SUITABLE MODIFICATIONS OF PUBLIC SPACES FOR PEOPLE WITH ASD

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ABSTRACT: This text explores the design of public space for individuals with Autism Spectrum Disorder (ASD), emphasizing a philosophical and phenomenological approach to architecture. The framework is based on Kant's triad of perception, reception, and apperception, viewing space as a culturally and spiritually shaped structure. Unlike conventional functional or technical approaches, the article highlights the importance of spatial legibility, rhythm, sensory stability, and non-verbal communication through materiality and form. It introduces concrete design principles that support sensory integration, environmental control, predictability, calming escape zones, previewing, and respect for individual sensitivity. The study points out the broader societal benefits of such spatial modifications and argues for their usefulness not only for individuals with ASD but for the general population. Architectural space is presented as a therapeutic, inclusive, and existentially supportive framework that fosters a dignified human presence in the world.

KEYWORDS: architecture and autism; ASD; public space; sensory integration; perception and apperception; philosophy of space; inclusive design; spatial legibility; previewing; therapeutic environment

INTRODUCTION

The creation of architectural space for individuals with autism spectrum disorder (ASD) requires a deeper approach than purely technical or functional considerations. People with ASD perceive their environment not only through sensory stimuli but also through its rhythm, organization, legibility, and spiritual qualities. This article introduces a philosophical-theoretical framework that emerged from a professional discussion between Prof. Ing. arch. Petr Hrůša and Ing. arch. Anna Janošová, drawing on Kant's concept of perception, reception, and apperception. It presents space as a culturally and spiritually shaped entity capable of influencing the user's mental state and supporting dignity, stability, and sensory integrity. In the context of autism, space is revealed not only as a functional framework of everyday life but also as a tool of therapy, orientation, and self-understanding—a finding that stems from a survey of current and practiced therapies within the Czech Republic. The aim of this text is to demonstrate that the integration of philosophical and phenomenological principles into design can bring a new approach to architecture—one that responds to the deeper existential needs of people with neurodiverse experiences.

PHILOSOPHICAL BASIS FOR CREATING ARCHITECTURAL SPACE FOR INDIVIDUALS WITH ASD

Designing space for people with autism spectrum disorder (ASD) requires a specific approach that transcends purely functional considerations. The theoretical-philosophical framework for designing space for people with ASD builds upon the triad of perception, reception, and apperception [1]. While most professional literature focuses on the physiological perception of space (e.g., light, sound, matter), autistic individuals also respond sensitively to metaphysical qualities of space—for instance, the spiritual atmosphere of sacred buildings.

Reception is understood here as the perception of measurability in space—for example, measurable and recurring time (chronos) versus the corporeality of time-space (tempos). People with autism are particularly sensitive to the tempo of space; for example, the restlessness of a train station corridor can induce stress, whereas the calm environment of a library evokes a sense of safety. Apperception then represents the unification of all levels of perception by harmonizing them into a meaningful whole. This does not apply solely to individuals with ASD but extends to the entire neurotypical population. Related to this is a fourth concept of spatial design—cultivation—through which meaningful space emerges.

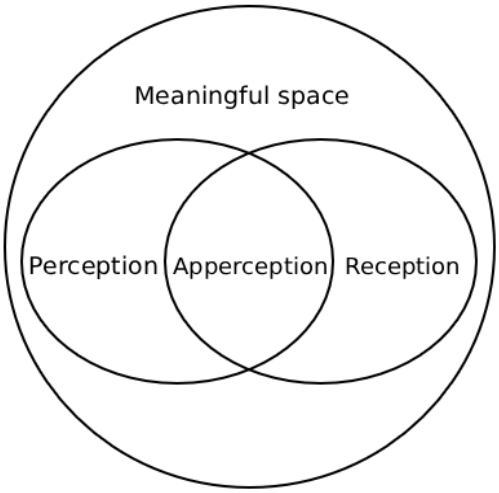

Fig. 1.: Venn diagram illustrating meaningful space (Source: Anna Janošová – own scheme), March 2025, VŠB-TUO

Modern, and particularly postmodern, architecture often neglects spatial stability and legibility. Yet individuals with ASD require space that is regular, legible, and predictable. Here, regularity carries a broader meaning and does not always imply symmetry or equidistant spacing. Regularity can manifest as the balance of spaces through a harmonious combination of multiple compositional elements. Rather than through evenly distanced elements, regularity may be perceived bodily—through the sense of "tactus," for instance, what gives meaning to the rhythm of walking.

