

## Contributions of environmental psychology to the architecture of mental health treatment facilities

## Contribuições da psicologia ambiental para a arquitetura dos locais de tratamento de saúde mental

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## Abstract

This paper analyzes the evolution of spaces intended for the treatment of individuals with mental disorders and discusses the role of architecture, from the perspective of Environmental Psychology, as a stimulus for treatment and for promoting individuals' physical and emotional well-being. The study is a narrative literature review with a qualitative character that seeks to consolidate the state of the art on the relationship between architecture and mental health. The bibliographic survey included the identification of historical milestones in psychiatric care, as well as concepts and theories of Environmental Psychology applied to healthcare environments. Additionally, we analyzed reference projects due to their incorporation of restorative and humanized architectural principles. The analysis demonstrates that aspects of the built environment, including lighting, sounds, integration with nature, privacy, and spatial predictability, directly influence behavior, well-being, and psychosocial recovery and rehabilitation processes. As a result, design guidelines are proposed that go beyond purely aesthetic aspects, recognizing architecture as a therapeutic tool in mental healthcare. We hoped to encourage discussions and reflections on the integration of Environmental Psychology and healthcare architecture, as well as foster an ongoing dialogue among architects, psychologists, and healthcare professionals aimed at designing treatment environments that are more humanized and responsive to the needs of this population.

**Keywords:** Environmental Perception. Healthcare Architecture. Restorative Environments. Life Quality. Mental Illness.

## Resumo

Este artigo analisa a evolução dos espaços destinados ao tratamento de pessoas com transtornos mentais e discute o papel da arquitetura, sob a ótica da Psicologia Ambiental, enquanto estímulo para esse tratamento e promoção do bem-estar físico e emocional dos indivíduos. A pesquisa caracteriza-se como uma revisão narrativa da literatura, de abordagem qualitativa, que busca consolidar o estado da arte acerca das relações entre arquitetura e saúde mental. O levantamento bibliográfico compreendeu a identificação de marcos históricos da assistência psiquiátrica, bem como de conceitos e teorias da Psicologia Ambiental aplicados aos espaços de cuidado em saúde. Complementarmente, procedeu-se à análise de projetos de referência selecionados por incorporarem princípios arquitetônicos restauradores e humanizados. A análise evidencia que aspectos do ambiente construído, como iluminação, sons, integração com a natureza, privacidade e previsibilidade espacial, influenciam diretamente o comportamento, o bem-estar e os processos de recuperação e reabilitação psicossocial. Como resultado, apontam-se diretrizes projetuais capazes de transcender aspectos meramente estéticos, compreendendo a arquitetura como ferramenta terapêutica no cuidado à saúde mental. Espera-se incentivar discussões e reflexões sobre a integração entre Psicologia Ambiental e arquitetura de assistência à saúde, bem como o estabelecimento de um diálogo contínuo entre arquitetos, psicólogos e profissionais de saúde, visando à concepção de ambientes de tratamento mais humanizados e responsivos às necessidades dessa população.

**Palavras-chave:** Percepção Ambiental. Arquitetura de Edifícios de Saúde. Ambientes Restauradores. Qualidade de Vida. Doença Mental.

## 1 Introduction

The contemporary mental health landscape presents growing challenges on a global scale. Data from the Pan American Health Organization (PAHO) indicate that 1 billion people live with a mental disorder, while 3 million deaths annually are associated with excessive alcohol consumption, and one suicide occurs every 40 seconds (Dia [...], 2020). In Brazil, the situation becomes even more concerning, as, according to the World Health Organization (WHO), the country has the highest anxiety rate in the world, affecting approximately 9.3% of the population (Brasil, 2022). In addition, the results of a survey conducted by the Vittude platform between 2016 and 2019 indicate that 86% of the 492,790 respondents presented some form of mental disorder, with high rates of anxiety, depression, and severe stress (Pimenta, 2019). These indicators reinforce the need to understand the factors that may contribute to the promotion of mental health, including the characteristics of the built environment.

Although mental health-related problems have accompanied humanity since its earliest history, advances in research in this field have enabled a better understanding of how these disorders affect society. For centuries, individuals with mental disorders were subjected to practices characterized by isolation and social exclusion, within spaces designed primarily for surveillance and control (Shorter, 2005; Rebollido, 2014). Only with the advancement of scientific knowledge and evolving conceptions of mental health did the need for spaces dedicated to the treatment of these individuals begin to be recognized, with the aim of integrating them into society rather than concealing them in basements and asylums, as had previously been the case (Amarante, 1995; Martins et al., 2011; Rebollido, 2014; Lisboa, 2021). These transformations were directly reflected in the architecture of treatment facilities, which gradually moved away from the asylum model and began to incorporate principles of humanization and user well-being.

