure	Immediate and automatic
MAIN EFFECT	Restoration of concentration and improvement of cognitive functions	Restoration of concentration and improvement of cognitive functions
DURATION OF EXPOSURE REQUIRED	Long for optimal effects	Short, with immediate benefits
MAIN APPLICATIONS	Environments that promote focus and creativity (schools, offices, libraries, public spaces)	Spaces designed to reduce stress and promote psychophysical recovery (hospitals, parks, waterfronts)

Table 4.01
Main Characteristic between ART and SRT.

The debate between Kaplan and Ulrich should not be interpreted as a rigid opposition between two irreconcilable perspectives but rather as a dialogue highlighting their approaches' complementarity. Both theories converge on the

idea that natural environments positively impact human well-being, yet they differ in the mechanisms they propose to explain these effects.

Kaplan and Kaplan's Attention Restoration Theory (ART) emphasizes the need to restore cognitive resources. It highlights how prolonged exposure to nature allows for the recovery of directed attention, which is often overloaded by the demands of urban environments and daily activities requiring high levels of concentration.

In contrast, Ulrich's Stress Reduction Theory (SRT) focuses on the immediate physiological and emotional relaxation response triggered by natural environments, reducing stress and modulating physiological parameters such as blood pressure, heart rate, and cortisol levels. While Kaplan's theory is more long-term, emphasizing the gradual recovery of cognitive abilities through attentional processes, Ulrich's perspective focuses on the immediate effects of nature in providing psychophysiological relief in response to stress-inducing situations.

Although distinct, these two approaches provide a solid foundation for understanding how public and natural spaces can be designed to promote human well-being more effectively. Integrating both perspectives into urban and landscape planning allows for creating environments that support cognitive restoration through non-intrusive attentional stimuli and offer immediate refuge from daily stress. Designing spaces that consider both dimensions—cognitive recovery and physiological stress reduction—can significantly enhance urban quality of life, making the public space experience more balanced and responsive to individuals' psychophysical needs.

4.3 PRS/IT EXPERIMENT

The method chosen to assess the restorative capacity of public space in the first phase was based on the Perceived Restorativeness Scale (PRS), a widely used psychological tool in environmental and environmental psychology studies. This scale evaluates how an environment is perceived as restorative and its ability to restore cognitive, emotional, and physical capacities, contributing to human flourishing within public spaces.

The PRS[15] was developed as a questionnaire comprising 26 items designed to measure an individual's perception of five key restorative factors. The frequency and intensity of these factors determine the level of an environment's restorative capacity. Therefore, the fundamental determinants of restoration are expressed as follows.

- ***Being-Away*:** For an environment to be restorative, it must provide a sense of being away, achieved through a change of scenery and an escape from certain aspects of everyday life, such as distractions, obligations, goal-seeking, and persistent thoughts. It involves distancing oneself from unwanted distractions in the surrounding environment, stepping away from usual work-related cues, and suspending the pursuit of specific goals[16].
- ***Fascination***: Also referred to as "effortless attention," this is considered the primary component of a restorative experience. People naturally respond with involuntary attention or fascination[17] to natural environments, which is the key process for recovering from mental fatigue[18]. Fascination can be directed toward specific contents and events and can also engage individuals in exploration and meaning-making processes within an environment. It may vary in pleasantness and intensity while also having

15 Hartig, T., Kaiser, F. G., & Bowler, P. (1997)
16 Kaplan, R. & Kaplan, S (1989)
17 Kaplan, S. (1995)
18 Berto, R. (2005

functional dimensions.

- ***Coherence*:** refers to the physical or conceptual consistency of an environment, which supports exploration and interpretation. A coherent environment is perceived as a structured whole with an overarching organizational framework that enhances understanding and navigation.
- ***Scope*:** relates to environmental characteristics extending across time and space, making the environment perceived as enterable and suitable for spending time within.
- ***Compatibility*:** refers to the alignment between the environmental support for intended activities and an individual's personal inclinations, ensuring that the space effectively meets its users' needs and preferences.

The PRS tool has demonstrated validity and reliability across different cultural and environmental contexts. A study confirmed the factorial structure of the PRS in Italian and Swedish samples, highlighting its robustness as a cross-cultural measurement instrument[19].

However, in its Italian version, there is no common consensus regarding this five-factor factorial structure. In this specific case, reference is made to the psychometric properties of the Italian version of the PRS (PRS/IT), analyzed by Margherita Pasini and Rita Berto[20].

Through a study involving a sample of individuals across three different age groups (ranging from 19 to 93 years old) and the evaluation of ten different environments (both natural and artificial), the research demonstrated that the four-factor solution is the most statistically solid, incorporating the "Scope" factor into a broader dimension[21].

19 Pasini, M., Berto, R., Brondino, M., Hall, R., & Ortner, C. (2014)
20 Pasini, M., Berto, R., Scopelliti, M., & Carrus, G. (2009)
21 Ibidem.

Unlike previous studies conducted using the PRS, this study is the first of its kind to investigate the perceived restorative capacity of public spaces designed by contemporary architects.

It is interesting to note that recent studies have explored the interaction between these factors. For example, a study found that "Coherence" and "Compatibility" are particularly significant in urban environments, suggesting that the design of public spaces should focus on these aspects to maximize restorative potential.[22]

The presence of nature in urban environments can significantly influence the perceived restorative effect on human experience. Previous studies have compared urban settings with and without green spaces, highlighting that urban green spaces are perceived as more restorative than urban areas without vegetation[23] [24]. Other research using images of various urban and natural environments found that natural environments are more restorative than urban ones[25].

This study compares six different types of public spaces among the 18 analyzed. In particular, the design choices and variables of four contemporary public spaces will be examined. The dichotomy between urban and natural environments is becoming increasingly blurred. An innovative study demonstrated that well-designed urban environments integrating natural elements can have restorative effects comparable to purely natural environments[26]. This finding suggests that the strategic integration of natural elements into the urban fabric could be an effective solution to enhance well-being in high-density cities.

This comparative analysis of various contemporary public

22 Martínez-Soto et al. (2014)
23 Hartig, T., Kaiser, F. G., & Bowler, P. (1997)
24 Lee, Andrew & Jordan, Hannah & Horsley, Jason. (2015)
25 Purcell, T., Peron, E., & Berto, R. (2001)
26 Stigsdotter, U. K., Corazon, S. S., Sidenius, U., Refshauge, A. D., & Grahn, P. (2017)

spaces provides a unique opportunity to explore how different design choices influence the perception of restorativeness. It will be particularly relevant to examine the interaction between urban design elements and the factors of the Perceived Restorativeness Scale (PRS), offering valuable insights for future urban design guidelines focused on psychophysical well-being.

4.3.1 RESEARCH QUESTION

Based on a critical literature review, I developed a targeted investigation to address a gap in evidence-based research. Currently, no comparative studies analyze the role of different compositional configurations in contemporary public spaces. Specifically, the relationship between color, geometry, and the perception of restoration in built environments has been underexplored.

An analysis of 18 contemporary public spaces in New York was conducted to address this need, classifying them according to a taxonomy of six typologies based on their compositional characteristics. This study proposes a comparative analysis using the Perceived Restorativeness Scale (PRS) questionnaire to examine its restorative impact on users.

While much of the previous research has primarily focused on the restorative effects of natural environments, this study extends that perspective to contemporary urban architecture, responding to recent calls in the literature for a deeper investigation of the psychological effects of urban design[27].

How do different compositional configurations of contemporary public spaces influence users' perception of restoration? More specifically, how do the 18 participants interact with the identified public spaces, and how does the presence of natural versus artificial elements shape their perception?

27 Ibidem.

This research question is grounded in a growing body of studies highlighting the influence of visual elements in the built environment on psychological well-being[28].
Extending these concepts to contemporary public spaces aims to provide practical tools for designers, contributing to a more conscious and user-centered approach to public space design.
Additionally, this study seeks to explore whether there are gender differences in the perception of restoration in public spaces, examining how men and women may experience and interpret urban spaces differently. Another key area of investigation concerns the role of educational and professional backgrounds: in particular, the study aims to understand whether and how architects and non-architects perceive the restorative quality of public spaces differently, considering the influence of design expertise and aesthetic sensitivity.
Finally, the research compares the relative restorativeness of public spaces along the riverfront versus those inland to determine which contexts are more restorative.

4.3.2 PARTICIPANTS

For the Perceived Restorativeness Scale—Italian version (PRS/IT) test, a sample exclusively composed of native Italian speakers was selected. The decision to include only native speakers ensured full linguistic and cultural comprehension of the questionnaire statements, thereby preserving the validity of the results.
The sample was divided into six age groups (18-25; 26-35; 36-45; 46-55; 56-65; 66-75 years) to analyze generational differences in the perception of public space qualities. Additionally, gender variables were considered, including the options male, female, other, and prefer not to say, ensuring an inclusive and respectful approach to diversity.

28 Akers, J., Béal, V., & Rousseau, M. (2020)

The test was administered to both architects and non-architects, as the study aimed to examine whether and how professional training influences the perception of architect-designed public spaces. This choice explores potential differences in evaluating restorative aspects of spaces between those with design expertise and those experiencing them as everyday users.
The study involved 122 participants, all of Italian nationality. Before answering the questionnaire, each participant watched a video created for the 18 public spaces analyzed. However, only 99 participants were deemed eligible for analysis, as 23 individuals either did not complete the test or failed to answer control questions correctly, compromising the validity of their responses.

4.3.3 MATERIAL

For the experiment, videos were created using a sequence of four photographs, each repeated twice for a duration of 7 seconds, resulting in a total video length of 56 seconds per space. Each video included an audio track of the same length (56 seconds), recorded directly in the respective public space, ensuring an immersive experience that closely aligns with the perceptual reality of each location analyzed.
Participants were advised to remain quiet and noise-free while watching the video and responding to the questionnaire. Additionally, they were encouraged to use headphones to enhance immersion and engagement with each space's sensory characteristics.

The photographs selected for the videos represented public spaces with distinct design features, categorized into six typologies: streets, parks, playgrounds, squares, waterfronts, and greenways. Participants watched the videos in a predefined order, following the sequence of the 18 selected case studies for the analysis.

34th Avenue



Figure 4.01
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

National 11 September Memorial



Figure 4.02
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Pier 26



Figure 4.03
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Little Island

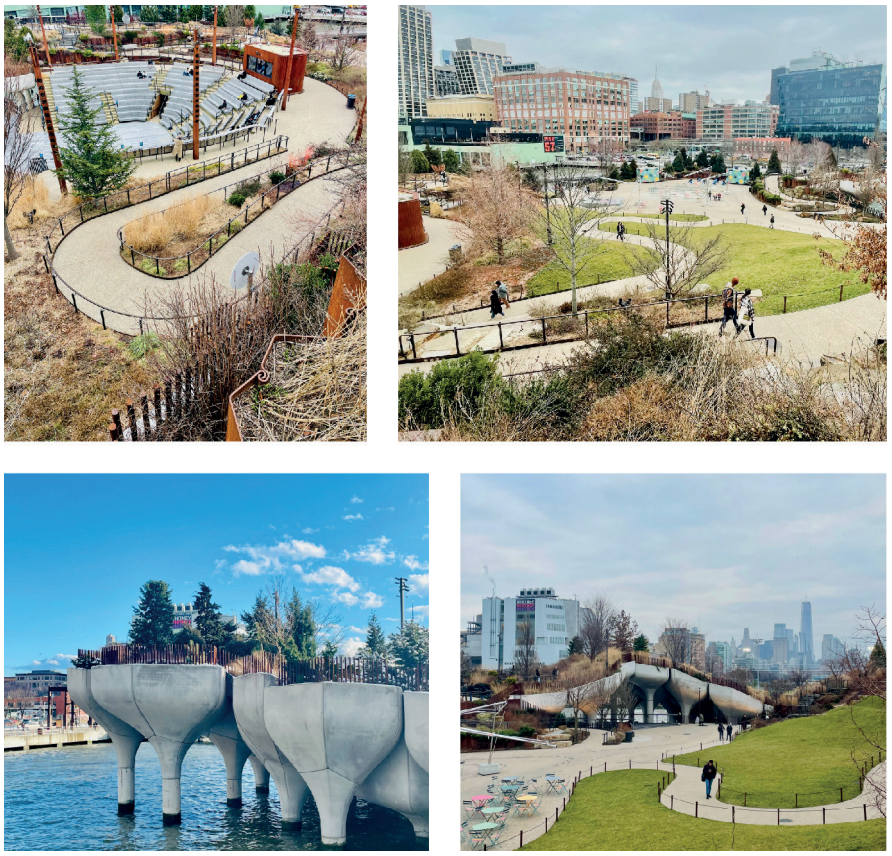


Figure 4.04
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

$6^{1/2}$ Avenue

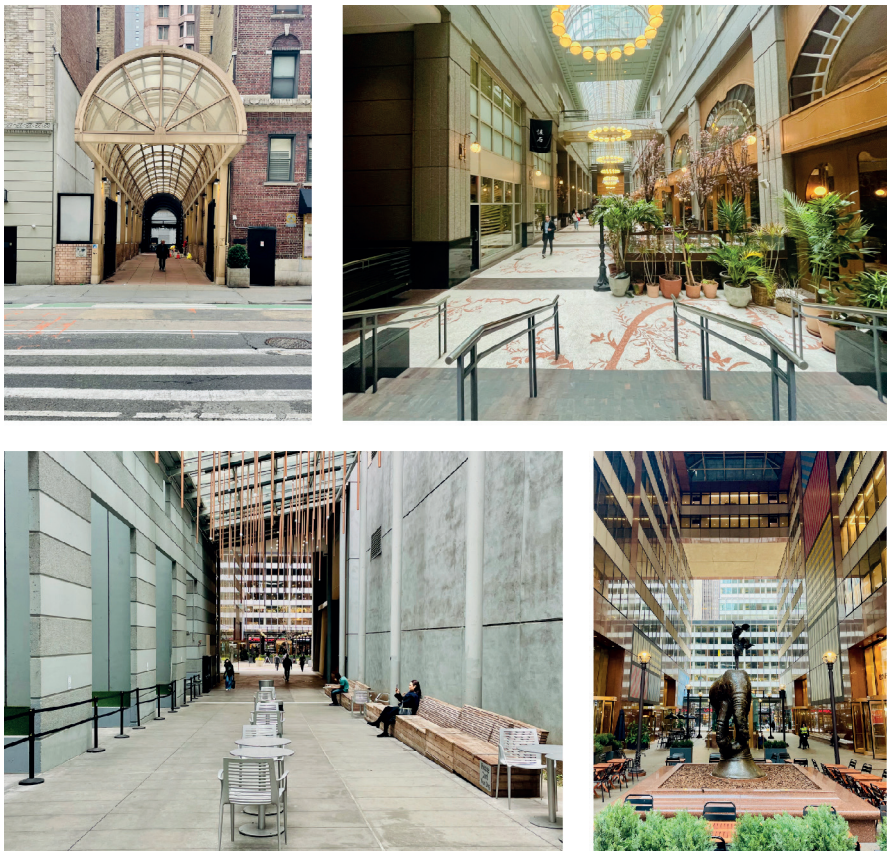


Figure 4.05
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

East Midtown Greenway



Figure 4.06
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Four Freedom Park



***Figure* 4.07**
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

The Hills



***Figure* 4.08**
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Brooklyn Bridge Park



Figure 4.09
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
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Gantry Plaza State Park

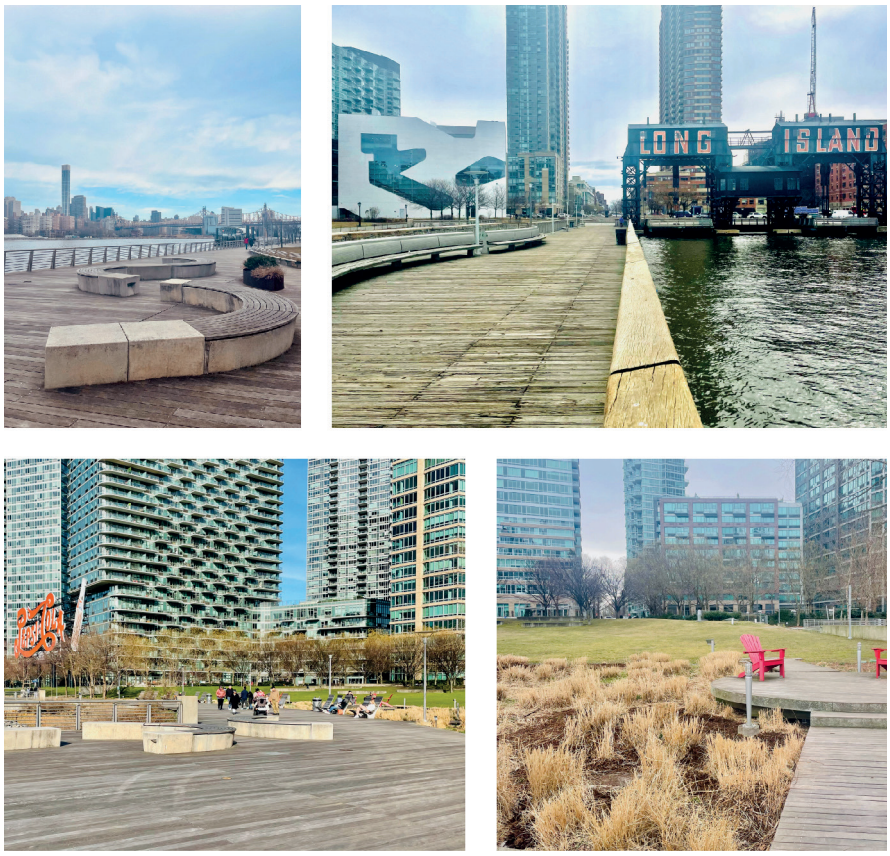


Figure 4.10
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Greenacre Park



Figure 4.11
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Hunter's Point South Park



Figure 4.12
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Times Square



Figure 4.13
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Kosciuszko Pool



Figure 4.14
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Anna Morgowicz

Battery Park - The Playscape



Figure 4.15
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

The High Line

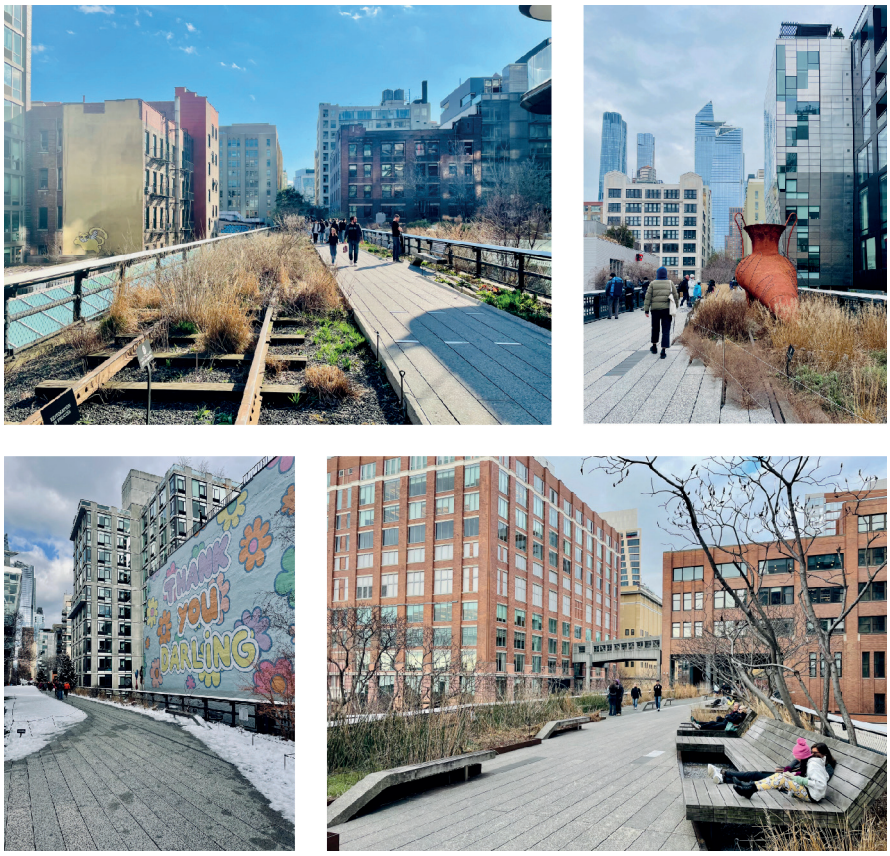


Figure 4.16
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Union Square

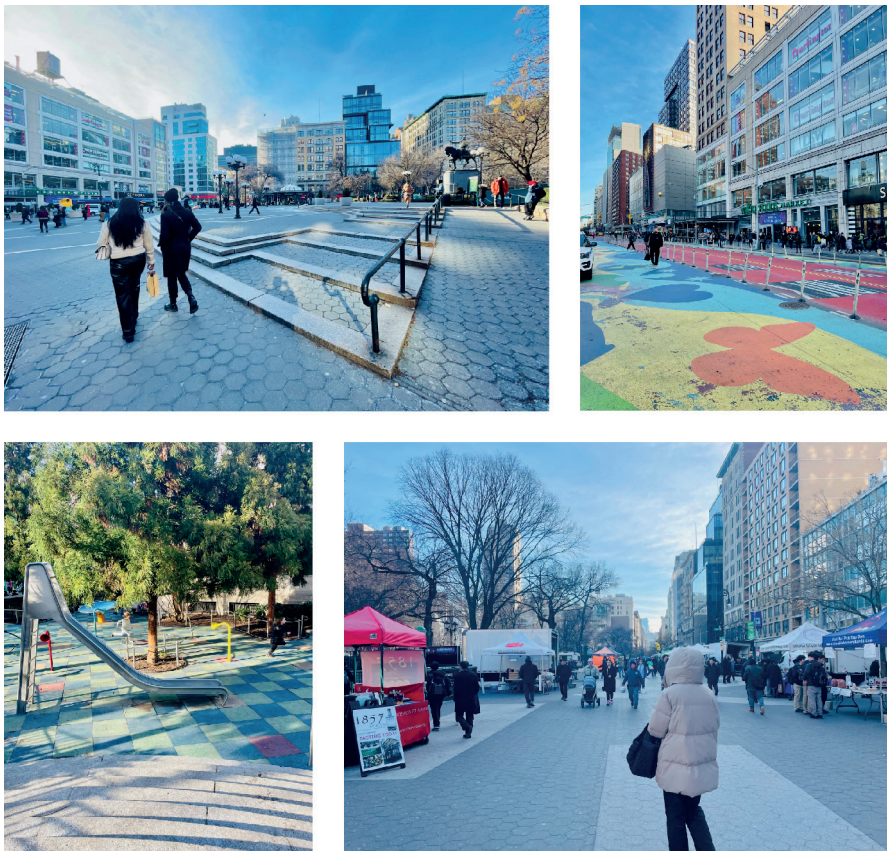


Figure 4.17
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
© Andrea Di Cinzio

Central Park



Figure 4.18
Photographs used for the PRS/IT experiment, the images were displayed in sequence, from top left to bottom right
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The photographs selected for the videos represented public spaces with distinct design features, categorized into six typologies: streets, parks, playgrounds, squares, waterfronts, and greenways. Participants watched the videos in a predefined order, following the sequence of the 18 selected case studies for the analysis.
This sequence was established to ensure balanced exposure to different types of public spaces and to avoid order effects that could influence participants' responses. The experiment aimed to assess users' perceptions of various public space typologies, taking into account both visual characteristics and the influence of the sound environment associated with each setting.