Legibility is not primarily about using pictogram signage but about avoiding mixed signals sent to users of the space. Materials, shapes, work with light, and other essentially receptive architectural tools convey nonverbal signals, which should not contradict one another. For example, through appropriate spatial structuring, choice of textures, or color placement, it is possible to create boundaries that clearly signal areas of focus and distinguish non-colliding, legible zones. A well-designed entrance is another typical example. Predictability of space can be ensured through visual connections or formal solutions.

All this can inspire a new architectural paradigm—perceiving space not merely as an intangible psychological locus, but as a culturally, physically, and spiritually shaped structure. Inspiration may also be found in phenomenology (Husserl, Brentano), which under-

stands space as existentially rooted [2].

HYPOTHESIS OF FOUR PARADIGMS FOR SPACE DESIGN [3]

1. Ontological paradigm (realist, essentially substantive): Emphasizes the permanence and immutability of things that exist independently of circumstances and are perceived through perception. In the context of an ASD-inspired approach, the epistemological question (noesis) is: "What does it mean that something permanent exists?" This approach is shared by classical philosophers such as Plato and Aristotle, as well as modern phenomenologists like Heidegger, who all sought enduring being. In architecture, permanence is not expressed by unchanging functions but, for example, through durable layouts shaped by high-quality materials or a sustainable rhythm of compositional elements.

2. Constructivist paradigm: Understands knowledge as the result of receptive consciousness, where what is substantive is created within conditions of cognition (such as logical rules or laboratory-like constructs). The central question is: "What can I know?" This approach is represented by René Descartes and Karl R. Popper and is linked to the development of noetics as a receptive epistemology. A typical example is the tectonics of space, which does not deny its fundamental principles.

3. Communicative paradigm (logically phenomenological): Based on the recognition that the boundaries of knowledge are limited by the possibilities of expression, it builds on apperception—that is, distancing from ordinary perception. The essential question is: "What can I understand?" This approach is associated with hermeneutics and supported by thinkers such as Brentano, Ingarden, Husserl, Patočka, Wittgenstein, Rezek, and Gadamer.

4. Complementary paradigm: Based on Plotinus's philosophy [4], which concerns the Good and the Beautiful, where true beauty is bound to unity (the One), reason (Logos), idea, and soul. Architectural space should result from intelligent creation—a synthesis of spiritual and sensory cognition. The aim of design inspired by Plotinus's legacy is not self-serving aesthetics but the achievement of a harmonious whole that fosters dignity, calm, and mental integrity of the user—especially those more sensitive to surrounding stimuli.

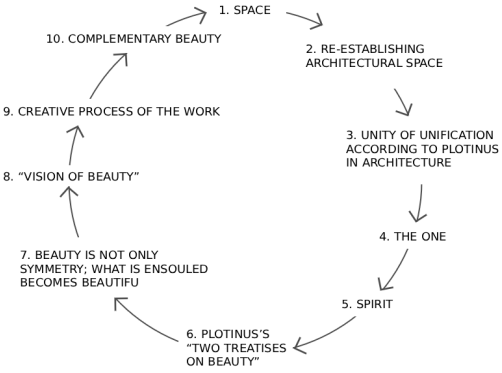

Fig. 2.: Diagram illustrating space design for individuals with ASD (Source: Anna Janošová – own scheme), March 2025, VŠB-TUO

A philosophical approach to designing space for individuals with ASD does not necessarily need to focus exclusively on people with ASD. On the contrary—surprisingly, it may also help the wider professional and lay public to uncover the deeper meaning of architecture as space rather than as a general environment; that is, space for human existence. A space designed according to these principles becomes not only functional but also therapeutic.

The above table illustrates the percentage of physical and mental health difficulties. If we acknowledge the importance of adapting space for people with physical impairments (16%) or visual disabilities (3%), why should we not adapt space for autistic individuals (1.4%) or for those with mental health problems (30%)? Such adjusted spaces are not only suitable for individuals with ASD but also generally reduce the psychological burden on all of us.