In recent decades, the relationship between architecture and health has been increasingly investigated, and understanding the role of the physical environment in promoting well-being and patient recovery has become essential for healthcare facility planning (Fontes, 2003; Felipe; Silveira, 2019). In this context, Ulrich's (1984) pioneering study is particularly noteworthy, as it established the foundations of restorative environments by demonstrating the positive influence of windows with nature views on hospital recovery. This study served as a starting point for subsequent investigations, such as that conducted by Rubin, Owens, and Golden (1998) at Johns Hopkins University, which recognized the impact of the treatment setting on patients' prognosis.

Given that the physical environment influences individuals' mental condition, shaping their attitudes and behaviors, architecture should be regarded as an ally in this process, contributing to the promotion of safety and well-being and, consequently, helping to eliminate preconceived barriers related to mental illness. Despite scientific

advances demonstrating a built environment's influence on human experience, discussions concerning architecture and mental health remain dispersed across different fields of knowledge. In this regard, it is important to compile and systematize the contributions from fields such as Environmental Psychology, neuroscience applied to architecture, and studies on restorative environments, thereby expanding the understanding of the role of physical space in mental healthcare processes.

In light of this, this paper aims to analyze the evolution of spaces intended for the treatment of individuals with mental disorders and to discuss the role of architecture, from the perspective of Environmental Psychology, as a stimulus for treatment and for promoting individuals' physical and emotional well-being.

## 2 Methodological procedures

This study is a narrative literature review with a qualitative character, an exploratory nature, and a historical-interpretative approach. Through this procedure, the research sought to map the state of the art regarding the relationship between architecture and mental health, in order to understand the evolution of spaces intended for the treatment of mental disorders and to systematize knowledge concerning the influence of the built environment on processes of care, recovery, and mental health promotion.

The investigation was conducted through a bibliographic and iconographic survey on the evolution of mental healthcare, the Psychiatric Reform movement, the foundations of Environmental Psychology, neuroscience applied to architecture, and studies on restorative environments, which constituted the theoretical basis for the analysis of the relationship between architecture and mental health.

In addition, case studies were analyzed through purposive sampling. The selection criteria included the historical, technical, and conceptual relevance of the projects, as well as their contribution to understanding architecture as an instrument for promoting health and well-being. The following projects were examined: Alvar Aalto's Paimio Sanatorium, recognized for its pioneering incorporation of restorative elements; the Sarah Kubitschek hospitals, designed by João Filgueiras Lima (Lelé), a national reference in the integration of humanization, environmental comfort, and bioclimatic strategies; and the Phoenix Children's Hospital by HKS Architects, representative of contemporary approaches that combine biophilia, sensory technology, and user-centered design.

The analysis of the case studies was conducted in a comparative and interpretative approach, aiming to identify design strategies related to environmental quality, sensory comfort, integration with nature, and the humanization of spaces, as well as to discuss their contributions to enhancing environments intended for mental healthcare.

### 3 Madness and the evolution of treatment spaces

Since the earliest stages of human existence, mental healthcare has been intrinsically linked to spiritual and religious practices.

The earliest forms of healthcare occurred in Ancient Egypt, where care was provided by priests in the Temple of Imhotep, the god of science, wisdom, and medicine (Miquelin, 1992; Gottschall, 2007; Rebolledo, 2014). However, the temple did not possess a physical spatial organization intended for the permanent accommodation or systematic treatment of patients by knowledgeable individuals (Lisboa, 2021). Consequently, the environment was occupied indiscriminately by orphans, patients, and pilgrims, regardless of their care needs.

The association between mental disorders and spirituality persisted in Ancient Egypt until 3100 BC, when priests began adopting therapeutic practices based on artistic activities such as dance, music, and painting, approaching methods still used today (Foerschner, 2010).

Like the Egyptians, the ancient Greeks also attributed psychological disorders to divine influence. Care was provided in temples dedicated to Asclepius, where priests guided patients toward healthy lifestyles and emphasized psychological aspects in treatment (Gottschall, 2007). Once again, the intuitive use of environmental elements such as contact with nature, water features, and artistic activities can be observed as therapeutic adjuncts (Gottschall, 2007; Rosen, 1994; Lisboa, 2021).

There were also the *iateias*, places where care was provided by natural philosophers who did not belong to the priestly caste (Miquelin, 1992; Lisboa, 2021). In the search to understand the relationship between humans and nature, the first initiatives aimed at investigating the causes of the disease emerged (Rosen, 1994; Fontes, 2003).