4.3.4 INSTRUMENTS

For the experiment, the Italian version of the Perceived Restorativeness Scale (PRS/IT) was used, translated by Peron & Berto (in Berto, 1998) in its full version, consisting of 26 items.
The PRS/IT is a validated tool for measuring the perceived restorative properties of an environment and evaluates four key factors of restorativeness:
Fascination (9 items) refers to the environment's ability to capture attention effortlessly.
Being Away (7 items), measuring the sense of detachment from one's habitual environment and sources of stress.
Compatibility (6 items), assessing the degree of correspondence between an individual's needs and the characteristics of the environment.
Coherence (4 items), expressing the perception of order and organization within the environment.
Participants rated each item using a 5-point Likert scale, where 1 corresponded to "Completely disagree" and 5 to "Completely agree".
The full PRS/IT version allowed for a detailed assessment of

individual perceptions of the analyzed spaces, contributing to a deeper understanding of their restorative qualities. Below are the questions included in the questionnaire:

FASCINATION

- Le cose che potrei fare lì sono cose che mi piacciono (COM 25)
- Quel luogo mi incuriosisce (FA 13)
- Sarebbe veramente interessante seguire ciò che accade lì (FA 6)
- Essere lì sarebbe in accordo con i miei interessi personali (COM 15)
- C'è molto da esplorare e da scoprire lì (FA 20)
- Quel luogo è affascinante (FA 4)
- Lì la mia attenzione sarebbe attratta da molte cose interessanti (FA 22)
- Quel luogo è abbastanza grande da poter essere esplorato in molte direzioni (FA 10)
- Se fossi lì non dovrei pensare a cose che non mi interessano (B-A 16)

BEING-AWAY

- In quel luogo potrei scappare dalle cose che di solito richiedono la mia attenzione (B-A 9)
- Essere lì mi aiuterebbe a smettere di pensare alle cose che devo fare (B-A 12)
- Trascorrere il tempo lì mi permetterebbe di staccare dal mio tran-tran quotidiano (B-A 5)
- Mi rifugerei in quel luogo se non volessi esseri disturbato (B-A 1)
- Se fossi lì non sarei obbligato a concentrarmi molto (B-A 14)
- Le cose e le attività che io vedo lì mi sembrano completarsi in un modo abbastanza naturale (COH 8)
- In quel luogo potrei scegliere di fare ciò che voglio (COM 3)

COMPATIBILITY

- Lì sarebbe facile fare ciò che voglio (COM 18)
- Quel luogo sembra completo di tutto (SCO 24)
- Sarebbe difficile annoiarsi lì (FA 26)
- Lì ci sono pochi ostacoli che mi impedirebbero di fare ciò che mi piace (COM 11)
- È come se quel luogo non avesse confini (SCO 17)
- Lì ci sono poche barriere o ostacoli che limiterebbero le mie possibilità di muovermi (SCO 7)

COHERENCE

- Lì ogni cosa sembra avere un proprio posto (COH 27)
- Lì è facile vedere come sono disposte le cose (COH 23)
- C'è un ordine chiaro nella disposizione fisica di quel luogo (COH 2)
- Lì potrei orientarmi senza problemi (COM 19)

In case studies no. 1 (34th Avenue), no. 3 (Pier 26), no. 7 (Freedom Park), no. 11 (Greenacre Park), and no. 17 (Union Square), a control question was included to verify that participants were responding attentively and thoughtfully to the proposed questions.
Below is the control question:
27_If you are reading this, answer "Somewhat disagree."

4.3.4 PROCEDURE

The test administration procedure was conducted online through the Qualtrics platform, allowing participants to respond using mobile and desktop devices. Before starting the test, each participant read and accepted the informed consent in compliance with Article 13 of Regulation (EU) No. 679/2016 and Legislative Decree No. 196/2003, as adapted by Legislative Decree No. 101/2018 on personal data protection. Following this, they anonymously filled out the demographic section using an alphanumeric code.

Participants then viewed the video corresponding to the case study before responding to each public space's PRS/IT questionnaire.

For data analysis, three independent variables were considered: gender (male, female, other, prefer not to say), age (divided into six groups: 18-25, 26-35, 36-45, 46-55, 56-65, 66-75 years), and profession (classified into two categories: architects and non-architects).

Before proceeding with the main statistical analyses, Cronbach's Alpha was calculated to assess the internal reliability of the PRS/IT questionnaire, ensuring response consistency and the validity of the results. This reliability measure was used to confirm that all test statements contributed homogeneously to evaluating the perceived restorativeness of public spaces.

Based on the participant distribution and the number of observations for each combination of independent variables, the most appropriate statistical technique was selected:

- Two-way ANOVA: A two-way ANOVA was applied, excluding one of the three independent variables. The choice of which variable to exclude was guided by theoretical relevance to the research objectives and the actual distribution of the sample. This analysis allowed for observing the main effects of the two retained variables and their interaction.
- One-way ANOVA: A one-way ANOVA was conducted to compare the results between two case study types, INLAND and WATERFRONT, to determine which of these spaces was more restorative. This test helped identify significant differences in the perceived quality of spaces' restorativeness based on their typology.

This analytical strategy ensured a rigorous and flexible approach, adapting to the sample structure while focusing on

the core research objectives. Additionally, a Pearson correlation analysis was conducted to determine whether there was a significant relationship between the presence of water in the projects and their perception of more restorative spaces in the two geographical categories of waterfront and inland.

4.3.6 RESULTS

The 99 participants were categorized based on gender, with the distribution as follows: 39 men, 60 women, and no participants identifying as "other." All participants were between 18 and 75 years old, but it was not possible to analyze age-based perception differences due to the uneven distribution of the sample. The most represented age group was 26 to 35 years, comprising 58 subjects, suggesting higher participation from young adults compared to other age brackets.

Beyond gender and age classification, participants were also categorized based on their professional background. Of the 99 participants, 42 were architects, while 57 belonged to architecture-related professions. This distinction enables a comparison between individuals with specialized expertise in architecture and those without formal training in the field, offering a more nuanced analysis of public space perception.

The reliability of the PRS/IT was assessed through Cronbach's alpha calculation, both for individual items and for the entire scale measuring perceived restorativeness. The values obtained, presented in the table, were all above 0.70, both at the individual item level and for the overall measure, indicating high internal consistency and good reliability of the instrument. Generally, a test is considered unreliable if Cronbach's alpha is below 0.70, as it suggests low internal coherence among the questionnaire items. These results confirm the scale's robustness and ability to consistently

measure the construct analyzed, with no need to exclude any items to improve the coefficient.

As shown in Figure XX, since it was impossible to use participant age groups as an independent variable, a Two-Way ANOVA was applied, categorizing the sample into four groups: male architects, female architects, male non-architects, and female non-architects.

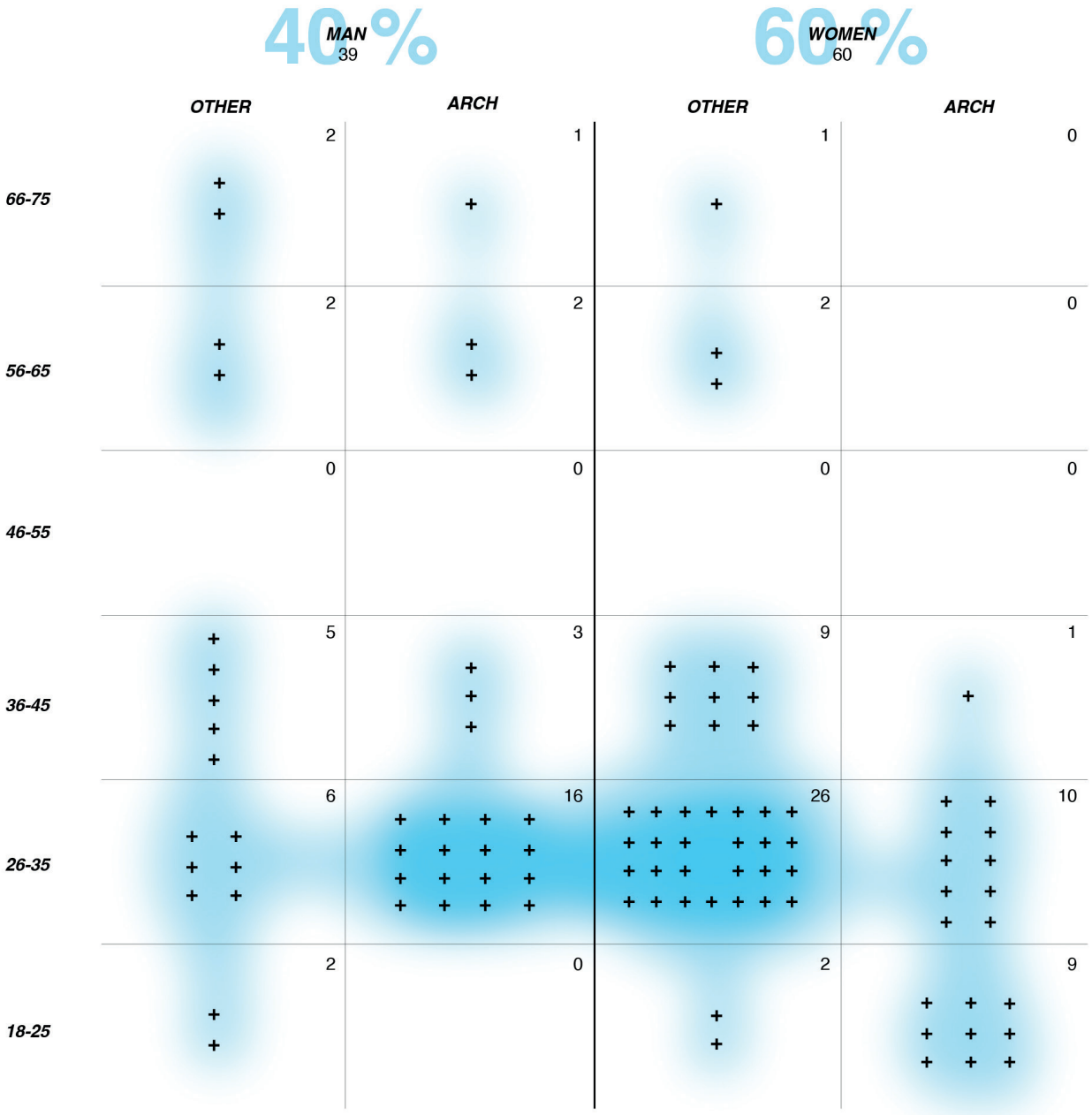


Chart 4.01
Distribution of participants in the PRS/IT experiment

For the analysis of results, a Two-Way ANOVA was performed, using gender and profession as independent variables.

This analysis was conducted separately for each of the 18 case studies, examining the outcomes of the four factors of the Perceived Restorativeness Scale (PRS): Being-away (BA), Coherence (COH), Compatibility (COM), and Fascination (FA). In addition to analyzing individual factors, the Restorativeness Index (RI) was calculated and analyzed. This index was obtained by averaging the scores of the four PRS factors, providing an overall measure of the perceived restorative capacity of the analyzed public spaces. This methodology allowed for an exploration of whether and how gender (male, female) and profession (architects, non-architects) influence the perception of the restorative quality of public spaces, identifying any significant differences both in the individual PRS factors and in the overall restorativeness index.

Absence of Gender and Professional Differences in the Perception of Public Spaces Based on Two-Way ANOVA Results

The statistical analysis revealed no significant differences in the perception of restorativeness based on gender or profession for the following public space projects:

- $6^{1/2}$ Avenue (Gender_p = 0.483; Profession_p = 0.206)
- September 11 Memorial (Gender_p = 0.751; Profession_p = 0.812)
- Gantry Plaza State Park (Gender_p = 0.755; Profession_p = 0.195)
- Greenacre Park (Gender_p = 0.100; Profession_p = 0.860)
- Hunter's Point South Park (Gender_p = 0.359; Profession_p = 0.229)
- Little Island (Gender_p = 0.368; Profession_p = 0.634)
- East Midtown Greenway Waterfront (Gender_p = 0.139; Profession_p = 0.604)
- Pier 26 (Gender_p = 0.173; Profession_p = 0.393)
- Times Square (Gender_p = 0.401; Profession_p = 0.833)
- Union Square (Gender_p = 0.798; Profession_p = 0.480)

Table 4.02
Averages of the scores assigned by participants (range: 0-5) for each of the four evaluation categories, divided by gender and profession. For each category, the Fisher statistic (F) and the significance value (p) from the ANOVA test for group comparison are reported. Significance is considered when p<0.05, where (from 0.05 to 0.01 (*), from 0.01 to 0.001 (**), and below 0.001 (***).

$6^{1/2}$ AVE	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	0.334	0.564	1.248	0.266	1.762	0.187
COH	2.700	0.103	0.206	0.650	0.305	0.581
COM	0.028	0.867	0.979	0.324	0.012	0.909
FA	0.157	0.692	1.644	0.202	1.584	0.211
RI	0.494	0.483	1.617	0.206	0.867	0.354
GANTRY PLAZA STATE PARK						
	F	p_value	F	p_value	F	p_value
BA	0.203	0.653	0.194	0.660	0.435	0.510
COH	0.228	0.633	2.547	0.113	0.052	0.819
COM	0.161	0.689	0.983	0.323	0.016	0.897
FA	0.140	0.708	2.551	0.113	0.171	0.680
RI	0.097	0.755	1.697	0.195	0.191	0.662
GREENACRE PARK						
	F	p_value	F	p_value	F	p_value
BA	1.828	0.179	0.005	0.940	0.285	0.594
COH	3.567	0.062	0.992	0.321	0.359	0.550
COM	1.856	0.176	0.002	0.963	0.609	0.437
FA	1.763	0.187	0.009	0.923	0.097	0.755
RI	2.750	0.100	0.030	0.860	0.383	0.537
HUNTER'S POINT SOUTH PARK						
	F	p_value	F	p_value	F	p_value
BA	0.418	0.519	1.125	0.291	2.438	0.121
COH	0.043	0.836	2.812	0.096	0.382	0.537
COM	1.170	0.282	0.675	0.413	0.415	0.520
FA	1.530	0.219	1.052	0.307	0.432	0.512
RI	0.849	0.359	1.465	0.229	0.995	0.321
LITTLE ISLAND						
	F	p_value	F	p_value	F	p_value
BA	0.371	0.543	0.177	0.674	0.038	0.845
COH	0.440	0.508	0.017	0.895	1.051	0.307
COM	0.679	0.411	0.006	0.934	0.017	0.894
FA	1.016	0.316	0.941	0.334	0.095	0.757
RI	0.817	0.368	0.227	0.634	0.031	0.860
EAST MIDTOWN GREENWAY						
	F	p_value	F	p_value	F	p_value
BA	3.366	0.069	1.398	0.240	8.820	0.003**
COH	0.462	0.497	0.478	0.490	0.162	0.687
COM	1.361	0.246	0.109	0.742	0.616	0.434
FA	1.258	0.264	0.016	0.898	0.198	0.657
RI	2.219	0.139	0.270	0.604	1.932	0.167
PIER 26						
	F	p_value	F	p_value	F	p_value
BA	3.548	0.062	0.432	0.512	1.809	0.181
COH	0.196	0.658	0.007	0.932	0.106	0.745
COM	0.793	0.375	0.024	0.875	0.528	0.469
FA	0.793	0.375	0.024	0.875	0.528	0.469
RI	1.879	0.173	0.733	0.393	0.542	0.463
TIMES SQUARE						
	F	p_value	F	p_value	F	p_value
BA	0.236	0.628	0.166	0.684	1.236	0.269
COH	1.869	0.174	0.004	0.947	0.035	0.851
COM	0.362	0.584	0.001	0.966	0.359	0.550
FA	0.437	0.510	0.021	0.884	0.830	0.364
RI	0.711	0.401	0.044	0.833	0.827	0.365
UNION SQUARE						
	F	P_value	F	P_value	F	P_value
BA	0.655	0.420	0.056	0.812	0.001	0.969
COH	1.837	0.178	0.092	0.761	0.492	0.484
COM	0.500	0.481	1.430	0.234	0.039	0.843
FA	0.082	0.774	1.014	0.316	0.099	0.753
RI	0.065	0.798	0.502	0.480	0.090	0.764

As far as the 34th Avenue project is concerned, there is only a significance for the COH factor in the profession (Profession_P = 0.018) with a higher preference by Non-Architects (Arch 3.260 < Non-Arch 3.596).

34th AVE	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	1.171	0.281	0.803	0.372	0.061	0.803
COH	0.444	0.506	5.702	0.018*	3.776	0.054
COM	0.482	0.488	2.153	0.145	0.000	0.977
FA	0.533	0.467	1.301	0.257	0.016	0.897
RI	0.517	0.473	2.453	0.120	0.124	0.724

Table 4.03
34th Avenue, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

In the Battery Park project, several significant differences were found for the BA factor (Gender_p = 0.007), FA factor (Gender_p = 0.021), and RI factor (Gender_p = 0.009), indicating a gender-based difference with a preference among women: BA (Men 3.583 < Women 3.950), FA (Men 3.942 < Women 4.220), and RI (Men 3.729 < Women 4.015).

BATTERY PARK	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	0.636	0.427	3.423	0.067	0.887	0.348
COH	4.642	0.033*	3.299	0.072	0.000	0.979
COM	0.648	0.422	3.180	0.077	0.169	0.681
FA	0.080	0.777	4.675	0.033*	0.624	0.431
RI	0.884	0.349	4.804	0.030*	0.482	0.489

Table 4.04
Battery Park, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

In the Central Park project, the only factor showing a significant gender difference is COH (Gender_p = 0.007), with a higher preference among women (Men 3.248 < Women 3.675).

CENTRAL PARK	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	0.630	0.429	0.461	0.510	0.537	0.465
COH	7.429	0.007**	2.800	0.097	1.833	0.178
COM	1.713	0.193	1.439	0.233	0.012	0.909
FA	0.296	0.587	0.177	0.674	0.000	0.988
RI	1.785	0.184	0.102	0.749	0.291	0.590

Table 4.05
Central Park, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

For the Four Freedoms Park project, several significant differences related to profession were found in the factors COM (Profession_p = 0.019), FA (Profession_p = 0.019), and RI (Profession_p = 0.043), with a higher preference among architects: COM (Arch. 3.583 > Non-Arch. 3.244), FA (Arch. 3.745 > Non-Arch. 3.362), and RI (Arch. 3.374 > Non-Arch. 3.467). Additionally, a single significant interaction was observed in the BA factor (Interaction_p = 0.030).

FOUR FREEDOM PARK	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	0.891	0.347	0.914	0.341	4.834	0.030*
COH	0.000	0.977	1.163	0.283	0.325	0.569
COM	0.761	0.385	5.623	0.019*	0.442	0.507
FA	0.720	0.398	5.645	0.019*	0.250	0.617
RI	0.726	0.396	4.190	0.043*	1.300	0.257

Table 4.06
Four Freedom Park, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

In the Kosciuszko Pool project, several significant differences related to gender were found, specifically in the FA factor (Gender_p = 0.019) and RI factor (Gender_p = 0.040), with a higher preference among men: FA (Men 3.060 > Women 2.624) and RI (Men 3.156 > Women 2.848). A significant difference was also found in the FA factor regarding profession (Profession_p = 0.021), with a higher preference among Non-Architects (Arch. 2.624 < Non-Arch. 3.056). Additionally, a significant interaction was observed in the COH factor (Interaction_p = 0.038).

KOSCIUSZKO POOL	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	3.149	0.079	2.269	0.135	1.727	0.191
COH	0.968	0.327	0.018	0.891	4.400	0.038*
COM	1.679	0.198	2.514	0.116	2.211	0.140
FA	5.639	0.019*	5.451	0.021*	3.279	0.073
RI	4.301	0.040*	3.508	0.064	3.597	0.060

Table 4.07
K Pool, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

In the East Midtown Greenway project, a highly significant difference was found only for the BA factor in the interaction (Interaction_P = 0.003).