Category	Prevalence in Europe
Autism	0.8–1 % (max. ~1.4 %) [5]
Severe visual impairment	1 in 30 Europeans (approx. 3 %) experience some form of vision loss, including severe and mild cases [6]
Serious mobility impairment	7–10 %; up to 16 % if including other difficulties [7]
Mental health problems (prevalence)	~30 % (of which 16 % daily, 10–15 % annually) [8]

Tab. 1.: Prevalence of health problems in the population. (Data sources: cited individually, compiled by Anna Janošová, 2025, VŠB-TUO)

SPATIAL DIVISION BY FUNCTION

The autobiographical testimonies of Temple Grandin, Donna Williams, Gunilla Gerland, and Ida Kedar reveal that physical space provides individuals with autism a stable anchor in a changing world. Stability, predictability, and sensory friendliness of the environment—as well-conceptualized space (cf. Plotinus)—are more essential for them than interpersonal relationships. As Ruud Hendriks points out, "inhuman (un?)predictable behavior and iron regularity" represent precisely what

Space	Examples	Main Function	Secondary Function
Public space	Náměstí, ulice, parky, nákupní centra	Cannot be simply defined	
Semi-public space	Schools, rehabilitation institutes, therapy centers	Concentration, treatment	Rest
Soukromý prostor	Housing, sheltered housing, day-care centers	Rest, calm	Concentration

Tab. 2.: Table summarizing spatial perception (Source: Anna Janošová, September 2022, VŠB-TUO)

Fig. 3.: Example of a suitable public space design for autistic individuals (Source: Anna Janošová – own photograph, May 2022, VŠB-TUO) – clearly defined division of space and its functions through appropriate use of surfaces and materials.

Fig. 4.: Example of an unsuitable public space design for autistic individuals (Source: Anna Janošová – own photograph, May 2022, VŠB-TUO) – a wide and busy intersection without calm zones (e.g., can be improved with greenery or pavement change) represents a typical problematic location for people with autism.

brings safety to autistic people [9].

Research on spatial perception confirms the existence of a so-called “spatial logic”—the preference for ritualized routes, visual legibility, and tactile interactions. An appropriate environment should meet three dimensions: sensory quality, spatial legibility, and clear navigation. Temple Grandin describes how visual and haptic experience (e.g., sand construction) helped her understand the world [10]. Conversely, the case of Erik Langer shows that sensory destabilization (e.g., sudden loss of sight) may lead to deep regression, somatic difficulties, and loss of motor skills, with functional recovery depending on sensory balance.

REQUIREMENTS FOR ADAPTING PUBLIC SPACE FOR PEOPLE WITH ASD

When designing a public space, it is necessary to take into account that this space serves everyone, not just autistic people, and therefore it goes without saying that it is not possible to adapt all places and design architecture only for autistic people. It is also necessary to recall the individuality of autism itself. The term “autism spectrum” was created in order to capture the diversity of autism manifestations, but it is often perceived only as a specific, that is, too linearly – as a scale from “mild” to “severe” autism. In reality, the individual manifestations of autism do not overlap on a single axis, but rather function as a “constellation” of diverse, even for us, instructive characteristics. [11] Therefore, it makes sense to make as many adjustments as possible that have the greatest impact on people with autism, but it should be noted that they do not affect every autistic person in the same way. The overall conceived meaningful space is created through apperception, which will influence the stress load of these people.

TERRITORIALITY AND NEED FOR CONTROL OVER THE ENVIRONMENT

People with ASD have an increased need for control over their environment. This means that only a suitable harmonized space allows for predictability and clear boundaries between private, semi-public and public zones. The possibility of escape to a safe zone also helps. [12] To gain greater certainty in space from the point of view of territoriality, the creation of material boundaries can be helpful, where it is appropriate to maintain distance, wider passages from space to space or clear transition zones. Territoriality and the need for environmental control are examples of a communicative paradigm (the logical phenomenological paradigm) based on the awareness that the boundaries of knowledge are limited by the possibilities of expression. The basic question is: "What can I understand?" Nonverbal communication through space is more than just an environment – space can even communicate without words using textures, light, silence, structure or symbolism. It enables self-regulation, anticipation of situations and supports emotional stability. [13]

This is related to the transparency of space and previewing, which is also based on the communicative paradigm. The ability to visually look into the space in advance (so-called “previewing”) allows people with ASD to better prepare for a change in the environment and reduces anxiety. Transparent materials, perspective axes and logical continuity of spaces support orientation. [14]

ORGANIZATION OF SPACE AND REDUCING CHAOS

A public environment, which often lacks the concept of “space”, must at least be clearly structured to avoid a feeling of overcrowding. It is important to eliminate visual noise, unnecessary elements and choose a simple, orderly character of the environment, which often contradicts fashionable design. [15] This is related to the above-mentioned constructivist paradigm, which is created within the framework of cognitive conditions assuming logical rules or logically constructed conditions.