During the Roman Empire, the worship of the god Asclepius and the *iateias* persisted, while the *Thermae* and the *Valetudinaria* emerged as spaces dedicated to healing. The *Thermae* were reserved for medicinal baths, whereas the *Valetudinaria* were military infirmaries serving landowners, slaves, and gladiators (Miquelin, 1992; Fontes, 2003; Lisboa, 2021). Despite advances in sanitary technologies and the emergence of structures more closely resembling the earliest hospital models, healthcare remained linked to spirituality.

In the Byzantine Empire, advances in sanitary technologies were accompanied by the construction of the Bimaristans, which became a prominent hospital model of the period, using the surroundings as a therapeutic technique in mental health treatment (Al-Ghazal, 2007). By integrating abundant daylight, contact with sounds and elements of nature, among other features, the Bimaristans intuitively applied principles that Environmental Psychology would validate centuries later by recognizing the sensory

perception of space as a stimulus capable of influencing behavior, emotions, and well-being. Furthermore, patients were separated by pathology, and dedicated areas were provided for treatment and outpatient consultations, similar to what is currently referred to as outpatient clinics (Figures 1 and 2).



**Figure 1:** The *al-Mansur Qalawun* Complex (Cairo, Egypt) comprising a hospital, a school, and a mausoleum.

**Source:** Sacred Footsteps (©2022).



**Figure 2:** Courtyard of the *Nur al-Din Bimaristan* (Damascus, Syria), featuring a fountain and a garden.

**Source:** Sacred Footsteps (©2022).

During the Middle Ages, mental disorders came to be interpreted as divine punishment (MacDonald, 1981; Rebollido, 2014), resulting in aggressive treatments such as the ingestion of herbs and tobacco to induce vomiting, the use of leeches, and bloodletting through the forehead (MacDonald, 1981).

Although the hospital concept had advanced in the Byzantine Empire, the Middle Ages witnessed a reinterpretation of the *Valetudinaria* (Miquelin, 1992). The few existing hospitals, strategically located along trade routes, accommodated individuals awaiting death. Even so, these buildings reflected advances in engineering, with large spans allowing abundant daylighting and ventilation.

This cycle of exclusion became consolidated in 1247 with the establishment of the first European public asylum, the Bethlem Royal Hospital, in Bishopsgate, London. Following its opening, several psychiatric hospitals were established throughout Europe, prioritizing individuals' confinement and social segregation over rehabilitative approaches (Shorter, 1997). These institutions, known as "asylums," were characterized by cruel conditions and inhumane treatments. Patients suffered from hunger, were chained, and, once institutionalized, rarely succeeded in reintegrating into their families and society (Vrklevski; Eljiz; Greenfield, 2017).

The dissociation between mental illness and religiosity occurred only during the European Renaissance, which fostered scientific and cultural transformations (Rosen, 1994; Rebollido, 2014). According to Rebollido (2014), the Renaissance hospital combined religious rituals, caregiving, artistic activities, and commerce. Within this context, the first "hospices" emerged in Italy in the 15th century, followed by public hospices

in Paris, including facilities exclusively for women. Despite scientific advances and the transformations promoted by Humanism, these institutions continued to accommodate mentally ill individuals, beggars, and criminals without therapeutic intent, maintaining mistreatment practices similar to those at the Bethlem Royal Hospital.

In the 15th century, workhouses emerged as residences offered by the Catholic Church to individuals with mental disorders in exchange for labor. Between the 16th and 18th centuries, the first asylums were established in Brazil and Portugal, operating in adapted facilities maintained through donations, whose conditions resembled those of prisons (Rebollido, 2014; Cibrão, 2019). Patients were confined in cells with little or no daylight, featuring small barred windows facing south, under the belief that cold and darkness would produce beneficial results (Cibrão, 2019). Thus, despite the expansion of asylums and psychiatric hospitals, individuals continued to be subjected to unhealthy conditions and deprived of basic healthcare standards.

In the 18th century, panopticism influenced hospitals and asylums' organization, whose architecture came to be planned for surveillance and for grouping individuals according to the severity of their disorders (Sánchez-Moreno; Barreiros, 2020). In 1774, the Asylum Act established licensing and annual inspection of these institutions, promoting a new understanding of treatment and the spaces intended for the mentally ill. Within this context, William Tuke founded the York Retreat in the United Kingdom at the end of the 18th century, an institution that consolidated a paradigm shift by replacing social exclusion with an environment of care and humanized treatment. Contact with nature, leisure activities, and work became integrated into therapeutic practices (Rosen, 1994; Rebollido, 2014), anticipating principles later associated with restorative environments and with Ulrich's (1984) study, which relates nature views to stress reduction and cognitive restoration in patients experiencing mental distress.