EAST MIDTOWN GREENWAY	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	3.366	0.069	1.398	0.240	8.820	0.003**
COH	0.462	0.497	0.478	0.490	0.162	0.687
COM	1.361	0.246	0.109	0.742	0.616	0.434
FA	1.258	0.264	0.016	0.898	0.198	0.657
RI	2.219	0.139	0.270	0.604	1.932	0.167

Table 4.08
East Midtown Greenway, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

Regarding The High Line project, significant differences were found in every factor based on professional background: BA (Profession_p = 0.000), COH (Profession_p = 0.011), COM (Profession_p = 0.001), FA (Profession_p = 0.000), and RI (Profession_p = 0.000), with architects showing a stronger preference: BA (Arch. 3.476 > Non Arch. 2.889), COH (Arch. 3.723 > Non Arch. 3.278), COM (Arch. 3.239 > Non Arch. 2.706), and FA (Arch. 3.763 > Non Arch. 3.133). Additionally, a significant interaction effect was observed in the COM factor (Interaction_p = 0.028).

THE HIGH LINE	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	0.678	0.412	13.19	0.000***	0.833	0.363
COH	2.547	0.113	6.649	0.011*	0.306	0.581
COM	0.598	0.440	11.19	0.001**	4.941	0.028*
FA	2.671	0.105	15.76	0.000***	3.058	0.083
RI	1.943	0.166	16.35	0.000***	2.738	0.101

Table 4.09
The High Line, the (F) and the ANOVA's significance value (p) for comparison between groups are reported.

Finally, in The Hills project, two significant differences were observed. The first concerns the BA factor in the interaction (Interaction_p = 0.013), while the second pertains to the FA factor in gender (Gender_p = 0.034), with a stronger preference among women (Man 3.598 < Woman 3.888).

THE HILLS	GENDER		PROFESSION		INTERACTION	
	F	p_value	F	p_value	F	p_value
BA	3.226	0.075	0.243	0.622	6.355	0.013*
COH	2.856	0.094	0.217	0.641	0.005	0.939
COM	0.706	0.402	0.389	0.534	2.117	0.149
FA	4.591	0.034*	0.359	0.550	1.726	0.192
RI	3.724	0.056	0.219	0.640	2.892	0.092

Table 4.10
The Hills, the (F) and the ANOVA's significance value (p) for comparison between groups are reported. (Previews page)

Table 4.11
Restorative Index interaction, the (F) and the ANOVA's significance value (p) for each case studies

RESTORATIVE INDEX

CASE STUDIES	INTERACTION	
	F	p_value
6 1/2 AVE	0.867	0.354
34th AVE	0.124	0.724
11/9 SEPTEMBER	0.958	0.330
BATTERY PARK	0.482	0.489
BROOKLYN PARK	1.532	0.218
CENTRAL PARK	0.291	0.590
FREEDOM PARK	1.300	0.257
GANTRY PLAZA	0.191	0.662
GREENACRE PARK	0.383	0.537
HUNTER'S POINT	0.995	0.321
K POOL	3.597	0.060
LITTLE ISLAND	0.031	0.860
MIDTOWN GREENWAY	1.932	0.167
PIER 26	0.542	0.463
THE HIGH LINE	2.738	0.101
THE HILLS	2.892	0.092
TIMES SQUARE	0.827	0.365
UNION SQUARE	0.090	0.764

Subsequently, a one-way ANOVA was conducted to analyze the geographic location of the projects, distinguishing between those situated along the waterfront and those located inland. A one-way ANOVA was chosen to examine the differences between projects, as there was no significance in the RI interaction across the 18 projects.

Consequently, all 99 participants were grouped for the analysis.

The results from the one-way ANOVA indicate significant differences among projects located along the waterfront. Specifically, the following comparisons yielded significant p-values:

Brooklyn Bridge Park vs. Four Freedom Park (p_value = 0.0036); Brooklyn Bridge Park vs. Battery Park (p_value <

0.0001); Brooklyn Bridge Park vs. Gantry Plaza (p_value < 0.0001); East Midtown Greenway Waterfront vs. Four Freedom Park (p_value = 0.0236); East Midtown Greenway Waterfront vs. Battery Park (p_value < 0.0001); East Midtown Greenway Waterfront vs. Gantry Plaza State Park (p_value < 0.0001); Pier 26 vs. Battery Park (p_value = 0.0069); Pier 26 vs. Gantry Plaza State Park (p_value < 0.0001); Hunter's Point South Park vs. Battery Park (p_value = 0.0076); Hunter's Point South Park vs. Gantry Plaza State Park (p_value < 0.0001); The Hills vs. Battery Park (p_value = 0.0116); The Hills vs. Gantry Plaza State Park (p_value < 0.0001); Little Island vs. Battery Park (p_value = 0.0179); Little Island vs. Gantry Plaza State Park (p_value < 0.0001).

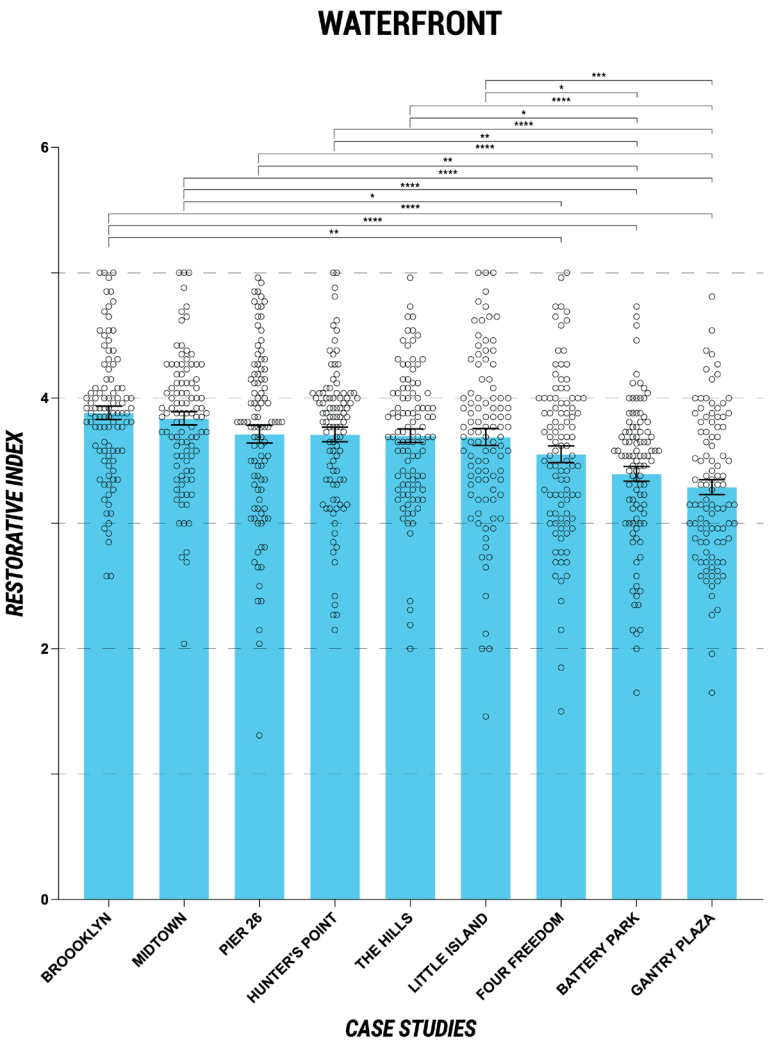


Chart 4.02
Average RI values compared to 99 subjects in the Waterfront projects. There is significance when p<0.05 where: 0.05 to 0.01(*), 0.01 to 0.001 (**), 0.001 to 0.0001 (***), less than < 0.0001 (****).

There are also significant differences among projects located within the urban fabric (inland). Specifically, the following comparisons yielded significant p-values: Central Park vs. High Line (p_value < 0.0001); Central Park vs. 34th Avenue (p_value < 0.0001); Central Park vs. Times Square (p_value < 0.0001); Central Park vs. Kosciuszko Pool (p_value < 0.0001); Central Park vs. Union Square (p_value < 0.0001); Central Park vs. 6 ½ Avenue (p_value < 0.0001); 11/9 September Memorial vs. High Line (p_value = 0.0005); 11/9 September Memorial vs. 34th Avenue (p_value < 0.0001); 11/9 September Memorial vs. Times Square (p_value < 0.0001); 11/9 September Memorial vs. K Pool (p_value < 0.0001); 11/9 September Memorial vs. Union Square (p_value < 0.0001); 11/9 September Memorial vs. 6 ½ Avenue (p_value < 0.0001); Greenacre Park vs. Times Square (p_value < 0.0001); Greenacre Park vs. Kosciuszko Pool (p_value < 0.0001); Greenacre Park vs. Union Square (p_value < 0.0001); Greenacre Park vs. 34th Avenue (p_value < 0.0001); The High Line vs. KosciuszkoPool (p_value = 0.0487); The High Line vs. Kosciuszko Pool (p_value < 0.0001); 34th Avenue vs. 6 ½ Avenue (p_value = 0.0066); Times Square vs. 6 ½ Avenue (p_value < 0.0350).

A Pearson correlation was conducted to further deepen the analysis and assess the linear relationship between the two variables.

The correlation was calculated using the mean value of the Restorativeness Index (RI) from the 99 participants for each of the 18 case study projects. This analysis allowed for identifying potential trends and significant relationships between the restorative perception of public spaces and their design characteristics, providing further insights into the factors influencing perceived well-being in urban environments.

Moreover, the two most restorative case studies by geographical location, as shown in the previous two graphs

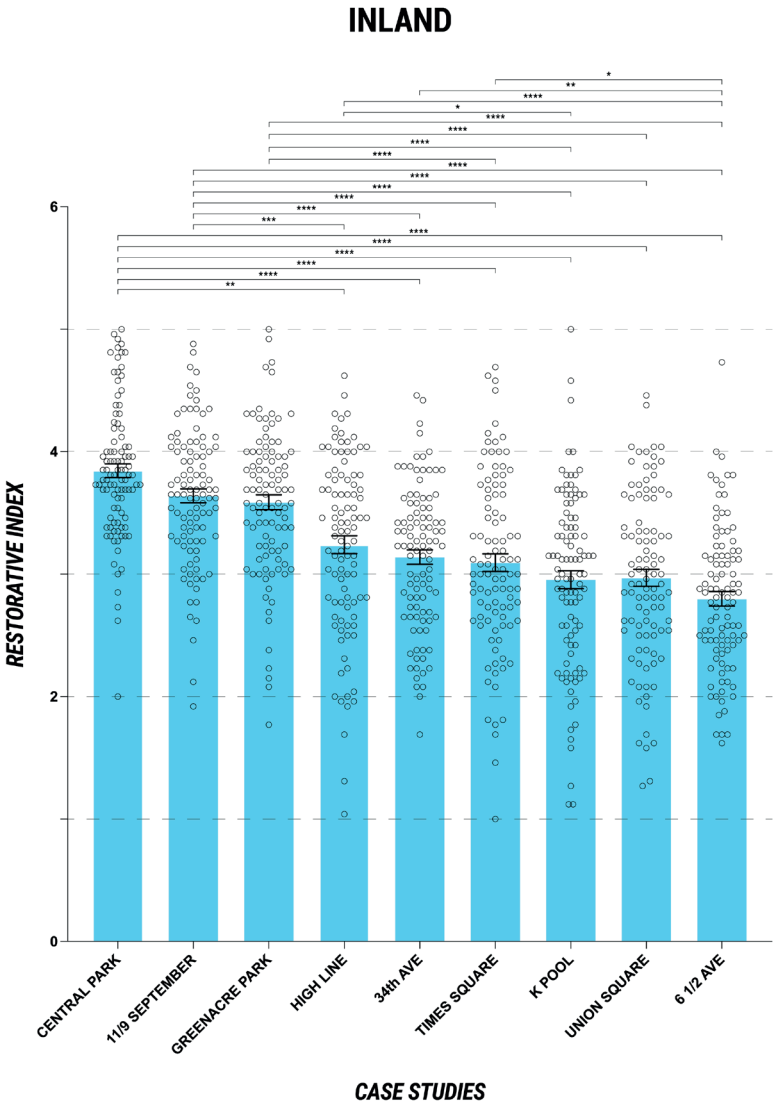


Chart 4.03
Average RI values compared to 99 subjects in the Inland projects. There is significance when p<0.05 where: 0.05 to 0.01(*), 0.01 to 0.001 (**), 0.001 to 0.0001 (***), less than < 0.0001 (****).

(Chart. 4.02 and Chart. 4.03), precisely correlate in the Pearson correlation graph with projects featuring the presence of water, either in its natural form or as a designed element. This finding strengthens the hypothesis that the aquatic element, regardless of origin, plays a key role in enhancing the restorative perception of public spaces.

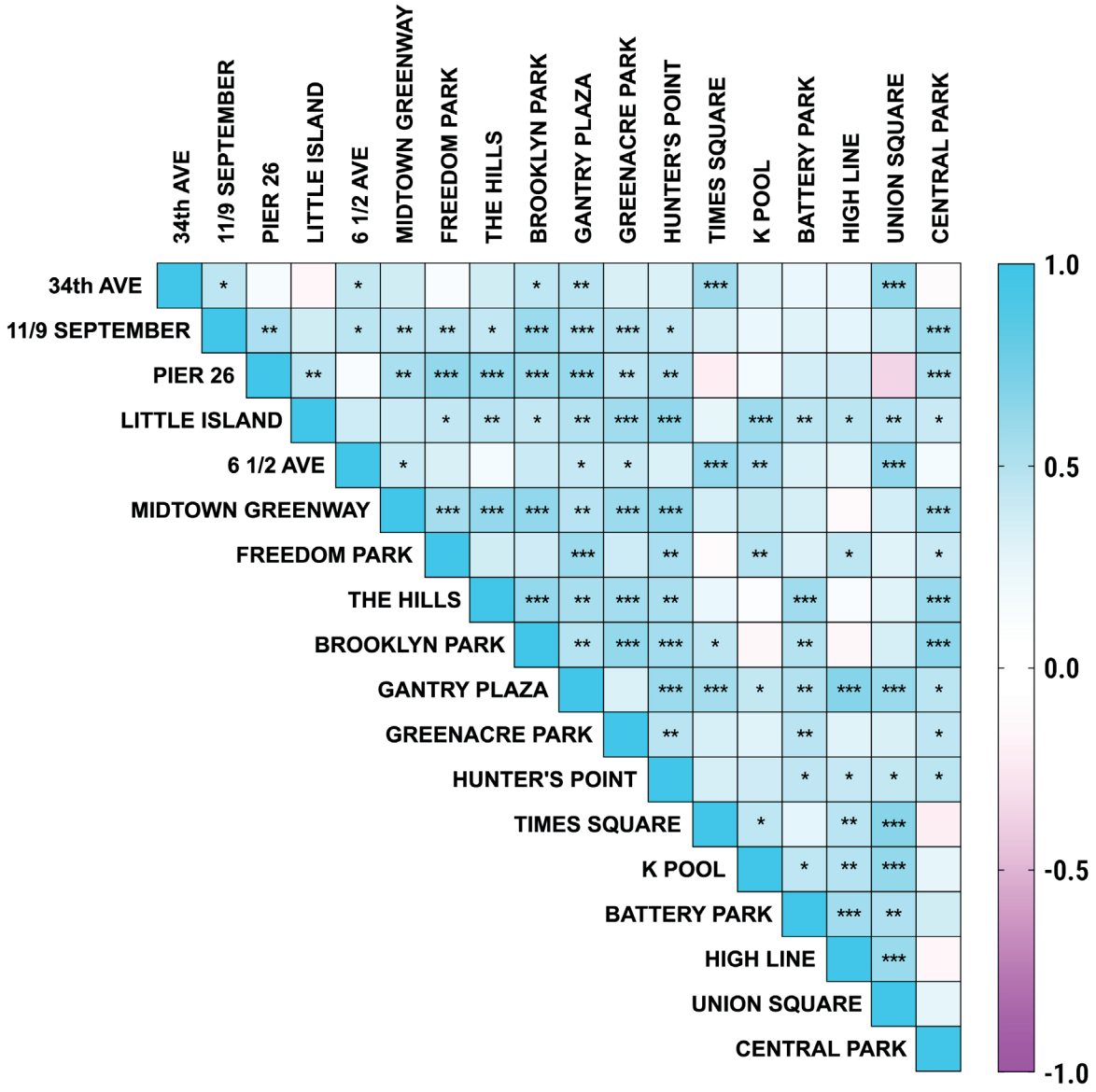


Chart 4.04
Pearson correlation carried out by means of average RI values from the 99 subjects over all case studies. The graph shows through colour the value of (r) and with asterisks the significance of the correlation. We speak of significance when p<0.05 where: 0.05 to 0.01 (*), 0.01 to 0.001 (**), 0.001 to 0.0001 (***), less than < 0.0001 (****).

4.3.7 DISCUSSION AND CONCLUSION

Restorativeness refers to the characteristics of places that facilitate recovery from the depletion of cognitive and attentional resources[29] [30] [31] [32] [33].

Environments featuring natural elements possess this property, generating a positive effect on the quality of life by reducing stress, fostering emotional connections with pla-

29 Ulrich, R. S. (1981)
30 Kaplan, R., and Kaplan, S. (1989)
31 Kaplan, S. (1995)
32 Hernández, B., Hidalgo, M. C., Berto, R., and Perón, E. (2001)
33 Hartig, T. (2010)

ces, and enhancing overall psychological well-being[34] [35] [36] [37] [38] [39]. Studies have shown that natural environments are generally perceived as more restorative than built environments. However, hybrid spaces that integrate natural and artificial elements, such as gardens, can offer high restorative properties[40].

The Perceived Restorativeness Scale (PRS) has demonstrated high reliability and sensitivity in distinguishing between environments with varying levels of restorativeness, even within the same scenario category[41] [42]. Furthermore, research suggests that preferred places tend to score significantly higher on PRS subscales, particularly in coherence and compatibility[43]. These findings highlight the importance of considering the specific characteristics of a place and refining the definitions of scenario typologies to enhance the understanding of restorative environments[44]. The results obtained through the PRS/IT test provided valuable insights into the impact of public space design on the perception of its restorative capacity. The analysis, conducted using ANOVA, revealed significant differences in evaluations based on gender, profession, and type of space, particularly:

Influence of Profession

The analysis of differences between architects and non-architects revealed a significant impact on the perception of designed spaces. Specifically:

- Four Freedoms Park: Architects assigned higher scores for Compatibility (COM), Fascination (FA), and the Restorativeness Index (RI), indicating greater sensitivity to

34 Ulrich, R. S. (1983)
35 Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., and Zelson, M. (1991)
36 Korpela, K., Ylén, M., Tyrväinen, L., and Silvennoinen, H. (2009)
37 Ruiz, C., Pérez, C., and Hernández, B. (2013)
38 Van den Berg, A. E., Jorgensen, A., and Wilson, E. R. (2014)
39 Carrus, G., Passiatore, Y., Pirchio, S., and Scopelliti, M. (2015)
40 Ivarsson, C., & Hägerhäll, C. (2008)
41 Ibidem.
42 Negrín, F., Hernández-Fernaud, E., Hess, S. and Hernández, B. (2017)
43 Korpela, K., & Hartig, T. (1996)
44 Ivarsson, C., & Hägerhäll, C. (2008)

design aspects.

- The High Line: Architects showed a significantly higher preference across all factors (BA, COH, COM, FA, RI), emphasizing how professional training influences the understanding of design quality.
- K Pool: Non-architects assigned higher scores to Fascination (FA), highlighting a more emotional perception of the space.

Influence of Gender

Gender differences were found to be significant in certain specific spaces:

- Battery Park: Women assigned higher scores for Being-away (BA), Fascination (FA), and the Restorativeness Index (RI), suggesting a greater perception of the space's restorative qualities.
- Central Park: Women rated the Coherence (COH) factor more positively.
- K Pool: Men were assigned higher scores for Fascination (FA) and the Restorativeness Index (RI).

Effects of Gender-Profession Interactions

Some spaces revealed significant interactions between gender and profession:

- Midtown Greenway: The significant interaction for Being-away (BA) suggests that the perception of psychological detachment varies by gender and profession.
- The Hills: There are significant differences in interaction effects regarding Fascination (FA) between men and women and being Away (BA).

Comparison Between Inland and Waterfront Areas

The one-way ANOVA revealed significant differences between projects located in Inland areas and those along the Waterfront. Specifically, Waterfront spaces obtained higher mean values for the Restorativeness Index (RI), highlighting the positive role of water in enhancing the restorative perception of public spaces. The analysis underscored

how the perception of a public space's restorative quality is influenced not only by its design but also by its users' personal experience and educational background. The differences between architects and non-architects emphasize the impact of disciplinary training in spatial interpretation, while gender distinctions highlight diverse sensitivities in the perception of environmental well-being.

Pearson Correlation

Finally, the comparison among projects confirms the importance of the natural context in promoting psychological well-being. The analysis demonstrated that the presence of natural or artificial water can foster well-being. In addition to Waterfront spaces, which showed higher mean values for the Restorativeness Index (RI), projects incorporating artificial water elements also received high scores. In Central Park, streams and lakes contribute to the restorative perception; the 9/11 Memorial generates a strong emotional and restorative impact through its two artificial waterfalls, while in Greenacre Park, the artificial waterfall fosters a sense of detachment and well-being. These examples suggest that integrating water into urban design, regardless of its natural or artificial origin, can enhance the restorative capacity of public spaces. These findings highlight the opportunity to design inclusive public spaces that are sensitive to diverse perceptions and capable of addressing various user needs.

4.3.8 LIMITATIONS

Although the results confirm the validity of the Perceived Restorativeness Scale (PRS) in analyzing public spaces designed by contemporary architects, certain methodological limitations that may have influenced the study's findings should be acknowledged.

One primary limitation concerns the sample selection, which consisted exclusively of Italian participants. This aspect may reduce the generalizability of the results to broader

contexts and populations with different cultural backgrounds. Previous studies have shown that the perception of restorativeness can vary based on socio-cultural factors[45], suggesting the need for future research with a more diverse sample.

Another limitation is related to the study's administration method, which was conducted entirely through an online questionnaire using video and images of the selected public spaces. While this methodology allows for standardized stimulus presentation, it cannot fully replace the direct experience of users in real spaces.