A clear logic of arrangement helps people with ASD to orient themselves. Space is therefore what is related to the architectural approach to people with ASD, i.e. it must have legible zones, hierarchy and consistent navigation. In an environment arranged in this way, mixed signals should not be sent to the “space”, such as rushing to the station when they have to wait for the train. This will help to design, for example, quiet waiting rooms.

INCLUSION AND SOCIAL DIMENSION OF THE ENVIRONMENT, BALANCE BETWEEN PRIVACY AND INTERACTION

Public space is what should provide opportunities for casual social contact without pressure to interact. Suitable places for observed participation are community gardens, quiet corners, benches with a view. [16]

The environment itself, although not yet the space described above, should offer both a refuge for solitude and tranquility, as well as the possibility of safe, non-violent interaction. Transition zones are important - e.g. benches by the wall, views into the action. [17] A good option is to create semi-private courtyards, for relaxation without a large crowd. Appropriately designed public spaces (e.g. courtyards, fireplaces, semi-public courtyards) facilitate community life.

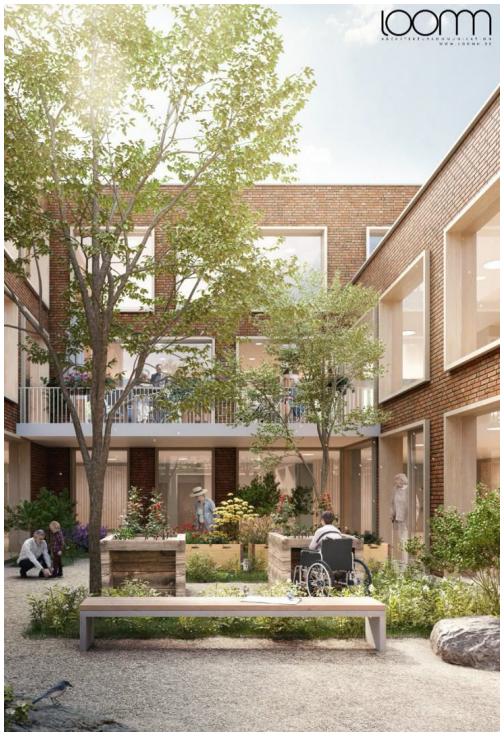

Fig. 5.: Visualization of a modern residential building with a communal courtyard. Visualization: Loomn, n.d. [online] [cited 2025-07-02]. Available from: https://www.loomn.de/start

NEIGHBORHOOD AND COMMUNITY

The broader environment surrounding people with ASD significantly affects their mental well-being. A supportive, safe, and inclusive neighborhood with access to nature, services, and opportunities for peaceful coexistence benefits not only the individual

with ASD but also their family. Poorly designed environments (e.g., noisy, neglected, or poorly lit areas) increase stress, reduce the sense of safety, and lead to social isolation. Proximity to nature, services, and community infrastructure is crucial.

An example is the current condition (before reconstruction) of the Republic Square underpass in Ostrava. In addition to its poor technical condition, the underpass exerts heavy sensory strain on everyone, not only autistic individuals. Dimness, poor ventilation, smell of urine, and echoing traffic noise are highly demanding. At night, the sense of safety is further reduced.

The proposed redesign appears promising in terms of natural light and ventilation. According to the visualization, however, it is unclear how the surfaces will be protected from graffiti and homeless occupancy. A potential risk is the use of mirrored metal surfaces above the platforms.