In France, Philippe Pinel emerged as a pioneer of humanization and therapeutic hospitalization for individuals with mental illness, contributing to the advancement of scientific studies on mental disorders (Amarante, 1995; Pacheco, 2003; Martins et al., 2011). Under his influence, patients were freed from chains, and mental hospitals dedicated exclusively to the treatment of mental disorders were established (Amarante, 1995; Rebollido, 2014). Pinel also defined specific requirements for treatment environments, advocating their location in isolated and peaceful settings, as well as the separation of men and women (Miquelin, 1992; Pacheco, 2003; Rebollido, 2014).

The surgeon Jacques-René Tenon also introduced a new perspective on mental illness and believed that psychiatric hospitals possessed a curative function. In addition to the tranquility advocated by Pinel, Tenon emphasized spaces that would enable walking and physical exercise (Toledo, 2008; Rebollido, 2014). This new approach led, for the first time, to architecture being regarded as an ally in patients' recovery (Rebollido, 2014).

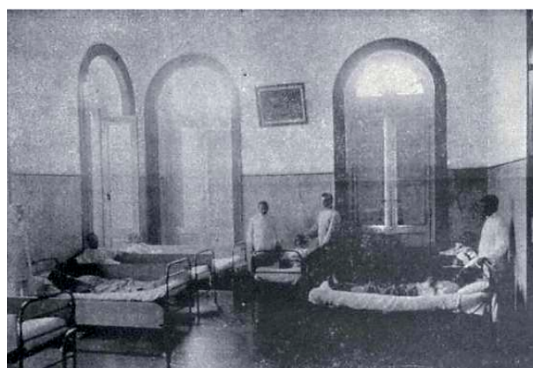
Thus, in the early 19th century, buildings began to be surrounded by vegetation, promoting privacy, safety, contact with nature, and outdoor activities (Miquelin, 1992). Jean-Étienne-Dominique Esquirol, a disciple of Pinel, further advocated interaction between patients and therapists and the location of asylums away from urban centers to distance patients from mechanisms believed to exacerbate their disorders. However, this practice ultimately reinforced the social isolation of these individuals (Shorter, 1997).

The trajectory of psychiatric care in Brazil, initiated with the Pedro II Hospice in Rio de Janeiro (Figures 3 and 4), already revealed in 1841, the precariousness of treatment environments when compared to European models. The institution accommodated individuals considered mentally ill who had previously been kept in the streets, prisons, or at the *Santa Casa de Misericórdia do Império*. Its establishment was driven by the criticisms presented by Antônio Luís da Silva Peixoto in his thesis defended at the Rio de Janeiro School of Medicine in 1837, in which he denounced the unhealthy, dark, and dehumanized conditions to which patients in the country were subjected (Hospício [...], 2023).



**Figure 3:** Pedro II Hospice.

**Source:** UFOP (©2024).



**Figure 4:** Pedro II Hospice

Dormitory.

**Source:** Faperj (2018).

The hospice was designed by the engineer José Domingos Monteiro, inspired by the Maison Nationale de Charenton (France), and built on Botafogo Bay, surrounded by a natural landscape (Hospício [...], 2023). The spaces were adapted to the hygiene standards of the period, which required patient separation by gender and severity of illness, as well as to the prevailing architectural style, Neoclassicism. The floor plan followed Renaissance principles, featuring a cruciform layout, a rectangular base, symmetry, a large central courtyard, and wide circulation areas (Vieceli, 2014). In an effort to keep patients mentally engaged and improve their clinical condition, facilities for hydrotherapy, physical exercise, and sewing activities were provided. Nevertheless, the architecture of isolation persisted, as the institution was located far from urban centers, depriving individuals of social interaction.

This trajectory culminated in the Psychiatric Reform movement during the 1960s, which promoted new approaches to the treatment of mental disorders, placing the individual at the forefront rather than the disorder. Consequently, invasive techniques

gave way to more sensitive and humanized treatments (Amarante, 1995; Delfini et al., 2009; Rebollido, 2014), consolidating a paradigm shift that required the transition from the hospital-based model to services focused on psychosocial rehabilitation and social integration.

As a result, the first Center for Psychosocial Care (CAPS - *Centro de Atenção Psicossocial*) was established in 1987, named CAPS Professor Luiz da Rocha Cerqueira (known as CAPS Itapeva), providing care and rehabilitation for individuals with mental disorders (SPDM Afiliadas, n.d.). Beginning in 2002, CAPS facilities replaced psychiatric hospitals, promoting patients' integration into society through reception, support, and humanized treatment.