Environmental perception is strongly influenced by situational factors such as weather conditions, ambient noise, and the presence of other people—elements that cannot be entirely replicated in a virtual setting[46]. An additional aspect to consider is the number and type of spaces analyzed.

The study examined 18 public spaces with different compositional configurations; however, the selection was limited to a specific urban context—New York City. This may not comprehensively represent the variety of public spaces found in other cities or geographical settings. Furthermore, although six types of public spaces were considered, certain design elements may not have been adequately represented, thus limiting the generalizability of the conclusions.

Another potential source of bias is the order of stimulus presentation. Despite using a predefined sequence for video viewing, it is impossible to entirely exclude the possibility that the presentation order influenced participants' responses. Previous research has demonstrated that environmental perception can be affected by the contrast effect between consecutively presented stimuli[47], introducing a potentially relevant variable in assessing public space re-

45 Pasini, M., Berto, R., Brondino, M., Hall, R., & Ortner, C. (2014)
46 Gifford, R. (2014)
47 Kaplan, R., and Kaplan, S. (1989)

storativeness. A further critical element concerns the reliability of the Italian version of the PRS.

Although Cronbach's alpha analysis confirmed high internal consistency across all analyzed factors, the factorial structure of PRS/IT has not yet been fully consolidated in the Italian literature. Some studies have suggested that a four-factor structure may be more suitable in the Italian context[48], which could have influenced the interpretation of the collected data.

Finally, the study relied exclusively on self-reported data collected via questionnaire, without the support of physiological measures such as heart rate variability, cortisol levels, or brain activity. Integrating these measures in future studies could provide a more objective assessment of the restorative effects of the analyzed public spaces. In light of these limitations, future studies could expand the research by including a larger and more diverse sample to examine potential cultural differences in the perception of restorativeness. Additionally, conducting in situ experiments with participants physically present in public spaces would be beneficial in comparing results obtained in virtual and real-world contexts. Neurophysiological and biometric measures could enable a more objective evaluation of psychophysiological responses to restorative environments, providing complementary data to subjective assessments. Finally, a longitudinal analysis would allow for observation of whether and how the perception of a space's restorativeness changes over time in relation to environmental conditions and user behavior, thereby contributing to a deeper understanding of the relationship between urban design and psychophysical well-being.

48 Pasini, M. & Berto, R. & Scopelliti, M. & Carrus, G. (2009)

5 | PART FIVE
NEUROPHYSIOLOGY

The chapter Brain Reacts to the Environment introduces the concept of Neuroarchitecture.
Particular attention is given to EEG, a technology that measures brain electrical activity and has enabled the identification of specific frequencies associated with relaxation states (alpha waves) or cognitive activation and stress (beta waves). The chapter provides a historical overview of EEG use, from the first recordings of brain electrical activity conducted in the 19th century to modern studies utilizing portable devices such as the MUSE Headband 2.0.
In particular, EEG was employed to measure brain electrical activity and assess the effects of public spaces on users' neurophysiological responses, focusing on alpha waves (associated with relaxation states) and beta waves (linked to stress and cognitive activation).
The experimental study was conducted in four contemporary public spaces in New York: Brooklyn Bridge Park, East Midtown Greenway, Greenacre Park, and The High Line. The experiment involved 12 Italian participants, who were exposed to each location in a resting condition for 10 minutes while the portable EEG device Muse Headband 2.0 recorded their brain activity. After the EEG measurement, participants completed the QQPS questionnaire to assess their perception of public space quality, considering eight factors: Nature, Culture, Diversity, Density, Visibility, Safety, Identity, and Flourishing.
The study highlights the importance of integrating natural elements into public space design and demonstrates that well-designed urban spaces can generate restorative effects comparable to those of natural environments. The results provide valuable insights for future design strategies to enhance users' psychophysical well-being, suggesting that the combination of vegetation, urban noise control, and appropriate spatial scale can significantly contribute to the quality of urban experiences and mental health.

5.1 BRAIN REACTS TO THE ENVIRONMENT

Neuroarchitecture is an interdisciplinary field that combines architecture, neuroscience, cognitive psychology, and behavioral sciences to study how built environments influence emotions, behavior, and human well-being. The term Neuroarchitecture began to gain traction in the early 2000s. Also, thanks to the contribution of the Academy of Neuroscience for Architecture (ANFA), founded in 2003 in San Diego, to explore the connections between neuroscience and architectural design. The first studies dedicated to this new collaboration between disciplines emerged from that moment[1].

This discipline is part of the field of emerging architecture. It aims to integrate neuroscience principles with architectural design practices to create spaces capable of enhancing the quality of life by optimizing users' cognitive and psychological experiences and their impact on well-being and brain activity[2].
Through advanced physiological, environmental, and behavioral measurement techniques, it is now possible to collect objective data to gain a deeper understanding of the interaction between humans and architectural spaces. Neuroarchitecture aims to address four pillars of well-being: physical, intellectual, emotional, and social[3].

Many studies have explored the effects of architectural features on the neurophysiological response of dynamic brain activity, measuring it through various assessment devices. This approach essentially allows for investigating the brain's response to architectural spaces in realistic settings or even with mobile devices directly within the environments.

1 Sternberg, Esther & Wilson, Matthew. (2006)
2 Assem, H. & Khodeir, L. & Fathy, F. (2023)
3 Ibidem.

Among the various tools available are:

EEG – Electroencephalography

This technique is helpful for measuring and visualizing the brain's electrical activity, allowing researchers to understand neural reactions to different architectural spaces. For example, some studies using EEG have observed differences in levels of arousal (i.e., physiological excitement or activation) in individuals exposed to environments illuminated with lights of different color temperatures, precisely 5000 K (cooler, white light) and 3000 K (warmer, yellow light)[4].

Other EEG measurements related to arousal have been conducted to examine physiological excitement and/or activation levels in people exposed to spaces characterized by the color red[5].

fMRI – Functional Magnetic Resonance Imaging

This technique enables the visualization of brain activity and the identification of areas of the brain that are activated in response to different architectural stimuli. The use of fMRI in the architectural field has, for example, demonstrated how buildings designed by renowned architects—such as the Pantheon, the Salk Institute, the Chapel of Ronchamp, the Alhambra, and the Cathedral of Chartres—can induce a state of contemplation compared to generic buildings[6].

EMG – Electromyography

This technique measures muscle activity and is useful for assessing physical tension and stress in response to environments. Additionally, EMG has been used in studies on facial expression recognition[7], which can help understand the

4 Noguchi, H., & Sakaguchi, T. (1999)

5 Küller, R., Mikellides, B., & Janssens, J. (2009)

6 Bermudez, J., Krizaj, D., Lipschitz, D. L., Elliott Bueler, C., Rogowska, J., Y.-Todd, D., & Nakamura, Y. (2017)

7 Calvo, M. G., & Nummenmaa, L. (2016)

emotional states individuals experience when interacting with architecture.

MEG - Magnetoencephalography

This neuroimaging technique measures the magnetic fields generated by neural electrical activity in the brain, allowing real-time visualization of changes in the magnetic fields produced by neuronal activity.

MEG could offer intriguing and still unexplored insights into architecture, such as studying the influence of different spatial configurations on brain activity or monitoring neural responses to various environments to assess stress or well-being levels.

The integration of neuroscience into architectural design presents an unprecedented opportunity to create spaces better suited to human needs. Thanks to neurophysiological measurement tools, we can now more precisely evaluate the impact of environments on brain activity, emotional well-being, and human behavior. Neuroarchitecture aims to translate these scientific findings into concrete design strategies, improving quality of life through spaces that not only meet functional requirements but also positively stimulate the human mind and body.

5.1.1 ELECTRICAL SIGNALS AND EEG

EEG is a neuroimaging technique that allows for recording brain electrical activity using electrodes placed on the scalp[8]. It offers high temporal resolution and is used in clinical and research settings to study brain functions, diagnose neurological disorders, and monitor brain activity during various tasks[9].

Human brain neural activity begins between prenatal deve-

[8] Teplan, M. (2002)

[9] Louis, D. N., Perry, A., Reifenberger, G., von Deimling, A., Figarella-Branger, D., Cavenee, W. K., Ohgaki, H., Wiestler, O. D., Kleihues, P., & Ellison, D. W. (2016)

lopment's 17th and 23rd weeks. It is believed that from this early stage and throughout life, the electrical signals generated by the brain not only represent brain function but also reflect the body's overall condition. Carlo Matteucci (1811–1868) and Emil Du Bois-Reymond (1818–1896) were the first to record the electrical signals emitted by muscle nerves using a galvanometer, establishing the foundation of neurophysiology.

The first references to electroencephalography date back to the late 19th century, thanks to studies conducted on animals by English physicist Richard Caton (1842–1926). However, it was not until 1924 that the first recording of human brain electrical activity was achieved. The credit goes to psychiatrist Hans Berger (1873–1941), who built a rudimentary electroencephalograph to observe the temporal patterns of brain electrical waves. He used metal strips as electrodes on the subject's scalp and a galvanometer as the recording instrument.

Since then, the terms *electro-* (referring to the recording of electrical activities), *encephalo-* (referring to the emission of signals from the head), and graphy (meaning to draw or write) have been combined, leading to the term EEG being used to indicate the brain's electrical neural activity.

Electroencephalography enables the development of clinical, experimental, and computational studies to discover, recognize, diagnose, and treat a wide range of neurological and physiological abnormalities of the brain and the rest of the central nervous system (CNS) in humans. It involves recording fluctuations in electrical potentials generated by the dendritic trees of numerous cortical neurons working synchronously, which are captured by electrodes placed on the scalp.

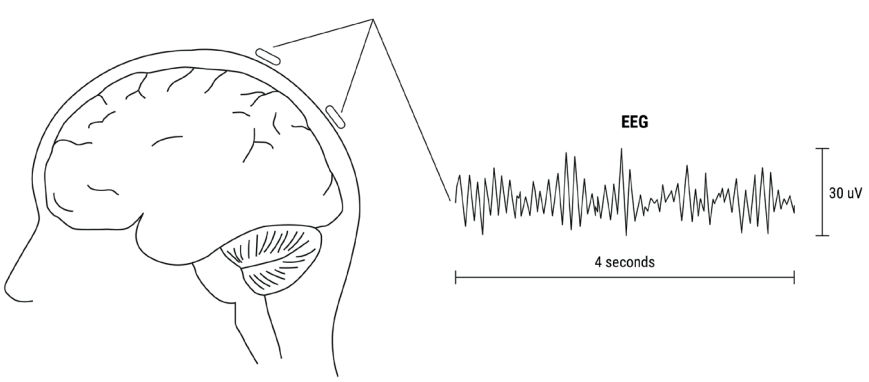


***Figure* 5.01**
Electrical signal recorded by the scalp from pyramidal neurons in the cortex

The electrodes placed on the scalp record the EEG signal from the scalp surface. However, the primary contributors to the detectable electroencephalographic signal are the neurons of the cerebral cortex, as it is the most superficial structure of the brain. The activity of neurons in subcortical structures does not directly appear in the recorded EEG signals due to their depth; however, it indirectly influences the activity of cortical neurons, which is then reflected in the EEG traces.

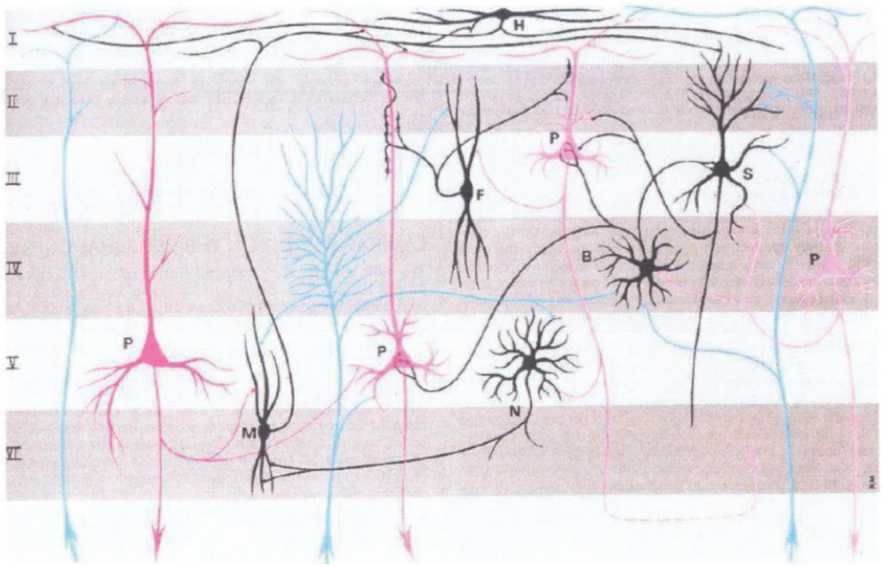


***Figure* 5.02**
Neuronal structure of the cerebral cortex

Brain electrical signals are recorded using biopotential electrodes placed on the scalp. This captures weak electrical activity on the scalp, which is then amplified, visualized, and recorded. The basic components of this system include electrodes, amplifiers and filters, an analog-to-digital con-

verter, and a recording device.
Skin preparation is necessary before applying the electrodes since the outer layers of the scalp are poor conductors. This process involves an initial cleaning of the target area using a special abrasive paste, followed by applying the electrode with gel or an electrolytic solution. The latter serves a dual purpose: it creates optimal electrode-skin contact to facilitate signal conduction and ensures stable adhesion between the electrode and the skin, thereby reducing movement and electrode artifacts.

The International 10-20 System regulates the exact placement of electrodes on the scalp, a standardized method developed in the late 1940s[10]. This system positions electrodes along ideal reference lines (anteroposterior sagittal, medial and lateral; frontal, central, and parietal coronal lines) based on fixed anatomical landmarks: the Inion (an external prominence of the occipital bone), the Nasion (a slight depression above the nose), and the preauricular points.
The term 10-20 refers to the percentage distances between these reference points: specifically, Fpz and Oz are located 10% away from the Nasion and Inion along the total anteroposterior midline length. All other electrodes are positioned at 20% intervals between Fpz and Oz.
Each electrode position is labeled using a letter, number, or second letter. The letter refers to the underlying cortical region; the numbers indicate lateralization (even numbers for the right hemisphere and odd numbers for the left), while the letter Z designates the midline position.
Electrodes are always used in pairs because the differential amplifiers that receive the signal acquired from the scalp consist of an inverting and a non-inverting input. Depending on specific experimental requirements, electrode pairs can be placed using monopolar or bipolar derivations.

10 Jasper, H. H. (1958)

The device used for measurements in the New York experiment employs a bipolar derivation, meaning that both electrodes are placed on active sites within the area of interest, and the recorded signal corresponds to the difference in activity between the two sites. Naturally, the channel arrangement depends on the type of EEG headset used. There are various types of EEG headsets, ranging from gel-based to water-based to dry systems, with different channel counts, ranging from 256 to 4 channels.
From a spectral perspective, the EEG signal spans a wide range of frequencies and is characterized by an amplitude ranging from a few microvolts (μV) to 500 μV. EEG studies have led to identifying well-recognizable brain waves, which can be classified based on their frequency range and are used to determine specific physiological or pathological states. The five main rhythms are delta (δ), theta (θ), alpha (α), beta (β), and gamma (γ).

- Delta Rhythm [0.5 - 3 Hz]: This is the slowest EEG rhythm and is associated with non-REM sleep states or unconsciousness, as well as pathological conditions such as coma, encephalopathies, or brain injuries. It tends to have a distinct irregular pattern.
- Theta Rhythm [4 - 7 Hz]: This rhythm is involved in action or response suppression mechanisms, meaning it plays a role in conflict resolution. It is also associated with introspective thinking, creative thought processes, and memory retrieval.
- Alpha Rhythm [8 - 13 Hz]: This rhythm occurs during wakefulness and is predominant in the transition state between wakefulness and sleep. It is also linked to mental relaxation and is recognized as playing a role in the active inhibition of brain regions not directly involved in the ongoing mental task. It is most present in the occipital regions.

- Beta Rhythm [14 - 30 Hz]: This is the most regular fast rhythm associated with states of concentration, attention, alertness, and anxiety.
- Gamma Rhythm [> 30 Hz]: This rhythm is linked to high-level cognitive processes and short-term memory.

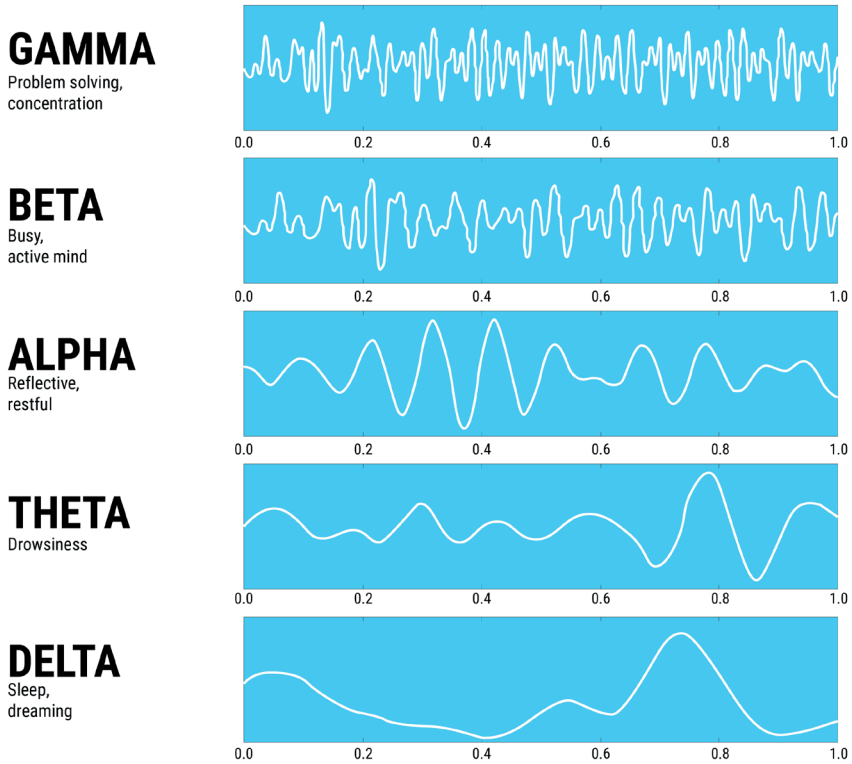


***Figure* 5.03**
Brain rhythms

5.2 WEARABLE EEG EXPERIMENT

To carry out measurements within the selected public spaces, the MUSE Headband 2.0 was used—a portable electroencephalogram (EEG) that captures brainwave signals through four channels: two temporoparietal (TP9 and TP10) and two frontal (AF7 and AF8). Additionally, the device is capable of acquiring a three-lead PPG signal and data from a triaxial gyroscope and accelerometer. Moreover, an infrared sensor allows for heart rate detection, enabling the measurement of Heart Rate Variability (HRV).

The Muse Headband 2.0 is a commercially available portable EEG headband designed for meditation, relaxation, and sleep monitoring via its dedicated app. However, by integra-

ting a second application (MindMonitor), it is possible to use Muse through its multi-channel wireless system to visualize and record raw data for the four reference channels and HRV.
Various studies have confirmed that these systems can be used for commercial applications and clinical investigations, albeit to a limited extent.

An example of the use of MUSE in clinical research was conducted by Raheel on a sample of 21 subjects to validate a method for recognizing emotions such as happiness, anger, sadness, and the state of relaxation[11]. Another study, also conducted using the EEG Muse Headband, aimed to explore emotional well-being in informal green spaces in Warsaw[12].
Furthermore, this type of wireless EEG system, which is minimally invasive and easy to wear, features dry electrodes that do not require skin preparation or the use of gel, eliminating the need for subsequent cleansing. This characteristic increases participants' tolerance and acceptance of the device, facilitating their engagement in the experiment.
Several experimental research projects have explored the relationship between well-being, mood, and urban environments that have employed electroencephalography (EEG) as the primary investigative tool[13] [14]. In the past, studies such as those by Ulrich have analyzed the impact of natural environments compared to urban settings and the role of vegetation in window views. Additionally, experiments have been conducted in controlled environments, such as laboratories or indoor spaces, to assess the impact of nature compared to urban contexts[15].
These experiments evaluate human reactions to visual sti-

11 Raheel, A., Majid, M., & Anwar, S. M. (2019)
12 Herman, Krzysztof & Ciechanowski, Leon & Przegalinska, Aleksandra. (2021)
13 Olszewska-Guizzo, A., Escoffier, N., Chan, J., & Puay Yok, T. (2018)
14 Tilley, S., Neale, C., Patuano, A., & Cinderby, S. (2017)
15 oe, J. J., Aspinall, P. A., Mavros, P., & Coyne, R. (2013)

muli, generally represented by selected images in various formats—such as static photographs, as previously discussed in the preceding chapter. These approaches stem from established methodologies for assessing visual quality and have progressively evolved from a mere aesthetic judgment, such as landscape beauty evaluations[16], toward a more complex analysis that considers the intrinsic values of landscapes[17], including their ability to influence psychophysical well-being[18].

EEG is widely used in studies on well-being, mindfulness, and meditation. It demonstrates how exposure to specific environmental stimuli can induce significant changes in brain waves, including increased alpha activity and, in some cases, higher theta and gamma rhythms[19].

5.2.1 RESEARCH QUASTION

Based on a critical analysis of the literature, this research has developed an investigation that aims to fill a gap in evidence-based research: Currently, there is a lack of comparative studies exploring the role of different compositional configurations in contemporary public spaces. In particular, the relationship between color, geometry, and the perception of regeneration in built environments has been underexplored.

To address this need, an experiment was conducted on four public spaces in New York, proposing a comparative analysis that combines neurophysiological data and perceptual assessments. The study uses the mobile EEG MUSE 2.0 to examine the impact of these spaces on users' brain activity, followed by the administration of a questionnaire designed to assess the perceived quality of the environment.