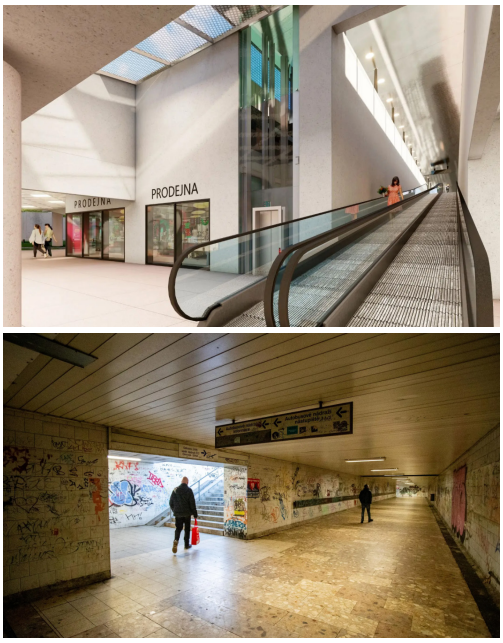

Fig. 6.: Republic Square underpass in Ostrava, current and proposed condition. (Photograph: Vladimír Pryček, ČTK, Novinky.cz, 2020 [online] [cited 2025-07-02]. Available from: https://www.novinky.cz/clanek/bydleni-ostuda-ostravy-konecne-zmizi-mesto-opravi-dopravni-uzel-v-centru-kam-selide-boji-chodit-40501539)

ARCHITECTURAL ELEMENTS

PASSAGEWAYS, QUIET CORNERS (QUIET PLACE) AND SUPPORT OF SENSORY REGULATION

It would be appropriate to design public spaces for people with ASD with clearly designated transition zones ("transition zones") of main routes, which serve as mediators between the busy public environment and the space and quiet zones. These quiet corners, equipped with ergonomically designed seating, dimmed lighting, and haptic surfaces, for example, allow people with ASD to quickly calm down and self-regulate emotions after exposure to highly stimulating environments. [18] It is also advisable to place special sensory design zones – for example, magnetic walls, interactive panels, textiles, or soft touch surfaces – can help people with ASD regulate sensory activity. Such elements allow safe contact with stimulating materials and dosed stimuli according to individual needs. [19] This is advisable to place in places where rushing is not expected, but rather relaxation, such as parks.

STRUCTURE, SURFACES, AND COLOR

Hypersensitivity in people with ASD manifests itself as sensitivity to hard, cold, sticky, or sharp surfaces. Such materials can cause discomfort and even panic, so public infrastructure should use soft, natural or softened textures, such as felt, soft laminate, but even with regard to the sustainability of textiles or natural wood and minimize contact with inappropriate surfaces. [20] Conversely, hyposensitivity forces them to seek intense sensory stimuli, such as distinctive structures, vibrating or rough surfaces. Architecture can offer, for example, textures or vibrating surfaces that serve as stimulation and help maintain attention or sensory walkways. [21] The possibilities of using surface structures in architecture support navigation and zoning, but also enable sensory regulation. Textures can visually and haptically signal the transition between activities (e.g., separating the zone of rest and activity), which facilitates orientation and regulates stimuli. [22] The use of mirrors and shiny surfaces is recommended in limited quantities. For some people with ASD, mirrored and shiny surfaces can cause stress, disorientation or panic, especially in crisis situations. For other autistic people, they act as a lure, they tend to look at them too much and they will not be willing to continue walking. If they are present in a public space, they should be placed away from the main traffic routes and matte surfaces with low reflection should be used. [23]

Even texture itself has an impact on emotional well-being. Subtle visual patterns (e.g., pastel gradients, soft transitions) realistic imitations of brick or wood are generally less distracting than glossy contrasting patterns, which can be confusing and increase cognitive load. [24] Billboards, typography, and photographs in the surrounding environment that do not harmoniously relate to the space have the same effect. When there is a large number or even advertising appeal, they can cause overload.

Colors significantly influence emotional and behavioral responses. Muted shades such as blue, green, beige and grey have a stabilizing and calming effect, while saturated red or yellow colours can cause stress, anxiety or aggression, especially in people with ASD. Individual testing and the use of colours only as functional boundaries is appropriate. Studies confirm the preference for subtle transitions and reduced contrast.