## 4 Results and discussion

The relevance of this study is justified by the growing mental health crisis observed on a global scale and, particularly, within the Brazilian context. Chronic stress and deficiencies in psychophysiological restoration are recognized as contemporary problems with significant impacts on health and quality of life (Takayama; Morikawa; Bielinis, 2019).

In this context, the architecture of mental healthcare facilities ceases to represent merely a functional support system and becomes a public health issue. Accordingly, it is essential that treatment environments be grounded in the principles of Environmental Psychology and capable of providing restorative stimuli through integration with nature, sensory comfort, and the reduction of stress-inducing factors. Thus, architectural design comes to be understood as an active therapeutic tool, contributing to stress reduction and to the promotion of well-being and individuals' psychosocial recovery.

The transition from an intuitive perception to an evidence-based approach has advanced significantly since Ulrich's (1984) findings. Contemporary discussions at the intersection of neuroscience and architecture, such as those by Villarouco et al. (2021) and Tavares (2022), expand this concept by explaining that environmental restoration is not merely contemplative but results from the human nervous system's sensory and emotional perception of the environment. According to Oliveira and Pinheiro (2021), emotional perception precedes rational thought, causing architectural configuration to cease functioning solely as a backdrop and instead modulate stress responses during mental health treatment.

For Roe and Aspinall (2011), mental health promotion was historically associated with psychological relaxation and stress reduction, based on the understanding that excessive arousal was detrimental to health. According to Ulrich (2000), the planning of healthcare facilities traditionally prioritized building functionality, costs, and

technologies effective for treatment, while neglecting patients' psychological and social needs and the creation of environments that promote calmness and supporting coping processes. However, current knowledge demonstrates the importance of strategies that support the development of coping resources to address everyday challenges.

From the perspective of Environmental Psychology, the physical environment is no longer understood merely as a functional support system and is instead recognized as directly influencing patients' mental state, attitudes, and behavior. The influence of the environment on treatment and recovery processes is scientifically supported (Sternberg, 2009; Dubose et al., 2016; Villarouco et al., 2021), since the built environment produces environmental, psychological, and behavioral impacts on individuals (Karlen; Roberts; Tucker, 2023). Scientific evidence demonstrates that factors such as building layout, number of single-patient rooms, air quality, acoustics, daylight availability, exterior views, colors, and finishing materials may influence the reduction of stress, delirium, depression, anxiety, the use of pain medication, and even the incidence of infections and medical errors (Ulrich, 1984, 1992; van der Voordt, 2021).

This occurs because environmental information obtained through the human senses affects and triggers emotion-based behaviors at an unconscious level (Augustin; Frankel; Coleman, 2009). The retina captures environmental stimuli and transmits them to the brain regardless of conscious attention to sounds, textures, smells, or visual elements. The brain continuously processes this information, such that the environment is perceived emotionally even before conscious reflection occurs (De Paiva, 2018; Oliveira; Pinheiro, 2021). Furthermore, the way space is perceived activates emotional centers in the brain, triggering neurochemical and hormonal responses that can alter how immune cells respond to disease.

In light of this, research in Environmental Psychology has grown considerably, examining the influence of space on human perception and the feelings resulting from this relationship with the environment (Moser, 2018; van der Voordt, 2021; Villarouco et al., 2021). As early as 1953, psychiatrists and architects concerned with the conditions of psychiatric hospitals initiated the Architectural Study Project, which sought to understand aspects of the hospital environment, such as lighting, color, privacy, and social interaction. These aspects subsequently influenced theories, methods, and architectural projects developed in the field (Ramsden, 2019).

By examining the effects of rural walking on individuals with mental disorders, Roe and Aspinall (2011) demonstrated the therapeutic benefits of natural landscapes for affective and cognitive restoration, improvements in mood and self-esteem, as well as the development of coping resources and stress reduction. In this context, green spaces become fundamental for transforming treatment settings into environments that promote comfort and well-being, since individuals with mental disorders may experience higher levels of stress and discomfort in the absence of stimulating

landscapes (Silveira; Kuhhnen, 2019). Furthermore, as smell is considered the most evocative of the senses, combining aromatherapy with green spaces is beneficial for both physical and mental recovery, since pleasant scents can help reduce stress, blood pressure, and perceived pain intensity (Horevicz; De Cunto, 2007; Dubose et al., 2016).