While most previous studies have primarily focused on the

16 Daniel, T. C. (1976)
17 Jorgensen, A. (2011)
18 Olszewska-Guizzo, A., Sia, A., Fogel, A., & Ho, R. (2020)
19 Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008)

restorative effects of natural environments[20], this research extends this perspective to contemporary urban architecture.

How do different compositional configurations of contemporary public spaces influence users' perception of regeneration? Specifically, how do participants respond to the four selected public spaces and their qualities as expressed in the administered questionnaire?

This research question is based on a growing body of studies highlighting the influence of visual elements in the built environment on psychological well-being[21]. Extending these concepts to architect-designed public spaces aims to provide practical tools for designers, contributing to a more conscious and user-well-being-oriented approach to urban design.

5.2.2 PARTICIPANTS

For the EEG test, a sample consisting exclusively of native Italian-speaking participants was selected. The decision to include only native speakers was made to ensure cultural continuity with the previous experiment, thereby preserving the results' validity and potential correlation.

The sample was divided into six age groups (18-25; 26-35; 36-45; 46-55; 56-65; 66-75 years) to analyze generational differences in the perception of public space qualities. Additionally, the gender variable was considered, including the options man, woman, other, and prefer not to say, to ensure an inclusive and diversity-respectful approach.

The study involved 20 participants, all of Italian nationality. Before participating, subjects completed a preliminary questionnaire to assess their eligibility for the EEG experiment. They were asked to provide information on age, gender, origins, race, U.S. citizenship status, level of education, and

20 Krzysztof Herman, Leon Ciechanowski and Aleksandra Przegalin´ska. (2021)

21 Akers, J., Béal, V., & Rousseau, M. (2020)

employment status.
Subsequently, a basic medical questionnaire was administered to determine whether the candidate was suitable for the study. Eight participants were excluded from the experiment as they were undergoing mood-stabilizing pharmacological treatment.

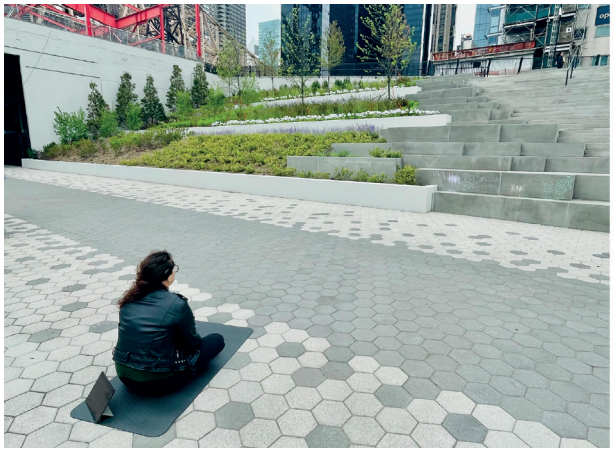
5.2.3 MATERIAL

The experiment was conducted in two distinct phases. The first phase involved EEG recordings, while the second phase required participants to complete a questionnaire.
The EEG recordings were carried out in four public spaces, selected from those identified as the most restorative in the previous experiment (see Part Four). Two spaces from the Inland category were excluded from the study to prevent potential cognitive biases:

- Central Park, as it is recognized as New York City's iconic and canonical park,
- The 9/11 Memorial, due to its association with a tragic global event, could have emotionally influenced the research outcomes.

For each of the selected spaces, two 10-minute EEG recordings were taken while the participant was resting and seated at two different points within the area.
Participants visited the locations in a predetermined order:
Midtown Greenway Waterfront

Figure 5.04
The participant during registration in the two spots in East Midtown Greenway Waterfront

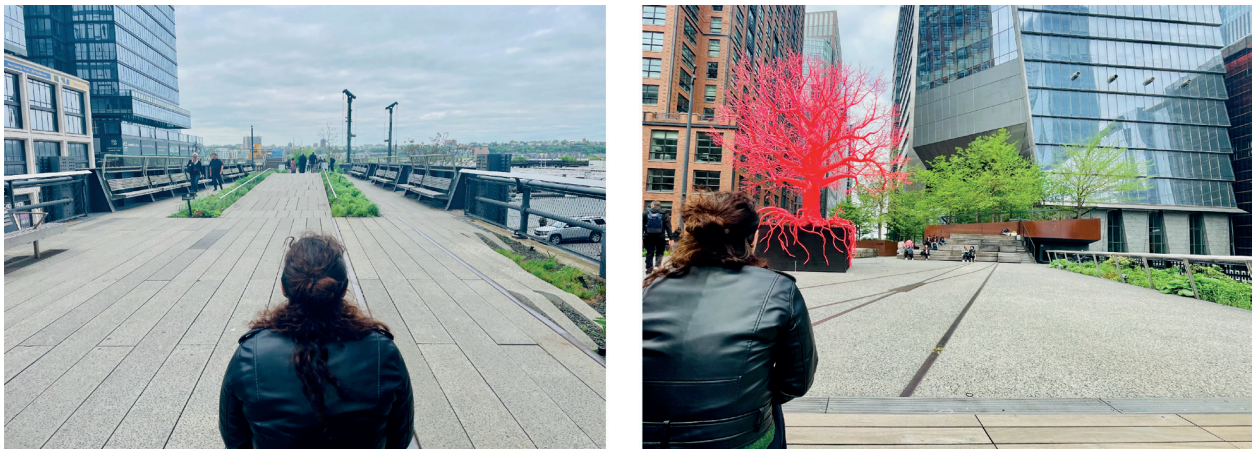




Greenacre Park



The High Line



Brooklyn Bridge Park



Figure 5.05
The participant during registration in the two spots in Greenacre Park

At the end of the experiment, each participant completed a questionnaire designed to evaluate the qualities of public space, taking into account both perceptual characteristics and the influence of the associated sound environment in each setting.

5.2.4 INSTRUMENT

For the experiment, a questionnaire was designed to define the qualities of public space. Using the QoPS allowed for a detailed assessment of individual perceptions of the analyzed spaces, contributing to a deeper understanding of their qualities.

Participants responded to relevant questions using a 5-point Likert scale for each factor, with reference values ranging from 1 (Completely disagree) to 5 (Completely agree). Additionally, each participant was asked to identify which of the observed factors they considered essential in improving both active and passive perceptions of well-being in public space.

The reference factors that determine public space flourishing in this case are expressed as follows, along with the respective questions asked:

Natural Quality (3 items):

A sense of fascination with the natural world, its strength, and power. A feeling of untouched nature or deliberate design. Seemingly self-seeded plants and naturally shaped water.

- The presence of greenery in this public space is an important factor.
- The presence of water enhances the natural qualities of this public space.
- This public space successfully conveys a sense of a designed natural landscape.

Cultural Quality (3 items):

A sense of fascination with culture, creativity, human efforts, and history. This includes appreciation for architecture as a whole, as well as for its details.

- This public space evokes a sense of fascination through its artificial elements.
- The equipment and design elements (shape, materials,

Figure 5.06
The participant during registration in the two spots in The High Line (previews page)

Figure 5.07
The participant during registration in the two spots in Brooklyn Bridge Park (previews page)

colors) enhance the cultural richness of this public space.
- Overall, this public space successfully integrates natural and artificial elements to create a harmonious environment.

Visibility Quality (2 items):
Panoramas, views, perspectives, and scenic spots. Open space for free movement, play, or physical activities.
- This public space offers visitors the opportunity to observe their surroundings in depth.
- Overall, this public space effectively uses its elements to create a sense of openness and freedom for visitors.

Density Quality (4 items):
The abundance of people and movement, social activities and interactions, and the presence of shops, cafés, restaurants, etc.
- The overall density of people and movement in this space is notable.
- The quality of social interactions and activities available, including the variety of shops, cafés, and restaurants, is significant.
- This space offers abundant opportunities for social interactions and activities.
- This space promotes community events, cultural meetings, and recreational facilities.

Diversity Quality (3 items):
A sense of variation and abundance. Diverse species of plants, animals, colors, furnishings, etc. Variations in spatial configuration and content.
- The overall diversity and abundance of plant and animal species in this environment is significant.
- The diversity in the spatial configuration and content of this public space, considering architectural styles, va-

riations in form, and artistic elements, is well perceived.
- The sense of variation and diversity in furniture and design elements, including colors, textures, and decorative accents, is abundant in the spaces you frequent.

Safety Quality (2 items):
A sense of shelter, safety, and protection. A closed environment, a refuge, a hideaway.
- The sense of shelter, safety, and security in this environment is well established.
- The overall quality of security in the area is perceived as high.

Identity Quality (3 items):
There should be a sense of inclusion, respect, and empowerment for all individuals, regardless of race, ethnicity, gender, sexuality, religion, disability, or other identity factors—elements that also contribute to the urban landscape's identity.
- This public space fosters inclusion and respect for individuals with different identities, including ethnicity, gender, sexuality, religion, disability, and others.
- This place allows individuals to freely express their identity without fear of discrimination or prejudice.
- This space reflects the diversity of identities and cultures that contribute to New York's urban landscape.

Flourishing Quality (5 items):
The overall physical, mental, and social well-being that allows individuals to experience vital energy and positive emotions such as happiness and beauty.
- This environment fosters a sense of physical, mental, and social well-being.
- The beauty of this environment frequently evokes positive emotions such as happiness.
- The overall vitality and energy experienced in this envi-

ronment contribute to a sense of well-being.
- This public space positively influences the overall mood.
- This public space actively promotes overall health and well-being.

5.2.5 PROCEDURE

To measure the frequency response of brain oscillations based on the recording location and the subject's reaction to the architectural panorama, they were exposed to, the MUSE Headband 2.0 device was used.

The MUSE software allows simultaneous recording of raw EEG data and the relative mean values of frequency oscillations during the 10-minute recording period. For each location, the average value of the different frequency bands—delta, theta, alpha, beta, and gamma—was extracted. By averaging across participants, it was possible to assess how each location influenced each frequency band.

Subsequently, regarding the questionnaire administered at the end of the experiments, based on the distribution of participants and the number of observations for each combination of independent variables, The most appropriate statistical technique was selected. A one-way ANOVA (Analysis of Variance) was performed. This test was used to compare the results between the eight public space quality factors and the four different projects.

This analysis aimed to identify the most influential factors in each analyzed space. The test allowed for verifying whether there were statistically significant differences in public space qualities based on the design of the different projects.

5.2.6 RESULTS

The 12 participants were categorized based on gender: male, female, and other. Among the 12 participants, 4 were men and 6 were women, while none identified as "other."

All participants were aged between 24 and 34 years, but it

was not possible to analyze differences in perception based on age, as the sample was not heterogeneously distributed. The most represented age group was 26 to 35 years, which included 11 participants.

A two-way ANOVA with repeated measures was conducted to determine whether there was a significant difference between frequency bands and locations. The ANOVA results indicated a main effect both for frequencies ($F(11,4)$; $p < 0.001$) and for positions ($F(11,7)$; $p < 0.001$), as well as for the interaction between the two variables ($F(11,28)$; $p < 0.001$).

All post-hoc analyses, with fixed locations across varying frequencies, are presented in the following table.

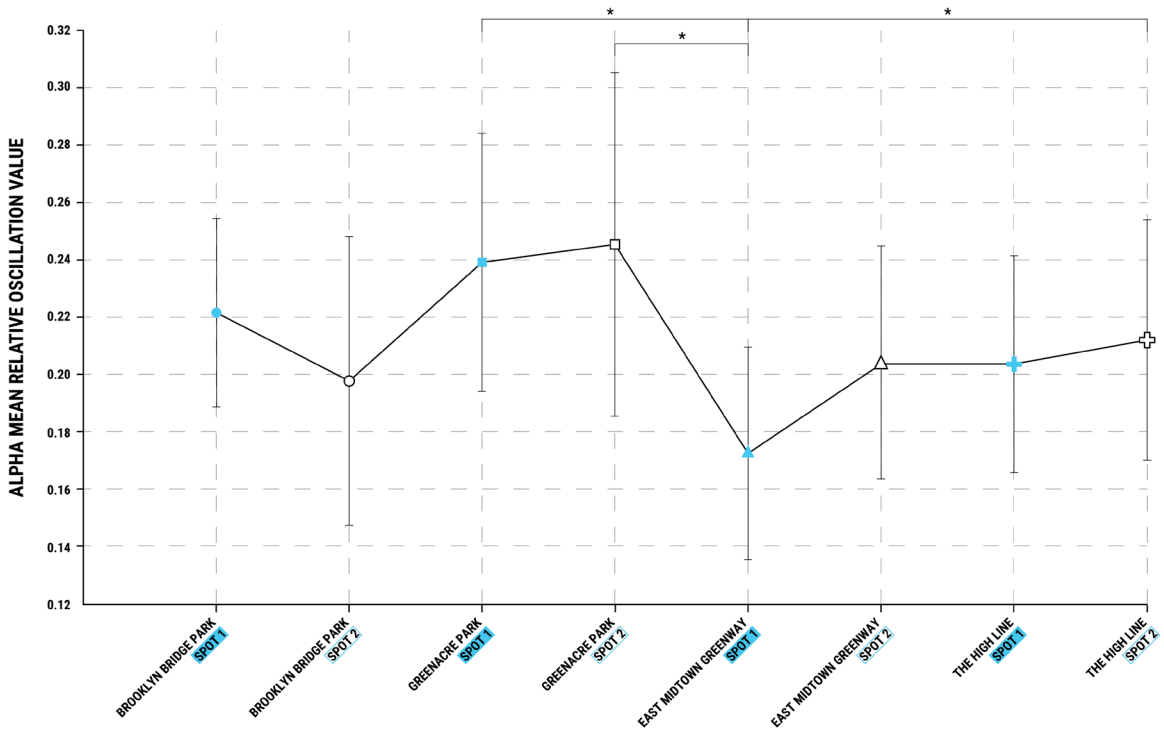


Chart 5.01
The average value of Alpha in the various recording spots and its significance resulted in a one-way repeated-measurement ANOVA.

The key frequency bands of interest in this experiment are the alpha and beta bands, which allow for evaluating the participant's relaxation level (higher alpha values) or stress level (higher beta values) in relation to the observed location.

Considering only the mean values of the alpha band in relation to the locations observed by participants, as shown in

the previous graph, there is a significant difference in the alpha band between:

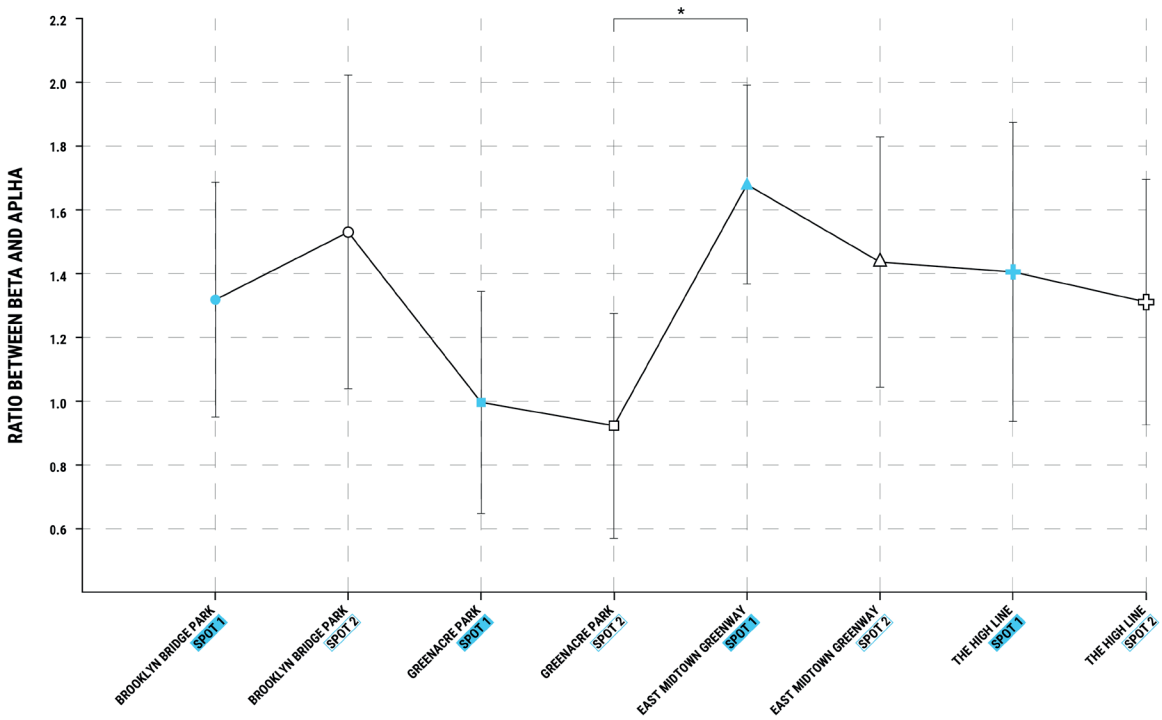
- Greenacre Park Spot 1 and East Midtown Greenway Spot 1 ($p < 0.05$),
- East Midtown Greenway Spot 1 and The High Line Spot 2 ($p < 0.05$),
- Greenacre Park Spot 2 and East Midtown Greenway Spot 1 ($p < 0.05$).

The ratio between beta and alpha band values, averaged across participants, is reported in Chart 5.01. This ratio quantifies the psychophysiological state of participants in different locations depending on its value.

A high Beta/Alpha ratio indicates lower alpha and higher beta activity, meaning the participant is in a state of stress.

A low Beta/Alpha ratio indicates higher alpha and lower beta activity, meaning the participant is in a state of calm and well-being. Chart 5.02 shows the beta/alpha ratio as a function of the observed locations. Significant differences were found between Greenacre Park Spot 2 and East Midtown Greenway Spot 1 ($p < 0.05$).

***Chart* 5.02**
The Ratio between beta and alpha. A one-way repeated-measurement ANOVA was used to detect significance between two recording spots



For the analysis of results, one-way ANOVA tests were conducted, using the four public spaces as independent variables, which were analyzed in relation to the eight public space qualities assessed in the QoPS questionnaire. This methodology allowed for an exploration of how different qualities (natural, cultural, diversity, density, visibility, identity, safety, and flourishing) influence public space quality and, in turn, well-being.

Flourishing Factor. Two significant differences were found:

- Greenacre Park > The High Line ($p = 0.0081$)
- Greenacre Park > East Midtown Greenway ($p = 0.0024$)

Nature Factor. Four significant differences were found:

- Greenacre Park > The High Line ($p < 0.0001$)
- Greenacre Park > East Midtown Greenway ($p = 0.0007$)
- Brooklyn Bridge Park > The High Line ($p < 0.0001$)
- Brooklyn Bridge Park > East Midtown Greenway ($p = 0.0068$)

Culture Factor. Three significant differences were found:

- Greenacre Park > Brooklyn Bridge Park ($p = 0.0466$)
- Greenacre Park > East Midtown Greenway ($p < 0.0001$)
- The High Line > East Midtown Greenway ($p = 0.0003$)

Density Factor. Two significant differences were found:

- Greenacre Park > East Midtown Greenway ($p = 0.0237$)
- Brooklyn Bridge Park > East Midtown Greenway ($p = 0.0052$)

Diversity Factor. One significant difference was found:

- The High Line > East Midtown Greenway ($p = 0.0194$)

Identity Factor. One significant difference was found:

- Greenacre Park > Brooklyn Bridge Park ($p = 0.0229$)

Safety Factor. Three significant differences were found:

- Greenacre Park > Brooklyn Bridge Park ($p < 0.0001$)
- The High Line > Brooklyn Bridge Park ($p = 0.0281$)
- East Midtown Greenway > Brooklyn Bridge Park ($p = 0.0146$)

Visibility Factor. Three significant differences were found:

- Brooklyn Bridge Park > Greenacre Park (p = 0.0015)
- The High Line > Greenacre Park (p = 0.0491)
- East Midtown Greenway > Greenacre Park (p = 0.0059)

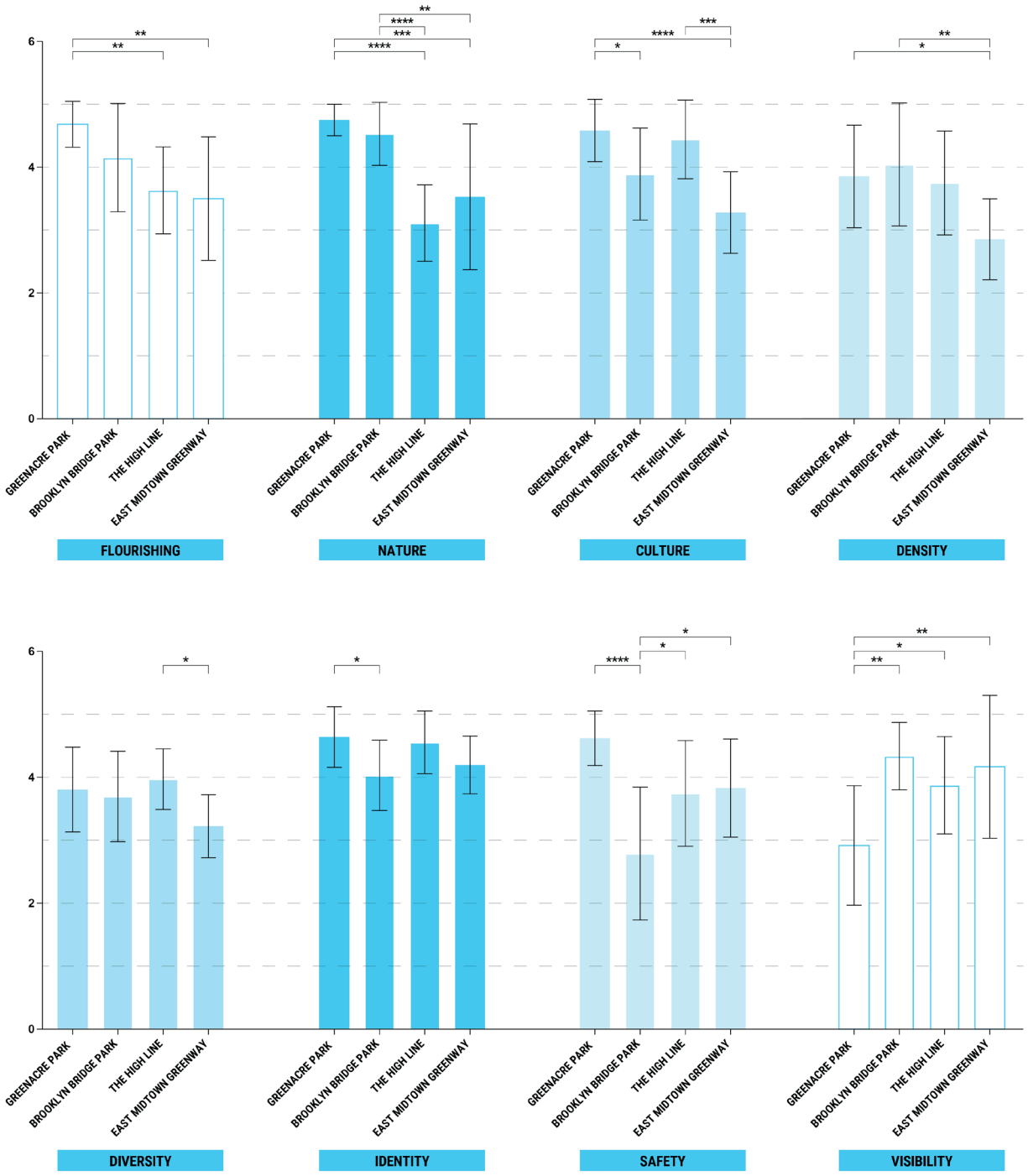


***Chart* 5.03**
In these charts, you can see the average values of the answers given by the 12 participants for each

5.2.7 DISCUSSION AND CONCLUSION

The results of this study highlight how different spatial configurations of contemporary public spaces influence

the perception of well-being and the regenerative qualities of the urban environment. The analysis conducted using the portable EEG Muse Headband 2.0 allowed for identifying significant neurocognitive and psychological variations across four public spaces in New York: Brooklyn Bridge Park, East Midtown Greenway, Greenacre Park, and The High Line. The QoPS questionnaire further revealed how different public space quality variables change within these environments.

category of questions on the qualities of public space. Through a one-way ANOVA, it was then possible to test the significance.