STIMMING IN SPACE

Stimming—repetitive behaviors that serve to harmonize emotions and sensory input—is a natural part of self-regulation in people with ASD. It should not be suppressed but rather supported through safe opportunities for practice. Stimming zones must be clearly separated from educational and therapeutic areas. Visual signals and free movement are important [25]. Possible design features include structured tactile elements, rotating components, or swinging elements. Large swings are not always necessary; such therapeutic tools can be integrated into interactive design solutions.

Water is also a form of stimming in space. While public water features can provide cooling in hot weather, for some autistic individuals they may pose challenges. In severe autism, a person may sit in the water and play with it for extended periods (over an hour), with interruption risking a meltdown. Therefore, water features should not be placed in critical locations, such as in front of hospitals, where they could hinder access to care.

SIZE OF THE SPACE, BARRIER-FREE AND SPATIAL ACCESSIBILITY

People with ASD often need more space due to the regulation of the stimulation load, predictability and zoning options (e.g. stim vs relaxation zone). It is recommended not to create narrow passages to allow for qualitytional manipulation space. The size should be adequate to avoid feelings of claustrophobia or "agoraphobia".

People with ASD often have movement and vision dis-

orders. Clear navigation, contrast and enough space are necessary. Decree 398/2009 Coll. regulates the accessibility of buildings and facilities. Elevator accessible floors or alternative solutions (platforms), wide entrances, enough manipulation space. Minimum widths of doors, ramps, heights of switches and sinks must be observed. As with wheelchair users, it is necessary to address space for turning, undertaking and movement. Barriers as such can be a psychological obstacle, for example, a step that is too large may not be able to be overcome by an autistic person. The same barrier can be a color that is too contrasting.

SENSORY INTEGRATION

People with ASD often show hypersensitivity or hyposensitivity to sensory stimuli (e.g. light, noise, smell, touch). Public spaces should minimize sudden, unpredictable, or strong stimuli and allow for sensory self-regulation, for example by using textured surfaces, sound-deadening zones, or natural materials.

Acoustics are a typical problem for people with ASD. People with ASD have a high incidence of hyperacusis, phonophobia, and misophonia. [26] These sound filtering disorders, such as sensory overload, have been objectively confirmed by neurophysiological studies. Therefore, it is necessary to limit infrasound and inappropriate types of vibrations in the design. Autistic people's reactions to vibrations vary. Regular vibrations are perceived positively, while sudden vibrations can be significantly disturbing. If there is more noise in a place, such as a busy intersection, which, among other stimuli, has a lot of noise and vibrations due to traffic, it is necessary to create a quiet space nearby. It is also advisable to avoid smooth and hard surfaces that can reflect acoustics inappropriately.

Lighting design is also an important aspect. For people with ASD, it is necessary to design spaces with enough natural light. This mainly concerns the interiors of public buildings, so it is necessary to use skylights, studio windows, transparent materials appropriately. Autistic people respond better to LED lights or diffuse lighting. It is important to avoid flickering lights. A possible relaxation element can be colored light, but it is necessary to use it in a place where the autistic person does not have to walk quickly or concentrate, because colored light can attract their attention and they will not want to leave. The possibility of regulating the intensity is a suitable element especially during the day in interiors, if a person with ASD goes from a sunny day to a dark space, a problem may arise or vice versa. [27]

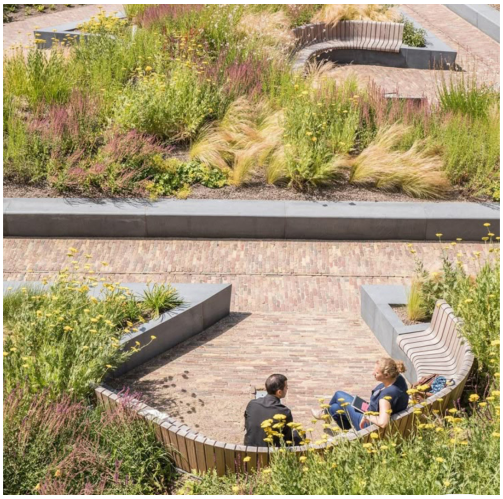

Fig. 7.: Illustrative photo of public space. (Source: Architect. Spring has arrived! Here are 10 fresh examples. [online]. 2023 [cited 2024-06-30]. Available from: https://www.archinect.com/news/article/150343160/spring-has-arrived-here-are-10-fresh-examples)

The photographs show two seemingly similar designs for public seating. Why is one well-conceived while the other has several shortcomings? The left-hand solution is superior: seating is placed in a recessed bay, forming an embracing curve that provides a sense of calm and enclosure. The design is moderate, functional, and well-crafted, offering autistic individuals a short-term refuge from overload.