Sternberg (2009) identifies noise as one of the greatest stressors for hospitalized patients, as it can increase heart rate, blood pressure, and stress levels, besides interfering with sleep quality, which is essential to rehabilitation and healing processes. This condition is often associated with the “sterile” character of healthcare environments resulting from the use of materials such as metals, stone, or ceramic tiles on interior surfaces, which, despite their ease of cleaning and maintenance, possess highly reflective acoustic properties. Consequently, the notion of “sterility” assumes a negative connotation, indicating a cold, noisy, and uncomfortable environment (Sternberg, 2009). In light of this, space geometry, the selection of finishing materials, and the positioning of doors and windows should be carefully planned to mitigate undesirable acoustic stimuli (Gurgel, 2004; Tavares, 2022).

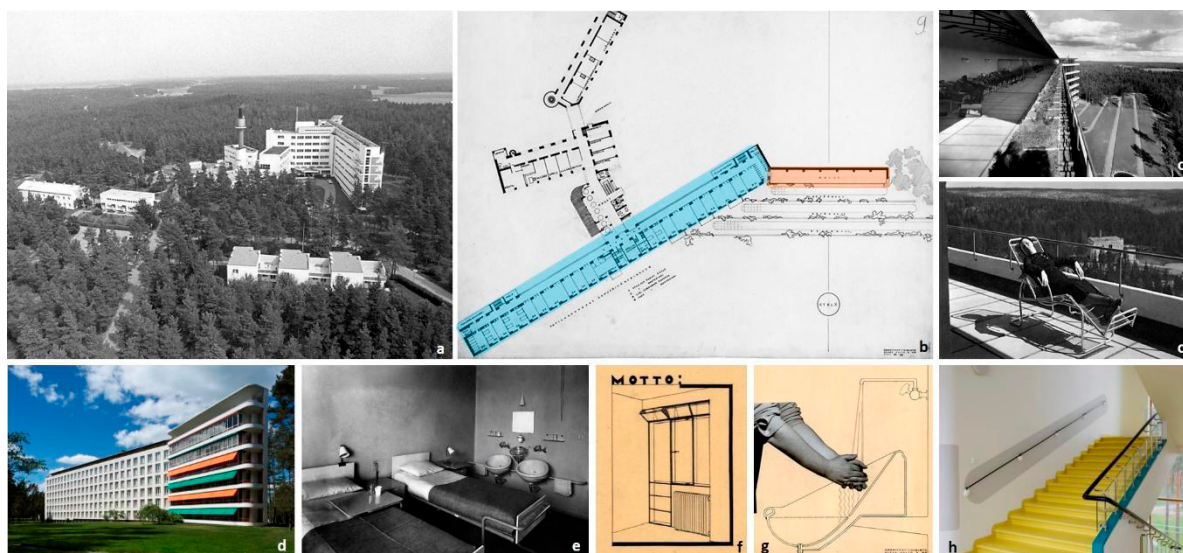
Villarouco et al. (2021) report that the interrelationship between the environment and its occupants occurs so intensely that spatial characteristics may reflect individuals’ emotional states. Thus, pleasant, organized, and comfortable environments tend to foster positive feelings and greater well-being, highlighting the influence of space on human experience.

The discussions presented are supported by architectural projects that incorporate environmental and sensory strategies aimed at users’ well-being and recovery. Architects such as Richard Neutra and Alvar Aalto incorporated therapeutic elements in their projects, conceiving an architecture designed to elicit positive effects in individuals and to value nature and natural settings, which were considered essential to health and recovery (Sternberg, 2009). The former Paimio Tuberculosis Sanatorium in Paimio/Finland, designed by Alvar Aalto; the Sarah Kubitschek hospitals designed by João Filgueiras Lima (Lelé); and the Phoenix Children’s Hospital by HKS Architects in Arizona/United States, are examples of humanized healthcare environments that positively influence patients’ rehabilitation processes.

The design of the Paimio Tuberculosis Sanatorium resulted from an architectural competition won by Alvar Aalto in 1929. Located within a pine forest far from the urban center and inaugurated in 1933, the sanatorium became an international reference for therapeutic environments and human-centered architecture (Paimio [...], ©2017-; Karlen; Roberts; Tucker, 2023). The project incorporated innovative yet simple and effective design solutions to promote patients’ physical and emotional well-being, including south-facing dormitories to maximize daylight exposure, floor-to-ceiling windows framing the natural landscape and promoting ventilation without direct drafts, and open balconies intended for sunbathing and social interaction. The

sanatorium also included hydrotherapy rooms, occupational therapy facilities, and outdoor pathways with fountains that encouraged walking in natural surroundings.