The EEG experiment results indicate that participants experienced the highest relaxation levels at the following spots (ranked from most to least relaxing):

1_Greenacre Spot 2
2_Greenacre Spot 1
3_High Line Spot 2
4_Brooklyn Bridge Park Spot 1
5_High Line Spot 1
6_East Midtown Greenway Spot 2
7_Brooklyn Bridge Park Spot 2
8_East Midtown Greenway Spot 1

These findings suggest that more enclosed environments enriched with natural and auditory elements contribute to a more significant reduction in beta activity relative to alpha activity, indicating a state of cognitive relaxation.

Furthermore, the analysis revealed a significant difference between Greenacre Spot 2 and East Midtown Greenway Spot 1, indicating that the former is significantly more relaxing than the latter. This result has important design implications: public spaces that combine natural elements, reduced exposure to urban noise, and a more enclosed scale appear to foster a greater state of relaxation.

The restorative effect of water, as observed in the previous experiment (see Part Four), seems to be confirmed in this case as well. The presence of a waterfall, capable of masking

the metropolitan noise with its sound and cooling the environment, appears to be one of the main contributors to the well-being experienced at Greenacre Park.
As a result, integrating vegetation, natural sound barriers, and semi-enclosed spaces into urban design could represent an effective strategy for enhancing users' well-being.

The statistical analyses conducted (One-Way ANOVA) on the QoPS questionnaire data revealed that certain spatial and environmental factors are associated with a greater perception of well-being, highlighting significant differences among the analyzed contexts. Specifically:

The "Flourishing" factor showed that Greenacre Park is perceived as the most restorative space. This suggests combining natural, acoustic, and spatial elements fosters greater emotional engagement. Design elements such as the presence of flowing water, diverse seating areas, and the aesthetic quality of the landscape appear to contribute to this positive effect.

The "Natural" quality highlighted that Greenacre Park and Brooklyn Bridge Park offer a more immersive experience. Using native plants, permeable surfaces, and well-distributed shaded areas is crucial in enhancing the perception of naturalness.

The "cultural" aspect showed that Greenacre Park is perceived as the most culturally rich. The presence of historical elements, artistic installations, and materials that evoke collective memory can enhance the perception of a public space's cultural value.

For "Density," "Identity," and "Safety," Greenacre Park received significantly higher scores. This suggests that clear pa-

thways, protected zones, and adequate lighting contribute to improving the perception of safety and urban identity. However, the "Visibility" factor showed the opposite effect, with Brooklyn Bridge Park, The High Line, and East Midtown Greenway scoring higher than Greenacre Park. Visibility could be improved by introducing strategic viewpoints, reducing visual barriers, and increasing the openness of connection spaces.

The "Diversity" factor indicated that The High Line is perceived as more diverse than East Midtown Greenway. This suggests that various spatial elements, the coexistence of different materials, and multiple levels of accessibility enhance the perception of diversity. Integrating urban furniture with different colors and textures, using heterogeneous architectural forms, and incorporating varied vegetation represent key strategies to increase the sense of spatial and functional variety in urban projects.

The collected data align with numerous studies that have already highlighted the role of the built environment in regulating emotions and influencing users' neurophysiological responses. Scientific literature supports the idea that public spaces can affect cognitive and emotional states through visual, auditory, and tactile elements[22].

This study expands this perspective by introducing an EEG-based approach to assess the direct impact of public spaces on human neurophysiology. The differences in cognitive responses across the studied public spaces suggest that architectural design, spatial arrangement, and accessibility influence how users perceive and interact with the environment.

22 Akers, J., Béal, V., & Rousseau, M. (2020)

5.2.8 LIMITATION

This study presents several limitations that should be considered for future research. The small sample size (12 participants) and its non-homogeneous age distribution limit the generalizability of the results, preventing a detailed analysis of generational differences. Additionally, the exclusive inclusion of native Italian-speaking participants may have influenced the data, limiting its applicability to a broader and more culturally diverse population. Including participants with different cultural backgrounds would help better understand how public space perception varies in multicultural contexts.

While practical and noninvasive, the mobile EEG MUSE 2.0 has lower sensitivity compared to more advanced laboratory tools, and resting-state measurements exclude the influence of dynamic activities or social interactions. Moreover, environmental factors such as noise, lighting, and temperature may have affected the collected data and should be more tightly controlled in future experiments to ensure greater reliability of results.

Based on a previous study, the selection of public spaces excluded Central Park and the 9/11 Memorial to avoid cognitive and emotional biases. However, this choice may have reduced the representativeness of New York's diverse public spaces. Expanding the number of analyzed sites, including environments with different shapes, scales, and functions, would allow for a more comprehensive understanding of how urban design influences the perception of regeneration.

Although the QoPS questionnaire provided detailed data, it may have introduced subjective biases and did not directly investigate participants' previous experiences in the examined locations. Future research could integrate more sophisticated data collection techniques, such as eye-tracking monitoring or qualitative analyses through in-depth inter-

views, to obtain a richer perspective on spatial perception and well-being.

These limitations highlight the need for future studies with broader methodologies, more representative samples, and advanced measurement tools, contributing to a deeper understanding of the interaction between spatial configurations and the perception of regeneration for well-being-oriented urban design.

6 | PART SIX
A NEW APPROACH

6.1 FLOURISHING SPACE

The architect plays a key role in territorial transformations, shaping the human habitat and deeply influencing cities, spaces, and, in turn, the quality of life. This profession goes beyond structural stability, regulations, technology, context, composition, and visual impact; it extends to a broader dimension that can more substantially integrate health, well-being, and perception.

Today, designing means understanding the interactions between space, body, and mind and recognizing architecture as a powerful cognitive device capable of modulating emotions, behaviors, and well-being.

Why Should This New Approach Start with Outdoor and Public Spaces?

The answer lies in our everyday experience while moving through the city. We spend a significant amount of time in vehicles traveling through urban streets or walking, crossing a sequence of spaces that make up our cities. As Heatherwick points out: «*Also, it is relatively easy to change how the interiors of buildings feel, with paint and objects and furniture. The outsides of buildings are different.*»[1]

However, this is not just about building facades. The focus must extend to all outdoor public spaces: streets, squares, parks, waterfronts, playgrounds, greenways, and other urban gathering places, which serve as the true stage for collective life. These environments shape our perception of the city and profoundly influence our daily well-being.

Investing in the quality of public spaces means acting on the most accessible and inclusive dimension of urban experience, contributing to creating welcoming, sustainable, and human-centered cities for all.

In 1971, Charles Jencks created an image titled *First Chart of Architects and Movements* from his book *Architecture 2000*.

1 Heatherwick T. (2023)

This infographic visually maps the major architects and architectural movements of the 20th century, using a graphical structure to illustrate interconnections, influences, and the evolution of various styles and architects over time.

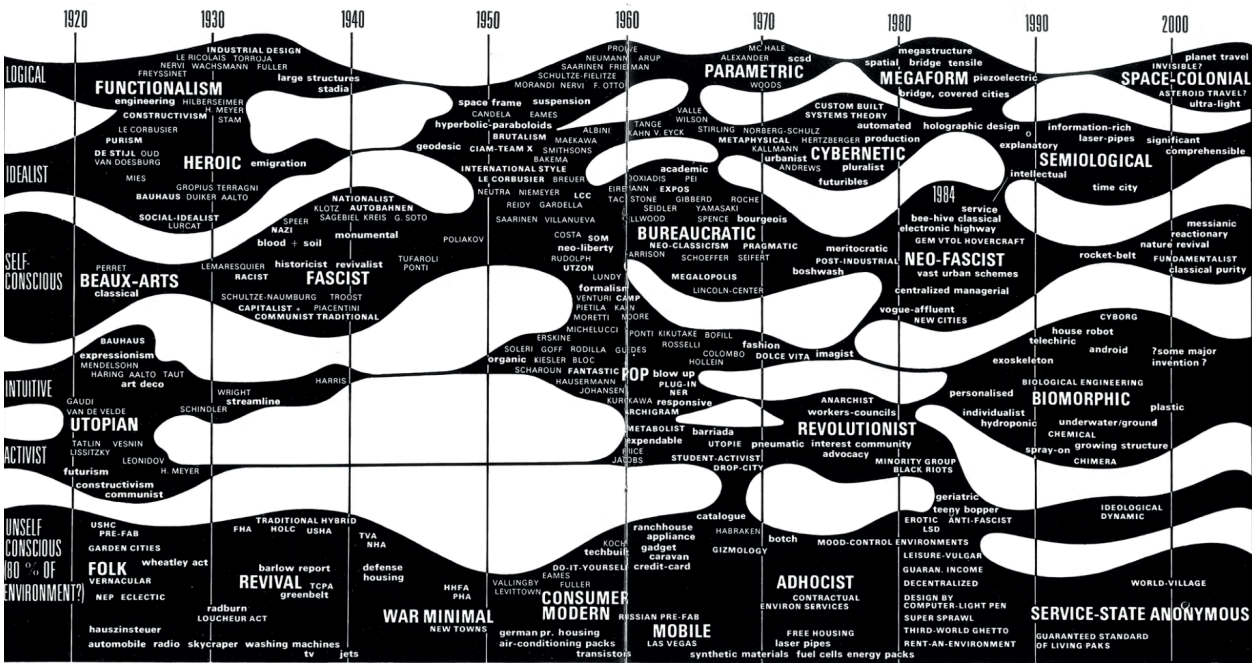


Figure 6.01
Charles Jencks,
Architecture 2000 (1971)

If we were to update Charles Jencks' infographic today to include architectural movements up to the present, we would need to consider the evolution and emerging trends that have shaped contemporary architecture. Indeed, many trends that emerged between the late 20th century and the early 2000s are missing from the original chart. Among them, Deconstructivism was crucial in challenging traditional notions of form and structure, introducing fragmentation and dynamic geometries. At the same time, High-Tech Architecture embraced industrial materials and advanced construction technologies, emphasizing transparency, flexibility, and innovation in building design. The rise of Bioclimatic and Adaptive Architecture has further reshaped the field, integrating sustainability, climate responsiveness, and ecological principles into the design process.

Perhaps today, we would also add Neuroarchitecture, a rapidly growing discipline that explores the connection between

architectural spaces and human cognition, demonstrating how the built environment can influence mental and emotional well-being. Updating Jencks' visual narrative would require integrating these new paradigms, reflecting how architecture continues to evolve in response to technological, environmental, and cognitive advancements.

The interaction and dialogue between different disciplines—such as neuroscience, environmental psychology, and human behavior studies—represent a fundamental aspect of conscious design. It is essential to conceive spaces beyond mere functionality and aesthetics, creating environments capable of promoting psychophysical balance and strengthening the connection between individuals and their surroundings. The impact of a project is not limited to humans alone but extends to the entire ecosystem in which we are immersed. A flourishing space integrates ecological dynamics, sensory sustainability, and the ability of spaces to generate meaningful experiences.

In this context, design becomes an act of responsibility and continuous research, a bridge between scientific knowledge and design sensitivity. Expanding awareness in architecture means questioning tools and techniques and reflecting on the values that guide the design process.

The five principles identified in this research are not just indicators of public space quality but keys to unlocking new perspectives on the role of architecture in society. Inspired by the famous statement "form follows function," this research proposes a paradigm shift towards "***Architecture follows Human Flourishing***," asserting the need for an architecture that is not merely a technical or aesthetic response but a valid instrument of collective well-being.

In this direction, these principles shape a manifesto for a new design vision, an invitation to action that encourages a cultural transformation. This architecture does not simply

build but heals, educates, and connects, placing the human being and their flourishing at the center of the project.

6.1.2 ARCHITECTURE FOLLOW HUMAN FLOURISHING

In light of the state of the art, the experiments conducted, and the reasoning developed, there emerges the need for a manifesto that synthesizes the fundamental principles for a new conception of open-air public space. This manifesto is not intended as a guide for designers, but rather as an invitation to collective awareness, emphasizing how urban spaces can foster both individual and social well-being.

Architecture has always sought to respond to the needs of society, creating buildings that serve as places of well-being for those who inhabit them. However, the evolution of cities, along with advancements in our understanding of human behavior, neuroscience, and well-being, compels us to redefine the criteria by which we conceive shared spaces.

The concept of ***Flourishing Space*** translates into six key principles that guide the design of open-air public spaces:

Open-Air Public Space Must be Natural

Research has shown that Greenacre Park and Brooklyn Bridge Park offer a more immersive natural experience. On one hand, the design of Greenacre Park provides a “controlled” and carefully arranged form of nature. The walls enclosing the space are covered with green climbing plants, trees are arranged in a formal grid, and there is an abundance of colorful flowers and aromatic plants. The artificial waterfall produces a natural sound that dampens metropolitan noise, while the presence of water helps to cool the environment. Additionally, the materials used in the space are natural, such as the raw stone of the eastern wall and the granite benches.

On the other hand, Brooklyn Bridge Park offers a more authentic natural setting, with densely wooded areas, green lawns, riverfront sandy zones, and the presence of the East River. This is a designed nature, but one that appears more "wild" and untamed.

Numerous studies have highlighted the importance of contact with the natural environment in improving psychological well-being and cognitive abilities. In particular, Attention Restoration Theory (ART) provides a valuable framework for understanding how different environments influence directed attention abilities. Rich in engaging but effortless stimuli, nature captures involuntary attention (bottom-up), allowing the voluntary attention system (top-down) to regenerate. In contrast, urban environments are characterized by excessively intense stimuli requiring more significant cognitive effort to process[2].

Two experiments conducted to validate ART demonstrated that walking in nature or even just viewing images of natural landscapes significantly improves directed attention capabilities, confirming the effectiveness of nature in cognitive function recovery[3].

Another study showed that mental well-being is closely linked to exposure to outdoor natural environments (NOE). This study, conducted in four European cities (Barcelona, Stoke-on-Trent, Doetinchem, and Kaunas), explored the relationship between NOE exposure and various psychological well-being indicators, including sleep quality, vitality levels, and stress-related somatization. NOE exposure was measured regarding the availability of green and blue spaces in residential areas (using geographic information systems) and through actual contact with nature, monitored via smartphone data over seven days.

The study found that direct contact with nature, particular-

2 Ohly, H., White, M. P., Wheeler, B. W., Bethel, A., Ukoumunne, O. C., Nikolaou, V., & Garside, R. (2016)

3 Berman, M. G., Jonides, J., & Kaplan, S. (2008)

ly proximity to greenery, was significantly correlated with improved mental health[4].

A key finding of the study concerns the role of perceived stress as the primary mediator in this relationship: natural spaces seem to be particularly effective in reducing stress, thereby contributing to enhanced psychological well-being. In contrast, other factors, such as physical activity and social interactions, were not found to be significant mediators[5].

Additionally, a systematic study analyzing 35 quantitative studies on the potential benefits of outdoor blue spaces—such as lakes, rivers, and seas—on health and well-being revealed a positive correlation between increased exposure to these environments and improved mental health and psychological well-being (12 studies), as well as higher levels of physical activity (13 studies).

Despite these promising findings, research on blue spaces still shows high heterogeneity in analytical methods, exposure criteria, and effect measurements, making it challenging to establish definitive conclusions.

Thus, further scientific research based on longitudinal studies and large-scale experiments is necessary to understand better the causal link between water, health, and well-being. However, current evidence suggests that the presence and accessibility of blue spaces could play a key role in psychophysical regeneration and promoting a healthier lifestyle[6].

These results indicate that simply being in contact with natural environments can have positive effects on mental health. Furthermore, they highlight the importance of designing cities that facilitate access to green spaces and in-

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4 Triguero-Mas, M., Donaire-Gonzalez, D., Seto, E., Valentín, A., Martínez, D., Smith, G., Hurst, G., Carrasco-Turigas, G., Masterson, D., van den Berg, M., Ambròs, A., Martínez-Íñiguez, T., Dedele, A., Ellis, N., Grazulevicius, T., Voorsmit, M., Cirach, M., Cirac-Claveras, J., Swart, W., Clasquin, E., Ruijsbroek, A., Maas, J., Jerret, M., Gražulevičienė, R., Kruize, H., Gidlow, C. J., & Nieuwenhuijsen, M. J. (2017).

5 Ibidem.

6 Gascon, M., Zijlema, W., Vert, C., White, M. P., & Nieuwenhuijsen, M. J. (2017)

tegrate water in various forms, not only in quantity but also in terms of the quality of the experience offered, thereby fostering psychological well-being and cognitive regeneration for individuals.

Open-Air Public Space Must be Cultural

Experiments have shown that Greenacre Park and The High Line offer a sense of fascination on a cultural, artistic, and architectural level. On the one hand, the design of Greenacre Park features a carefully controlled arrangement of architectural elements, with a precise and geometric spatial organization, natural materials, and steel coverings. An interesting geometric cut of raw stone also creates a visually stimulating material surface. On the other hand, The High Line's design integrates a series of artworks and a color contrast between the natural tones of corten steel, greenery, and wood and the vibrant colors of artistic installations along the path. Moreover, the site-specific design enhances the uniqueness and appeal of this space.

Numerous studies have highlighted how color in indoor environments can significantly impact perception, physiology, and emotional states. In particular, experimental research has demonstrated that color variation influences spatial perception and cognitive and emotional responses. Studies conducted in rooms with different color tones have found that color modifies environmental perception and physiological reactions: bold colors such as red can increase brain arousal, sometimes paradoxically slowing heart rate, while cooler tones like blue tend to promote a sense of calm[7].

Similarly, studies in the therapeutic field have explored the role of colors and landscape shapes in promoting psychological well-being through perceptual and emotional processes. In a study conducted with psychiatric clinic patients, color and spatial configuration were examined through the-

7 Küller, R., Mikellides, B. and Janssens, J. (2009)

rapeutic painting and autobiographical narration, revealing how environmental perception intertwines with symbolic and emotional dimensions. The experience of place is not limited to its physicality but also involves visual and chromatic elements, which influence feelings of comfort and belonging[8]. Additionally, perceived brightness plays a crucial role in psychological processes and behavior. Humans are constantly exposed to stimuli that shape psychological functions, potentially through emotional influence. Color, particularly its brightness attribute, has been identified as a significant factor in this process[9].

In this context, the role of art in public space holds a unique and revolutionary potential as an activator of self-determination movements:

«*Being the heart of spatial contestation, urban space, in particular, embraces the voices and diverse identities of minorities*»[10].

Art not only aesthetically enriches public spaces but also serves as a catalyst for social dynamics and a tool for collective expression.

A recent experimental study investigated the role of art in urban well-being, assessing the impact of an artistic intervention in a public space through a video simulation. Participants observed three different versions of the same urban environment: one decorated with art, one enhanced with natural elements (active control), and one without any interventions (conventional control). The results showed that, while mood levels tended to decline in the control conditions, they remained stable in the art-enhanced environment. Additionally, a positive correlation was observed between the subjective experience of the artwork and perceived well-being, suggesting that art can play a fundamen-

8 Lengen, C. (2015)

9 Bortolotti, A., Cannito, L., Anzani, S., Rossi, M., & Palumbo, R. (2022)

10 Tartari, M. (2024)

tal role in urban regeneration and improving quality of life[11]. Another crucial factor to consider is site-specific design, which does not impose arbitrary forms but instead arises from an in-depth reading of the context, highlighting qualities that emerge from the enhancement of the existing environment: «*By excavating and bringing value to what already exists, we can generate new beauty and happiness for those who inhabit it.*»[12]

These results indicate that a conscious use of color and art in public space design can help improve mood, reduce psychological distress, and promote overall well-being. Integrating calibrated artistic and chromatic strategies enhances the aesthetic quality of environments. It represents a concrete opportunity to create spaces that respond to the emotional and cognitive needs of those who experience them while simultaneously promoting inclusion and social self-determination.