Fig. 8.: Illustrative photo of public space. HOME X FASHION HUB. (Source: Modern Oasis: Illuminated Urban Garden Seating. [online]. 2023 [cited 2024-06-30]. Available from: https://www.pinterest.com/pin/modern-oasis-illuminated-urban-garden-seating/)

By contrast, the “pleasantly interesting” design on the right is overstimulating: too many lights, varied curves, and shapes unrelated to material division. If several people were seated here, personal space would be compromised. Ambient floor lighting may be pleasant for some autistic users but is more suitable in semi-public areas, where strong street lighting is absent. In public space, however, it may highlight litter such as discarded cigarette butts, which could severely distress individuals with a phobia of mess.

In urban environments, cultivating inner courtyards is an effective approach. Rather than generic parking or undefined surfaces, material design and carefully selected vegetation—professionally planned for maintenance—are essential. In landscaping, labeling areas merely as “green” is insufficient.

A common phenomenon is the “gazebo-non-gazebo”: small structures lacking architectural purpose, which only vaguely resemble their original function but serve no real use.

Fig. 9.: Roof of Nivy Bus Station, Bratislava, Slovakia (Source: Anna Janošová – own photograph, August 2022, VŠB-TUO)

Fig. 10.: Roof of Nivy Bus Station, Bratislava, Slovakia (Source: Anna Janošová – own photograph, August 2022, VŠB-TUO)

Fig. 9 – A smoking area: not only autistic individuals fail to understand why one should smoke in something resembling a cage. How does such a pseudo-solution even contain smoke?

Fig. 10 – The shading functions only at certain sun angles, and due to perforated metal hardly blocks sunlight at all—perhaps an intentional "anti-architectural" design gesture. The seating cubes are unsuitable for autistic individuals, whose heightened kinesthetic awareness may encourage rocking, posing safety risks. Such features can cause motor blockages and proprioceptive confusion.

CONCLUSION

The choice of a suitable environment is based on the meaning of creating an architectural space for people with autism spectrum disorder (ASD) and must not be reduced to the mere fulfillment of technical parameters or functional requirements. If we can design the space at least partially according to the above-mentioned elements, the space will be based on the Complementary Paradigm based on Plotinus' philosophy [28], where true beauty is connected with unity (One), reason (Logos), idea and soul. The architectural space will then become a synthesis of spiritual and sensory knowledge. The reason for the Plotinus reference mentioned here is that his philosophy does not describe only aesthetics for its own sake, but the effort to achieve a harmonious whole that supports the dignity, peace and mental integrity of the user.

As this research, based on several studies and my own research as the basis for this text, shows, a truly inclusive and therapeutic environment is created only when the design is guided by a deeper philosophical and phenomenological understanding not only of a "pleasant environment", but directly of architectural space as a carrier of meaning, safety and continuity of harmonious existence. For people with ASD, space is a fundamental medium of self-regulation, orientation and relating to the world. Perception goes beyond the physiological senses – it includes rhythm, predictability, the logic of arrangement and non-verbal communication through materials, light, structure and time. All this points to the validity of the above-mentioned hypothesis of four paradigms: Ontological paradigm, Constructivist paradigm, Communicative paradigm and Complementary paradigm.

Based on an interdisciplinary approach – connecting findings from philosophy, psychology, architecture and neuroscience – it is possible to formulate specific design principles that respect sensitivity, the need for control, the need for escape and the desire for an intelligible world. Dividing space according to the degree of privacy, applying the principles of previewing, sensory zoning, choosing materials and lighting conditions, as well as emphasizing a culturally shaped sense of the wider environment – all of this contributes to a higher quality of life not only for people with ASD, but also for society as a whole.

Architectural space thus becomes a tool for inclusion, therapy and understanding. In the dialogue between the user and the architect, a space can be created that is at the same time functional, aesthetic and existentially supportive. The challenge for contemporary architecture is to accept this complexity and seek new paradigmatic frameworks that will allow the creation of environments sensitive to all forms of human experience.

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