Beyond functional aspects, Aalto was concerned with individuals' sensory experience through the strategic use of color, including yellow floors in the main staircase, colored walls in the corridors, dark ceilings in patient rooms, and orange balcony railings, as well as through the design of furniture and lighting (Figure 5), anticipating principles later associated with restorative environments and Environmental Psychology (Sternberg, 2009; Paimio [...], ©2017-; Karlen; Roberts; Tucker, 2023).



**Figure 5:** a) Paimio Tuberculosis Sanatorium aerial view; b) Floor plan of the sanatorium: highlighting the patients' dormitories block (blue) and the balconies/terrace (orange); c) Sun balcony; d) Block containing dormitories and balconies/terrace; e) Dormitory; f) Dormitory window; g) Sink designed for the sanatorium; h) Use of color in the interior spaces.

**Source:** Adapted from Alvar Aalto Foundation (s.d.), Holma (©2017-), and Welin (©2017-).

When analyzing the project from Ulrich's Psychoevolutionary Theory (1983) perspective, the visual integration with nature and the plenty of daylight can be seen as providing restorative stimuli that reduce stress and anxiety while supporting patients' psychophysiological recovery. This outdoors integration also aligns with the sensory impact described by De Paiva (2018), which explains that the environment is perceived emotionally before conscious reflection occurs. Thus, the retina captures the abundance of daylight and vegetation, and, at an unconscious level, the processing of this information activates emotional centers that release neurochemicals associated with well-being and immune system functioning. In this way, the windows designed by Aalto cease to be merely architectural openings and become effective tools for sensory stimulation, reinforcing the influence of the viewed landscape on individuals' behavior and well-being within treatment environments.

The Sarah Kubitschek hospitals reflect Lelé's concern for the humanizing of healthcare environments by integrating environmental comfort, human scale, and the physical and emotional well-being of individuals (Ribeiro, 2007). In his projects, the architect explores forms, colors, textures, artworks, and environmental design strategies to make spaces more welcoming and less associated with the traditional hospital model. In addition, green areas adjacent to treatment and inpatient sectors promote contact with the outdoors and patients' interaction with the natural landscape, allowing for outdoor activities and moments of contemplation (Lima, 2013).

The projects incorporate passive design solutions such as *brise-soleil* systems for solar radiation control, sawtooth roofs for top lighting, cross-ventilation for indoor temperature regulation and space sanitation, as well as atria and galleries for air renewal and the removal of hot air from the building (Figures 6 and 7) (Vasconcelos, 2004; Ribeiro, 2007). Beyond meeting technical requirements, these strategies enhance the quality of the indoor environment by promoting better thermal, visual, and acoustic comfort conditions. In this sense, Lelé's work breaks with the image of the "sterile," cold, and noisy hospital environment criticized by Sternberg (2009), bringing architecture closer to a therapeutic dimension grounded in sensory comfort and environmental quality.



**Figure 6:** Garden and corridor of Sarah Brasília Lago Norte.

**Source:** Lima (2013).



**Figure 7:** Central area of Sarah Brasília Lago Norte.

**Source:** Lima (2013).

HKS Architects designed the renovation and expansion of Phoenix Children's Hospital, transforming it into one of the largest pediatric healthcare campuses in the United States. The project was based on enhancing existing facilities and creating human-centered, sensorially comfortable environments. The proposal values the natural beauty of the surrounding mountains and desert, incorporating panoramic views and green areas with native vegetation into inpatient and communal spaces. The connection between the new and existing buildings is established through a rooftop play garden, meditation gardens, and restaurants, promoting social interaction and contact with the outdoors (Phoenix [...], ©2018–2023; Phoenix [...], ©2023).

Within the interior spaces, notable features include the use of vibrant colors, playful sculptures, and lighting strategies aimed at enhancing patients' sensory

comfort. Diffuse daylighting promotes a sense of calm, while wall-mounted luminaires provide orientation and interactive entertainment for patients. In some areas, concealed lighting fixtures change color or simulate effects comparable to the water movement, incorporating various shades of blue (Figures 8 and 9), transforming potentially stressful stimuli into more pleasant and reassuring experiences (Phoenix [...], ©2018–2023; Phoenix [...], ©2023). In this way, the project demonstrates how contemporary healthcare architecture can integrate nature, technology, and environmental comfort to create spaces that are more responsive to patients' emotional and sensory vulnerabilities.