Open-Air Public Space Must be Diversified

Public space must be diverse and rich in stimuli, capable of offering varied and engaging experiences. Research has shown that participants clearly preferred The High Line over other projects, emphasizing the value of its dynamic and multisensory design.

This space stands out for its great variety of plant species, carefully selected to follow seasonal changes, creating an ever-evolving landscape. The combination of wild and cultivated vegetation enhances an immersive and natural perception, transforming a former elevated railway infrastructure into a green urban corridor. Beyond its botanical richness, The High Line provides a wide range of spatial experiences, with elevated pathways that offer unique and unexpected perspectives of Manhattan and the Hudson River.

11 Dehove, M., Mikuni, J., Podolin, N., Leder, H., & Oberzaucher, E. (2024)

12 Ricci, M., Ferretti, M., Lamanna, R., Piccione, E., Prunesti, L., & Tiberi, M. (2022)

The artistic element plays a fundamental role in diversifying the urban experience. Site-specific artworks, temporary installations, and interactive sculptures blend with the landscape, making each visit different and stimulating. Even urban furnishings contribute to the sensory variety of the place: from classic benches to chaise longues for relaxation to small suspended amphitheaters, spaces designed for socialization, contemplation, and cultural events.

Another key element is the diversity of materials, which enhances the tactile and visual perception of the environment. The project integrates natural and industrial materials, alternating wood, corten steel, metal, and stone, giving the space a unique material quality and a strong connection to the pre-existing urban context.

Research suggests that biodiversity and variety in natural environments and daily life can positively impact health and well-being. Green spaces with diverse ecosystems have been associated with better mental health, lower mortality rates, and improved immune system regulation[13]. Similarly, variety in elderly life has been linked to better mental health, increased enjoyment, and a higher quality of life[14].

The importance of variety for older adults is multifaceted. It contributes to mental sharpness, motivation, and reduced self-absorption[15]. Both studies highlight the need for further research to fully understand the long-term health effects of diversity and variety in natural and personal environments.

The shape and configuration of architectural objects also significantly influence human perception and psychophysical experiences. Albertazzi explores the concept of form from multiple perspectives, including Gestalt psychology, phenomenology, and mathematics, emphasizing the importance of formal characteristics in spatial representation.[16]

13 Aerts, R., Honnay, O., & Van Nieuwenhuyse, A. (2018)
14 Jansen, D. A., Sauve, J. L., & Aubart, S. M. (2023)
15 Idibem.
16 Albertazzi, L. (1999)

These findings highlight the importance of consciously using geometric forms in architectural design to create environments that positively impact urban inhabitants' emotional and psychological well-being.

Open-Air Public Space Must be Inclusive and Active

Another fundamental aspect concerns the ability of public space to be attractive, active, and inclusive, providing an accessible and welcoming environment for all. A well-designed public space must be able to respect and empower every individual who experiences it, regardless of race, ethnicity, gender, sexual orientation, religion, disability, or other identity factors.

As highlighted by research, Brooklyn Bridge Park and Greenacre Park are significant examples of places where people can feel included. Both spaces offer accessibility, a variety of experiences, and a safe, welcoming atmosphere, fostering active participation and diversity among visitors.

Brooklyn Bridge Park provides a wide range of recreational and sports activities, making it a dynamic and inclusive public space that meets the needs of a diverse community. The park features beach volleyball courts, allowing visitors to play sports in a relaxed environment with a view of the Manhattan skyline.

One entire pier is dedicated to sports activities, including soccer fields, basketball courts, ping-pong tables, and paddle courts, offering play opportunities for people of all ages and skill levels. In addition to sports areas, the park has large green spaces perfect for socializing, relaxing, and picnicking, making Brooklyn Bridge Park an ideal destination for outdoor leisure.

Another distinctive feature is a dedicated barbecue area, equipped with grills and picnic tables, where friends and families can gather on spring and summer weekends, creating moments of conviviality and shared experiences. This

variety of functions makes the park a model of multifunctional public space, successfully combining sports, nature, and social interaction in a single, accessible, and welcoming environment.

The presence of physical and social activities in public spaces like Brooklyn Bridge Park is not only an opportunity for recreation but also brings significant benefits to cognitive and mental health. Numerous studies have demonstrated that physical activity improves cognitive functions across all age groups, from preteens[17] to young adults[18] and even middle-aged and older adults[19]. In particular, research has shown that movement can reduce the risk of dementia, even through light exercise[20].

Beyond physical activity, socialization also plays a crucial role in mental well-being. Social interactions help combat conditions such as depression, which is strongly linked to isolation and low-quality social relationships[21]. Another study found that loneliness and limited social participation are both associated with an increased risk of dementia[22].

These findings emphasize the importance of designing public spaces that encourage the integration of physical activity and social interaction. These spaces should create environments that stimulate active participation, reduce the risk of isolation, and promote a better quality of life. Brooklyn Bridge Park represents a virtuous example of how public space can catalyze physical, cognitive, and social well-being, making the urban environment healthier and more inclusive.

17 Pesce, C., Crova, C., Cereatti, L., Casella, R., & Bellucci, M. (2009)

18 Stroth, S., Hille, K., Spitzer, M., & Reinhardt, R. (2009)

19 Hörder, H., Johansson, L., Guo, X., Grimby, G., Kern, S., Östling, S., & Skoog, I. (2018)

20 Smith, J. C., Nielson, K. A., Antuono, P., Lyons, J. A., Hanson, R. J., Butts, A. M., Hantke, N. C., & Verber, M. D. (2013)

21 Stahl, S. M., Morrissette, D. A., Faedda, G., Fava, M., Goldberg, J. F., Keck, P. E., Lee, Y., Malhi, G., Marangoni, C., McElroy, S. L., Ostacher, M., Rosenblat, J. D., Solé, E., Suppes, T., Takeshima, M., Thase, M. E., Vieta, E., Young, A., Zimmerman, M., & McIntyre, R. S. (2017)

22 Kuiper, J. S., Zuidersma, M., Oude Voshaar, R. C., Zuidema, S. U., van den Heuvel, E. R., Stolk, R. P., & Smidt, N. (2015)

Open-Air Public Space Must be Safe

Safety is an essential element in the design of open-air public spaces. It is about physical protection and perceptual and emotional security, creating environments where people feel comfortable, protected, and free to experience urban life serenely.

As demonstrated by the behavioral experiment's results, Greenacre Park serves as a quintessential example of how spatial design can foster a sense of security through the combination of prospect and refuge. The park's spatial organization ensures a gradual transition from the chaotic urban environment to a more intimate and contemplative space, allowing users to adjust to the new sensory experience without feeling an abrupt detachment.

Greenacre Park offers a hierarchy of relaxation spaces where individuals can choose their preferred level of protection and isolation. Along the ivy-covered western wall, an elevated platform with a canopy provides an intermediate condition between social interaction and refuge. This area, located near the waterfall, is sheltered from the park's main movement and offers excellent visual and physical protection. The park's lower level is perhaps the most pronounced example of a refuge. Positioned several meters below street level, this area is visually separated from the city. Here, seated visitors cannot see the street but are immersed in vegetation and water instead. Additional isolation is ensured by the sound of the waterfall, which not only masks urban noise but also filters conversations, fostering a state of introspection and tranquility.

The design of Greenacre Park reflects the principles of the prospect-refuge theory, which suggests that environments offering both open vantage points (prospect) and sheltered places (refuge) are psychologically appealing to humans[23] [24].

[23] Dosen, Annemarie & Ostwald, Michael. (2016)

[24] Nasar, J. L., Julian, D., Buchman, S., Humphreys, D., & Mrohaly, M. (1983)

Research has shown that open spaces are perceived as safer than enclosed ones, with this effect being particularly evident in exposed vantage points[25].

Gender differences also influence this perception of safety: studies indicate that women tend to feel safer in protected spaces, whereas men prefer open and visually exposed environments[26]. Originally proposed in 1975, the prospect-refuge theory gained architectural relevance thanks to Hildebrand, who applied it to Frank Lloyd Wright's buildings[27], expanding its interpretation through the concepts of complexity and exploration[28]. However, despite its widespread use in architectural analysis, the theory still lacks a universally accepted definition and sufficient empirical evidence supporting its direct application, highlighting the need for further studies to understand better how design elements shape feelings of protection and openness in urban spaces[29].

Applying prospect-refuge theory to public space design could provide a new tool to enhance the perception of safety in cities. Creating accessible yet protected spaces is crucial to encouraging public space usage and improving users' psychological well-being.

Greenacre Park demonstrates how balancing prospect and refuge can create a comfortable and reassuring environment that is adaptable to different individual needs. Elements such as elevation variations, vegetation, water sounds, and spatial diversity generate a sense of security without requiring invasive control measures.

Open-Air Public Space Must be Beauty and Happy

Beauty is an essential component of public space, generating positive emotions and enhancing individual and col-

25 Ibidem.
26 Ibidem.
27 Hildebrand, G.(1991)
28 Dosen, Annemarie & Ostwald, Michael. (2016)
29 Ibidem.

lective well-being. The perception of beauty is not merely an aesthetic matter but a multidimensional phenomenon involving psychology, neuroscience, and philosophy. A well-designed public space should be able to evoke wonder, inspiration, and joy, creating an environment that fosters happiness and a sense of belonging—a flourishing space.

Scientific research demonstrates that aesthetic experiences significantly influence mood and cognitive functions. Neuroaesthetics, a field that studies the relationship between the brain and the perception of beauty, has highlighted how harmonious and well-proportioned spaces can activate brain circuits associated with pleasure and reward[30].

Moreover, aesthetics can serve as a fundamental perceptual reward, helping to mitigate stress in healthcare environments. Thus, the beauty of urban and natural environments is not merely a symbolic value but a factor directly impacting people's quality of life.

Greenacre Park in New York is an emblematic example of how beauty can transform public space. This small urban garden, nestled among Midtown Manhattan's skyscrapers, demonstrates how a well-designed public space can create a profound and engaging aesthetic experience through careful spatial planning.

The beauty of Greenacre Park lies in its harmony between nature and architecture, its attention to detail, and the quality of the sensory experience it offers. Beauty in public spaces is not only visual but multisensory. The sound of water, the freshness of the air, the fragrance of flowers, and the texture of stone all contribute to a holistic and restorative experience. Recent studies have shown that environments like this can reduce cortisol levels, the stress hormone, and enhance concentration and memory[31].

However, beauty must be accompanied by happiness. Pu-

30 Zeki, S. (1999)

31 Berman, M. G., Jonides, J., & Kaplan, S. (2008)

blic spaces should be designed to elicit joy, encourage social interaction, and create moments of lightness and play. Although Greenacre Park is a small and tranquil retreat, it also serves as a community gathering point, offering refuge from the urban frenzy and fostering a sense of belonging and connection to the place.

A public space that is both beautiful and joyful is a space where people want to return, a space that inspires, welcomes, and rejuvenates. This is not merely an aesthetic concern but a necessity for collective well-being, as the city of the future will be one where beauty and happiness are consciously designed to enhance everyone's life.

This manifesto is not intended to be a rigid model but rather a starting point for rethinking the role of architecture in the urban context. The proposal of a paradigm based on "***Architecture follows Human Flourishing***" represents both a challenge and an opportunity to move beyond the traditional opposition between function and aesthetics, placing human and environmental well-being at the center of the debate.

Many scientific studies tend to work within clear-cut dichotomies, contrasting elements such as linear and curved forms, warm and cool colors, order, and complexity. While these approaches help analyze the characteristics of spaces, they risk rigidifying design into standardized frameworks, losing sight of the dynamic and complex nature of urban experience. For this reason, it is essential to avoid the trap of a rigid architectural vision and instead maintain a critical and flexible perspective capable of adapting and responding empathetically and sensitively to the specificities of each context.

Design must be a tool for listening and interpretation, capable of understanding the needs of both citizens and places, not only through measurable parameters but also through

a deep comprehension of social, cultural, and emotional dynamics. Only in this way can we envision public spaces that generate collective well-being and profound meaning beyond rigid categorizations and binary oppositions.
The design of open-air public spaces, as the primary stage for collective life, must lead this transformation. Through these five principles, we can imagine cities that not only respond to society's immediate needs but also create meaningful experiences, authentic connections, and well-being.

6.2 POSSIBLE FUTURES

This research has explored the intricate relationship between disciplines that may appear distant, contributing to theoretical and methodological frameworks useful for evaluating the quality of public spaces and their impact on users' perceptions and experiences. However, as in any evolving field of study, numerous potential directions exist to expand further and deepen the research presented here.
One of the first future developments concerns the extensive validation of the proposed environmental psychology questionnaire to consolidate its reliability and generalizability. An extension of the study could include research conducted in different urban contexts, incorporating more or less restrictive variables, from a morphological analysis of spaces (colors, materials, geometries) to a more complex evaluation of users' emotional responses to these places.
At the same time, more advanced measurement methods could be integrated to correlate subjective perceptions with neurophysiological data. Techniques such as EEG (electroencephalography) to analyze brain activity, eye-tracking to study visual attention points, and GSR (galvanic skin response) to measure emotional reactions could provide new insights into cognitive and affective responses to public spaces. Additionally, artificial intelligence and machine learning tools could be employed to analyze large datasets, identifying

recurring patterns in urban experiences.

Moreover, experimental studies using immersive models through VR (Virtual Reality) and AR (Augmented Reality) could allow for controlled testing of different spatial configurations and their impact on users, providing replicable and optimized design scenarios before the actual construction of spaces.

Another key research development involves the evolution of public space in contemporary cities, influenced by three major phenomena:

The transition toward cognitive cities, the impact of the longevity economy, and the challenges posed by climate and social changes.

In cognitive cities, the integration of innovative technologies and interactive systems could transform public space into an adaptive environment capable of dynamically responding to users' needs. Environmental sensors, big data, and artificial intelligence could monitor and regulate parameters such as lighting, temperature, air quality, and acoustics, promoting a smoother and more personalized urban experience. In this context, it would be valuable to investigate whether and how these tools enhance perceptions of well-being and inclusivity in public spaces.

At the same time, population aging introduces new challenges for urban design. Studying the role of public space in promoting health and well-being among older adults becomes crucial. Exploring the concept of "architecture as care" through tests in spaces designed to stimulate neuroplasticity, encourage mobility, and support social interaction can offer insights into a more accessible and intergenerational city. In this perspective, measurement tools such as cognitive tests, heart rate variability (HRV) evaluations, and posture and movement analysis could provide valuable data to guide future urban planning.

Finally, climate change and social crises make it necessary

to rethink public spaces as tools for urban resilience. Future studies could explore adaptive design strategies to address extreme weather events, heat waves, and migratory flows, analyzing how the morphology of spaces and the presence of natural elements can help mitigate environmental and social impacts. The adaptive design approach could become a central research avenue, aiming to develop flexible public spaces that can evolve over time in response to emerging urban challenges.

The evolution of research on public space and human well-being lies within a multidisciplinary horizon, embracing architecture, cognitive sciences, digital technologies, and social studies. The future perspectives outlined here emphasize the need for an integrated approach capable of translating scientific evidence into concrete design strategies for the city of the future. The hope is that these developments will contribute to academic discourse and guide policies and design practices aimed at creating more sustainable, inclusive, and regenerative urban environments.

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GLOSSARY

A

Affect. In the context of this research, Affect refers to a pre-cognitive quality of the relationship between the body and space, capable of triggering somatic and perceptual responses prior to rational processing. In architecture, it describes the ability of an environment to modulate emotional and sensory states, thus influencing well-being and the perception of place.

Affordance, introduced by James J. Gibson, refers to the action possibilities offered by the environment in relation to the individual's perceptual and motor abilities. In this thesis, the concept is applied to public space to describe how material configurations, shapes, and architectural elements implicitly suggest behaviors such as pausing, walking, observing, or interacting.

Agency. In the context of this thesis, Agency denotes the individual's capacity to actively engage with public space, influencing its use, meaning, and transformation. An environment designed to be inclusive and stimulating enhances users' agency by fostering participatory experiences, a sense of control, and symbolic appropriation of place.

Anova (Analysis of Variance), is a statistical technique used in this research to compare the mean scores obtained from questionnaires administered across different types of public spaces. Through variance analysis, it was possible to determine whether the differences between data groups were statistically significant, thereby contributing to the empirical validation of the results.

Alpha waves, are brain oscillations within the 8–12 Hz frequency range, associated with relaxed alertness and psychophysiological well-being. In this thesis, EEG analysis of alpha waves was employed to assess users' neurophysiological responses to different spatial configurations, highlighting the regenerative potential of designed environments.

Attention Restoration Theory (ART). Developed by Rachel and Stephen Kaplan, the Attention Restoration Theory posits that certain environments—especially natural ones—facilitate the recovery of directed attention, which becomes fatigued due to prolonged cognitive stimulation. This thesis adopts the ART framework to analyze the restorative quality of designed public spaces, using the PRS/IT questionnaire as a tool.

Authentic Happiness Theory. Formulated by Martin Seligman, the Authentic Happiness Theory suggests that well-being arises from the combination of positive emotions, engagement, and meaning. In this thesis, the theory provides a conceptual framework for interpreting the role of public space as a setting capable of activating emotional experiences and a sense of belonging.

Autonomic nervous system. The autonomic nervous system automatically regulates physiological states such as relaxation, arousal, and alertness. In this thesis, it is implicated in the interpretation of brainwave activity (Alpha, Beta) recorded through EEG, as these patterns reflect the underlying neurophysiological states induced by architectural space.

Autonomy. In the context of this thesis, Autonomy refers to the subjective perception of control and freedom of action within public space. Environments designed to encourage varied choices, paths, and behaviors enhance the individual's sense of autonomy, contributing to psychological well-being and the quality of urban experience.

B

Behavioral. The term Behavioral refers to observable actions and responses in relation to the built environment. In this thesis, it is used to describe how spatial configurations, forms, and materials influence ways of moving, pausing, and interacting within public space, highlighting the connection between environmental perception and behavioral response.

Being-Away is one of the four factors of the Perceived Restorativeness Scale (PRS) and refers to the psychological sensation of distancing oneself from everyday routines. In this thesis, the parameter is employed to assess the ability of public space to offer a restorative pause, fostering a perception of being elsewhere while remaining within the urban context.

Beta waves are brain oscillations within the 13–30 Hz range, associated with active attention, alertness, and cognitive stimulation. In this thesis, an increase in beta activity—measured via EEG—is interpreted as an indicator of emotional engagement and mental activation in response to specific spatial configurations.

Brainwave activity. The term Brainwave Activity refers to the range of electrical signals generated by the brain, divided into various frequency bands (Alpha, Beta, Theta, etc.) detectable via EEG. In this thesis, the analysis of brainwave activity serves to measure users' neurophysiological responses to spatial stimuli, with particular focus on states of relaxation and cognitive activation.

Built environment. The term Built Environment refers to all human-designed and constructed spaces, which directly influence perception, behavior, and psychophysical states. In this thesis, architectural public space is analyzed as an active component of the built environment, capable of modulating well-being, social interactions, and neuropsychological responses.

C

Coherence refers to the degree of perceptual order and visual legibility of a space—that is, the ease with which environmental elements integrate into a comprehensible whole. In this thesis, spatial coherence is considered a factor that facilitates navigation, reduces stress, and contributes to the quality of the urban experience.

Cognitive city is an emerging urban paradigm that moves beyond the smart city model by placing human experience, collective learning, and sensitive interaction between citizens and the environment at its core. In this thesis, it serves as the theoretical framework that enhances the value of public space as a cognitive interface between body, mind, and the city.

Compatibility is one of the four factors of the Perceived Restorativeness Scale (PRS) and measures the extent to which an environment supports an individual's goals, desires, and activities. In this thesis, the parameter is used to assess how well public space aligns with users' expectations and facilitates experiences of well-being.

Cronbach's Alpha is a statistical index of internal reliability, used to measure the consistency among items within a psychometric scale. In this thesis, it was applied to the PRS/IT to verify its internal consistency and its validity in assessing the perceived restorative potential of designed public spaces.

D

Delta wave are low-frequency brain oscillations (0.5–4 Hz), typically associated with deep sleep and states of physiological regeneration. Although not central to the EEG analysis in this thesis, they are considered within the broader theoretical framework to account for the full spectrum of neurophysiological responses to space.

E

EEG (Electroencephalography) is a non-invasive technique that records brain electrical activity through sensors placed on the scalp. In this thesis, it was used to monitor, in real time, the brainwaves (Alpha, Beta) of participants exposed to different designed public spaces, in order to evaluate neurophysiological responses related to perceived well-being.

Embodied cognition is a theory suggesting that the mind is not separate from the body but emerges from the dynamic interaction between perception, action, and environment. In this thesis, this approach supports the idea that public space directly influences cognitive and emotional processes through situated and multisensory bodily experiences.

Embedded cognition refers to the perspective that cognitive processes are deeply rooted in the environmental context in which they occur. In this thesis, the concept reinforces the notion that thinking and well-being also emerge from the quality of public space, which acts as an active component of the human cognitive system.

Enacted cognition is a theory suggesting that cognition emerges from situated action and continuous interaction between body, environment, and intentionality. In this thesis, the approach supports the idea that the experience of public space is not passive, but actively constructed through users' movement, perception, and behavior.

Environmental Psychology is a discipline that studies the relationships between humans and the physical environment, with particular attention to perceptual, behavioral, and emotional effects. In this thesis, it provides the theoretical and methodological framework for analyzing how public space influences psychological

well-being, through tools such as the PRS/IT and behavioral observation.

Electromyography (EMG) is a technique that measures the electrical activity generated by muscles during contraction. Although not directly used in this thesis, it is considered among complementary methods for neurophysiological monitoring, useful in studies on bodily experience within built environments.

Extent is one of the four factors of the Perceived Restorativeness Scale (PRS) and refers to the perception that an environment offers a sufficiently vast, coherent, and structured world that allows for exploration and mental immersion. In this thesis, the parameter is used to evaluate the ability of public space to foster perceptual continuity and cognitive engagement.

Extended cognition is a theory proposing that the mind does not reside solely in the brain but extends outward through interaction with tools, bodies, and environments. In this thesis, the concept supports the idea that architectural public space actively participates in cognitive processes, functioning as a functional extension of human thought and experience.

F

Fascination is one of the four factors of the Perceived Restorativeness Scale (PRS) and refers to an environment's ability to effortlessly and spontaneously capture attention. In this thesis, the parameter is used to assess the extent to which public space stimulates perceptual curiosity, fostering attentional recovery and exploratory interest.

Flourishing refers to a condition of full human development, in which psychological well-being, meaningful relationships, sense of purpose, and personal fulfillment are interwoven. In this thesis, public space is explored as a design device capable of fostering conditions conducive to flourishing, placing architecture in service of both individual and collective growth.

Functional Magnetic Resonance Imaging (fMRI) is a neuroimaging technique that detects brain activity by measuring changes in blood flow. Although not used directly in this thesis, it is cited as a complementary method for investigating cognitive and emotional responses to architectural environments.

G

Gamma wave are high-frequency brain oscillations (above 30 Hz), associated with complex cognitive processes such as learning, memory, and sensory integration. In this thesis, although not central to the EEG analysis, they are considered within the theoretical framework of neurophysiological responses potentially activated by designed public spaces.

M

Magnetoencephalography (MEG) is a neuroimaging technique that detects the magnetic fields generated by neural activity. Although not used in this thesis, it is mentioned as a high temporal and spatial resolution method for studying brain dynamics, complementary to EEG in the analysis of cognitive responses to architectural spaces.

N

Neuroarchitecture is an interdisciplinary field that explores how the built environment affects the brain, mind, and human behavior. In this thesis, it serves as the theoretical and experimental framework for analyzing public space, combining architecture, neuroscience, and perceptual experience to investigate the relationship between spatial form and psychophysical well-being.

Neurophysiology is the study of the biological processes governing the functioning of the nervous system. In this thesis, it provides the scientific basis for interpreting EEG data, which are used to measure real-time brain responses to different configurations of designed public space.

O

Open-Air Public Space refers to outdoor public spaces that are accessible, shared, and not shaped by consumerist dynamics. In this thesis, such spaces are considered privileged contexts for analyzing the impact of architecture on human well-being, as they are places where form, perception, and behavior intertwine directly and immediately.

P

Perceived Restorativeness Scale (PRS) is a psychometric tool developed by Rachel and Stephen Kaplan to measure the perceived restorative potential of an environment, based on four factors: Being-Away, Fascination, Extent, and Compatibility. In this thesis, its Italian version (PRS/IT) was used to assess the psychological quality of public spaces designed by contemporary architects.

Pearson Correlation is a statistical index that measures the strength and direction of the linear relationship between two variables. In this thesis, it was used to analyze the correlations between the PRS/IT dimensions and users' subjective evaluations of public space quality, in order to identify meaningful links between environmental perception and psychological well-being.

Q

Quality of Public Space (QoPS) is an experimental scale developed within this thesis to assess the perceived quality of public space through eight key factors: Nature, Visibility, Culture, Density, Diversity, Safety, Identity, and Flourishing. The tool integrates environmental, symbolic, and psychological aspects to provide a comprehensive interpretation of the urban experience.

S

Scope refers to the perception of openness, vastness, and exploratory potential offered by a space. Although not one of the official factors of the Perceived Restorativeness Scale (PRS), in this thesis it is used as a descriptive concept to explore the immersive quality of public spaces, particularly in relation to their spatial articulation and visual continuity.

Sick Building Syndrome (SBS) describes a set of physical and cognitive symptoms—such as headaches, fatigue, irritation, or difficulty concentrating—that occur in built environments perceived as unhealthy. In this thesis, the concept is referenced critically to emphasize, by contrast, the importance of public spaces designed to

foster well-being rather than environmental stress.

Stress Recovery Theory (SRT), developed by Roger Ulrich, posits that exposure to certain environments—especially natural ones—promotes rapid recovery from physiological and psychological stress. In this thesis, SRT serves as a theoretical reference for interpreting emotional and neurophysiological responses to public spaces, in relation to their restorative potential.

T

Theta wave are low-frequency brain oscillations (4–8 Hz), associated with deep relaxation, introspection, and imagination. In this thesis, although not a primary focus of the EEG analysis, they are considered within the theoretical framework to describe the connection between immersive cognitive states and the perceptual qualities of public space.

The 4E model describes an approach to cognition based on four principles: Embodied, Embedded, Enacted, and Extended. In this thesis, the model provides the theoretical foundation for interpreting the interaction between body, environment, and cognitive processes, highlighting how architectural public space actively contributes to the construction of human experience and well-being.

The 4A model proposes a view of cognition grounded in four principles: Affectivity, Autonomy, Agency, and Attention. In this thesis, the model is referenced to describe the active role of individuals within public space, where emotions, action capacity, sense of control, and attentional mechanisms dynamically intertwine, contributing to the quality of urban experience.

W

Well-Being Theory, developed by Martin Seligman within the field of positive psychology, expands on the earlier Authentic Happiness Theory by including five core dimensions of well-being: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment (PERMA). In this thesis, the theory informs the interpretation of public space as a design tool capable of fostering conditions conducive to human flourishing.

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ANNEXES

PRS/IT QUESTIONNAIRE

Consenso informato

Lo studio si propone di indagare il rapporto tra individuo - ambiente con l'intento di verificarne l'influenza sul benessere umano nel contesto urbano.

La persona responsabile del progetto è il PhD candidate Andrea Di Cinzio, con supporto del Professore Lorenzo Pignatti del Dipartimento di Architettura (UNICH), del Professore Marcello Costantini del Dipartimento di Scienze della Salute e del Territorio (UNICH) e della Professoressa Marcella Del Signore del New York Institute of Technology (NYIT).

Chiediamo la tua disponibilità a partecipare alla ricerca. Prima di decidere se dare o meno il consenso, è importante che tu legga attentamente le seguenti informazioni relative agli obiettivi della ricerca e alle modalità con cui è condotta. Ti preghiamo di prenderti il tempo necessario e di non esitare a chiedere chiarimenti o approfondimenti.

Perché sono statə contattatə proprio io?

Per realizzare lo studio stiamo chiedendo la partecipazione di chiunque abbia voglia di apportare un'aggiunta alla ricerca del benessere. L'avere il maggior numero di dati relativi a genere ed età, può aiutare al comprendere meglio il modo in cui le persone si relazionano con l'ambiente urbano.

Cosa devo fare in quanto partecipante attivo ?

Se accetti di prendere parte alla ricerca, ti verrà chiesto di rispondere alle domande di un questionario su 18 casi studio. La sua compilazione richiederà all'incirca 35/40 minuti.

Ti consigliamo di fare il test in un luogo comodo e da un

device che ti permetta di concentrarti sul contenuto delle domande. Consigliamo l'uso delle cuffie.

La mia identità è protetta?

I dati saranno trattati ai sensi dell'articolo 13 del Regolamento (UE) n. 679/2016 e dal D.L. 196/2003, così come adeguato al D.L. 101/2018 in tema di protezione dei dati personali. I dati raccolti saranno utilizzati esclusivamente per scopi di ricerca scientifica. Tutte le informazioni raccolte saranno conservate in modo sicuro e ne sarà impedita la visione da parte di estranei. Qualsiasi informazione che possa identificare le persone partecipanti sarà rimossa per garantirne l'anonimato. Il materiale sarà custodito dalla persona responsabile dello studio.

In quanto partecipante corro dei rischi?

Non ci sono rischi di natura fisica e/o psichica derivanti dalla partecipazione allo studio in questione.

Quali sono i benefici derivanti dalla partecipazione?

Non sono previsti benefici diretti dalla partecipazione alla ricerca. Tuttavia, anche grazie alla tua partecipazione, sarà possibile approfondire la conoscenza delle dinamiche e/o dei processi inerenti all'area oggetto di indagine.

È possibile conoscere i risultati della ricerca?

I risultati della ricerca saranno resi pubblici sia attraverso i consueti canali scientifici sia attraverso quelli maggiormente divulgativi.

Chi posso contattare per avere ulteriori informazioni?

Se dovessi avere delle domande o dubbi sulla ricerca in questione, puoi di rivolgerti ad Andrea Di Cinzio attraverso la mail: andrea.dicinzio@unich.it

Quali sono i miei diritti se decido di partecipare alla ricerca?
Qualora decidessi di ritirare il tuo consenso ed interrompere la tua partecipazione alla ricerca, non rinuncerai ad alcun diritto legale acquisito attraverso la partecipazione alla ricerca.

Ti ringraziamo per la collaborazione.

Vuoi proseguire?
_ SI
_ NO

DATI ANAGRAFICI

Per favore crea e inserisci il seguente codice ANONIMO:
1) Iniziale del nome di Tuo padre
2) Ultime tre cifre del Tuo numero di telefono cellulare
3) Iniziale del nome di Tua madre
4) Giorno della Tua data di nascita espresso in due cifre
Esempio di codice: A869F09

Qual è il tuo genere?
_ Maschio
_ Femmina
_ Altro
_ Preferisco non dirlo

A quale fascia d'età appartieni?
_ 18-25
_ 26-35

_ 36-45

_ 46-55

_ 56-65

_ 66-75

In quale categoria rientri?

_ Architetto/Sudente di Architettura

_ Altro

Adesso ti verrà mostrato un video con delle immagini di spazi pubblici e con dei suoni registrati nei rispettivi spazi.
Quello che ti chiedo è di rispondere a delle domande mostrando il tuo gradimento in una scala da 1 (Completamente in disaccordo) a 5 (Completamente d'accordo).
Prima di rispondere alle domande ti chiedo di premere play e ascoltare il file audio e guardare attentamente le immagini presenti per ogni spazio pubblico.
P.S. è consigliato l'utilizzo delle cuffie.
NOTA BENE: Il questionario richiede molto tempo. Ti consiglio, se ne avrai la necessità, di interromperlo e riprenderne la compilazione in seguito, appena ne avrai l'opportunità. Ricorda di utilizzare lo stesso dispositivo in modo da non perdere le risposte già date.
Quando sei pront* clicca sulla freccia e inizia.

Visualizzazione del video della durata di 0,56 minuti per ogni spazio pubblico selezionato.

PRS/IT

Le cose che potrei fare lì sono cose che mi piacciono.
Quel luogo mi incuriosisce.
Sarebbe veramente interessante seguire ciò che accade lì.
Essere lì sarebbe in accordo con i miei interessi personali.
C'è molto da esplorare e da scoprire lì.
Quel luogo è affascinante.
Lì la mia attenzione sarebbe attratta da molte cose interessanti.
Quel luogo è abbastanza grande da poter essere esplorato in molte direzioni.
Se fossi lì non dovrei pensare a cose che non mi interessano.
In quel luogo potrei scappare dalle cose che di solito richiedono la mia attenzione.
Essere lì mi aiuterebbe a smettere di pensare alle cose che devo fare.
Trascorrere il tempo lì mi permetterebbe di staccare dal mio tran-tran quotidiano.
Mi rifugerei in quel luogo se non volessi esseri disturbato.
Se fossi lì non sarei obbligato a concentrarmi molto.
Le cose e le attività che io vedo lì mi sembrano completarsi in un modo abbastanza naturale.
In quel luogo potrei scegliere di fare ciò che voglio.
Lì sarebbe facile fare ciò che voglio.
Quel luogo sembra completo di tutto.
Sarebbe difficile annoiarsi lì.
Lì ci sono pochi ostacoli che mi impedirebbero di fare ciò che mi piace.
È come se quel luogo non avesse confini.
Lì ci sono poche barriere o ostacoli che limiterebbero le mie

possibilità di muovermi.

Lì ogni cosa sembra avere un proprio posto.

Lì è facile vedere come sono disposte le cose.

C'è un ordine chiaro nella disposizione fisica di quel luogo.

Lì potrei orientarmi senza problemi.

Sei mai statə in questo luogo?

_ SI

_ NO

ELIGIBILITY FOR EEG EXPERIMENT

This questionnaire will ask some questions to determine your eligibility for the EEG study, “Flourishing in Public Open-Air Space”
First, please tell us your name and contact information, so that we can be in touch.

Name and Surname:

_____

Email:

_____

What is the best way to contact you?

_ Email

_ Phone (call)

_ Phone (text)

Please specify your age:

_____

Please specify your gender:

_ Male

_ Female

_ Non-Binary

_ Prefer not to say

***Please specify your gender*:**

_ Hispanic or Latino

_ Not Hispanic or Latino

_ Prefer not to say

***Please specify your race*:**

_ American Indian / Alaskan Native

_ Asian

_ Native Hawaiian, ot other Pacific Islander

_ Black or African American

_ White

_ Other (please specify): _____

Are you a U.S. citizen?

_ Yes

_ No, i am from: _____

***Please specify the highest level of education you have completed*:**

_ Less than high school

_ High school

_ Some college / Currently attending

_ Undergraduate

_ Graduate

_ Doctorate / Professional

***Please specify your current status of employment*:**

_ Employed

_ Unemployed

_ Student

_ Retired

_ Other (please specify): _____

What is your handedness:

_ Left handed

_ Right handed

_ Ambidextrous

Are you currently taking any medication?

_ Yes. Specify: _____

_ No

Have you ever been diagnosed with a psychiatric disorder (e.g., schizophrenia, major depressive disorder, post-traumatic stress disorder, bipolar disorder)?

_ Yes

_ No

Have you ever been diagnosed with a neurological illness (e.g., epilepsy, dementia)?

_ Yes

_ No

Are you pregnant, or do you think you might become pregnant before you do the study?

_ Yes

_ No

Do you have normal vision?

_ Yes. I do not need to wear glasses or contacts.

_ Yes, but it is corrected to normal (I wear glasses or contacts).

_ No

Do you wear contact lenses, and would you be able to wear them for the EEG study?

_ Yes

_ No

Do you have normal hearing?

_ Yes

_ No

_ Yes, but I wear hearing aids, and I need them to hear well.

Some of the following items may be can interfere with the EEG examination. Please indicate if you have any of the following.

Cardiac pacemaker

_ Yes

_ No

Implanted cardiac defibrillator

_ Yes

_ No

Aneurysm clip

_ Yes

_ No

Carotid artery vascular clamp

_ Yes

_ No

Neurostimulator

_ Yes

_ No

Insulin or infusion pump

_ Yes

_ No

Implanted drug infusion device

_ Yes

_ No

Spinal fusion stimulator

_ Yes

_ No

Cochlear, otologic, or ear implant

_ Yes

_ No

Ear tubes

_ Yes

_ No

Prosthesis (eye/orbital, penile, etc.)

_ Yes

_ No

Implant held in place by a magnet

_ Yes

_ No

Heart valve prosthesis

_ Yes

_ No

Artificial limb or joint

_ Yes

_ No

Other implants in head

_ Yes

_ No

Electrodes (brain)

_ Yes

_ No

Intravascular stents, filters, or coils

_ Yes

_ No

Shunt (spinal or intraventicular)

_ Yes

_ No

Vascular access port and/or catheters

_ Yes

_ No

Swan-Ganz catheter

_ Yes

_ No

Transdermal delivery system (Nitro.)

_ Yes

_ No

IUD or diaphragm

_ Yes

_ No

Pessary or bladder ring

_ Yes

_ No

Tattooed eyeliner or eyebrows

_ Yes

_ No

Metal fragments (eye, head, ear, skin)

_ Yes

_ No

Internal pacing wires

_ Yes

_ No

Aortic clips

_ Yes

_ No

Venous umbrella

_ Yes

_ No

Metal or wire mesh implants

_ Yes

_ No

Wire sutures or surgical staples

_ Yes

_ No

Harrington rods (spine)

_ Yes

_ No

Metal rods in bones; joint replacements

_ Yes

_ No

Bone/joint pin, screw, nail, wire, plate

_ Yes

_ No

Breathing or motion disorders

_ Yes

_ No

Is there anything else that you think might affect your safety in the EEG that you'd like to share?

_ Yes. Specify: _____

_ No

QUALITY OF PUBLIC SPACE (QOPS) QUESTIONNAIRE

After experiencing the various selected public spaces, I ask you to answer some questions with respect to certain elements and qualities of these spaces.
Answer the questions by selecting a value from 'completely disagree' to 'completely agree', where 'completely disagree' is worth 1 (a little) and 'completely agree' is worth 5 (a lot)

Before we start I need some of your data

***Name and Surname*:**

_____

***Email*:**

_____

***Please specify your age*:**

_____

***Please specify your gender*:**

_ Male

_ Female

_ Non-Binary

_ Prefer not to say

***Please specify your gender*:**

_ Hispanic or Latino

_ Not Hispanic or Latino

_ Prefer not to say

Please specify your race:

_ American Indian / Alaskan Native

_ Asian

_ Native Hawaiian, ot other Pacific Islander

_ Black or African American

_ White

_ Other (please specify): _____

Are you a U.S. citizen?

_ Yes

_ No, i am from: _____

Please specify the highest level of education you have completed:

_ Less than high school

_ High school

_ Some college / Currently attending

_ Undergraduate

_ Graduate

_ Doctorate / Professional

Before answering, the participant displays the two areas where he/she performed the EEG experiment for each Public Space. The display and subsequent response to the questions follows the order of the EEG experiment, i.e.: Midtown Greenway Eastriver, Greenacre Park, The High Line

and, Brooklyn Bridge Park. What I ask you is to answer questions by showing your liking on a scale of 1 (Completely disagree) to 5 (Completely agree).

Natural Quality (3 items):
A sense of fascination with the natural world, its strength, and power. A feeling of untouched nature or deliberate design. Seemingly self-seeded plants and naturally shaped water.

- The presence of greenery in this public space is an important factor.
- The presence of water enhances the natural qualities of this public space.
- This public space successfully conveys a sense of a designed natural landscape.

Cultural Quality (3 items):
A sense of fascination with culture, creativity, human efforts, and history. This includes appreciation for architecture as a whole, as well as for its details.

- This public space evokes a sense of fascination through its artificial elements.
- The equipment and design elements (shape, materials, colors) enhance the cultural richness of this public space.
- Overall, this public space successfully integrates natural and artificial elements to create a harmonious environment.

Visibility Quality (2 items):
Panoramas, views, perspectives, and scenic spots. Open space for free movement, play, or physical activities.

- This public space offers visitors the opportunity to observe their surroundings in depth.
- Overall, this public space effectively uses its elements to create a sense of openness and freedom for visitors.

Density Quality (4 items):
The abundance of people and movement, social activities and interactions, and the presence of shops, cafés, restaurants, etc.

- The overall density of people and movement in this space is notable.
- The quality of social interactions and activities available, including the variety of shops, cafés, and restaurants, is significant.
- This space offers abundant opportunities for social interactions and activities.
- This space promotes community events, cultural meetings, and recreational facilities.

Diversity Quality (3 items):
A sense of variation and abundance. Diverse species of plants, animals, colors, furnishings, etc. Variations in spatial configuration and content.

- The overall diversity and abundance of plant and animal species in this environment is significant.
- The diversity in the spatial configuration and content of this public space, considering architectural styles, variations in form, and artistic elements, is well perceived.
- The sense of variation and diversity in furniture and design elements, including colors, textures, and decorative accents, is abundant in the spaces you frequent.

Safety Quality (2 items):

- A sense of shelter, safety, and protection. A closed environment, a refuge, a hideaway.
- The sense of shelter, safety, and security in this environment is well established.
- The overall quality of security in the area is perceived as

high.

Identity Quality (3 items):
There should be a sense of inclusion, respect, and empowerment for all individuals, regardless of race, ethnicity, gender, sexuality, religion, disability, or other identity factors—elements that also contribute to the urban landscape's identity.

- This public space fosters inclusion and respect for individuals with different identities, including ethnicity, gender, sexuality, religion, disability, and others.
- This place allows individuals to freely express their identity without fear of discrimination or prejudice.
- This space reflects the diversity of identities and cultures that contribute to New York's urban landscape.

Flourishing Quality (5 items):
The overall physical, mental, and social well-being that allows individuals to experience vital energy and positive emotions such as happiness and beauty.

- This environment fosters a sense of physical, mental, and social well-being.
- The beauty of this environment frequently evokes positive emotions such as happiness.
- The overall vitality and energy experienced in this environment contribute to a sense of well-being.
- This public space positively influences the overall mood.
- This public space actively promotes overall health and well-being.

Quality.

Which of the factors you observed do you consider to be fundamental in increasing the perception of your well-being in public space? you can choose more than one

_ Natural

_ Cultural

_ Visibilty

_ Density

_ Diversity

_ Safety

_ Identity

_ Flourishing

Would you come back?

_ Yes. Why? _____

_ No. Why? _____

This doctoral thesis explores how urban public spaces can actively foster human flourishing through a multidisciplinary approach that integrates architecture, environmental psychology, and neuroscience. Building on the hypothesis that the built environment has measurable effects on human behavior and neurophysiological states, the research critically examines the relationship between spatial design and well-being. The study is structured around three interrelated phases: the first involves the identification and taxonomic classification of 18 public spaces in New York City, analyzed through behavioral observation and interpreted using the 4E-4A cognitive-environmental model; the second consists of an empirical assessment using the Perceived Restorativeness Scale (PRS/IT); and the third presents an EEG-based neurophysiological experiment conducted in selected urban environments. Results indicate that specific design elements — such as natural features, forms, sensory richness, and inclusive accessibility — significantly contribute to psychological restoration and cognitive-affective regulation. The research proposes a new design paradigm shifting from "form follows function" to "architecture follows human flourishing," advocating for public spaces that are not only functional but also restorative, inclusive, and emotionally resonant. The thesis concludes with a five-point manifesto aimed at reorienting architectural practices toward the creation of spaces that enhance individual and collective well-being in the 21st-century urban context.