**Figure 8:** Phoenix Children's Hospital entrance hall.

**Source:** ArchDaily (2012).



**Figure 9:** Patients' room at Phoenix Children's Hospital.

**Source:** ArchDaily (2012).

The foregoing discussion demonstrates that the built environment directly influences individuals' perception, behavior, health, and well-being. According to Tavares (2022), space is an extremely effective means of communication, and the brain is programmed to process environmental stimuli through the sensory system, fostering a symbiotic relationship between human beings and place. Thus, architectural design becomes a key element by providing the stimuli necessary to prevent or assist in the rehabilitation of neuropsychological disorders and trauma. Drawing upon the convergence of theoretical foundations and the examination of architectural precedents, Table 1 systematizes guidelines regarding the qualification of these environments.

**Table 1.** Design Guidelines for Mental Healthcare Environments Based on Environmental Psychology Principles

| Category                            | Design Guidelines                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Benefits for Mental Health                                                                                                                                                         |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Integration with Nature</b>      | <p>Ensure nature views through large windows and low window sills, accessible even from a seated or lying position</p> <p>Provide physical access to green areas, therapeutic gardens, and courtyards</p> <p>Incorporate outdoor pathways connected to gardens or natural landscapes to promote nature-based and outdoor activities</p> <p>Integrate fountains and water features into the landscape</p> <p>Use balconies and terraces for direct contact with fresh air and nature as indoor extensions</p>                                                                                                                       | <p>Stress and anxiety reduction; cognitive and affective restoration; improvement in mood, self-esteem, and coping resources</p>                                                   |
| <b>Lighting and Visual Quality</b>  | <p>Maximize daylight penetration through appropriate building orientation and the use of large windows, top lighting, atria, and courtyards</p> <p>Ensure exposure to sunlight in inpatient rooms</p> <p>Ensure adequate illuminance levels and glare control to prevent visual fatigue</p> <p>Use electric lighting for spatial orientation and flexible use</p> <p>Adapt lighting scenarios for day/night transitions and different activities</p>                                                                                                                                                                               | <p>Biological rhythms regulation; stress and anxiety reduction; visual comfort improvement; promotion of psychophysiological well-being; enhancement of mood and sleep quality</p> |
| <b>Acoustic Comfort</b>             | <p>Use sound-absorbing materials and avoid excessively reflective surfaces (such as metals and stone finishes)</p> <p>Prioritize natural soundscapes (birdsong, wind, and water) to mitigate artificial noise and promote a calming acoustic environment</p>                                                                                                                                                                                                                                                                                                                                                                       | <p>Stress reduction; improvement in sleep quality, privacy, communication, and patient recovery</p>                                                                                |
| <b>Thermal Comfort</b>              | <p>Implement bioclimatic strategies for passive thermal control according to local climate</p> <p>Promote natural ventilation and constant air renewal to enhance indoor air quality and thermoregulation</p> <p>Utilize shading devices (brise-soleils, shutters, or blinds), to mitigate solar heat gain in indoor Spaces</p> <p>Provide shaded and weather-protected outdoor areas to ensure thermal comfort during use</p>                                                                                                                                                                                                     | <p>Air quality improvement; reduction of physical discomfort; strengthening of conditions favorable to recovery</p>                                                                |
| <b>Positive Sensory Stimulation</b> | <p>Use colors and textures strategically to promote sensory comfort and create welcoming environments</p> <p>Avoid excessively homogeneous or sterile environments by incorporating elements that provide sensory variety and visual interest</p> <p>Integrate nature-themed art (photographs/illustrations) into indoor spaces to reduce environmental sterility and provide visual interest</p> <p>Incorporate aromatic vegetation to provide pleasant olfactory stimuli and enhance sensory diversity</p> <p>Use interactive or scenic lighting to enhance the sensory experience and emotional regulation within the space</p> | <p>Promotion of emotional regulation; anxiety reduction; creation of safe and welcoming</p>                                                                                        |
| <b>Privacy and Autonomy</b>         | <p>Provide refuge spaces to encourage voluntary withdrawal and reduction of environmental stimuli</p> <p>Prioritize single or low-occupancy rooms to foster privacy and family support</p> <p>Position openings and furniture strategically to reduce unwanted visual exposure</p> <p>Enable choice between collective and private settings to regulate social exposure</p>                                                                                                                                                                                                                                                        | <p>Increased sense of control; greater privacy; stress reduction; improvement in sleep quality, emotional security</p>                                                             |

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Humanization and Socialization</b>    | Provide social spaces to strengthen bonds between patients, families, and healthcare staff<br>Designate areas for therapeutic and recreational activities to promote active participation, socialization and psychosocial rehabilitation<br>Connect gardens and balconies with social areas to expand leisure and interaction opportunities<br>Integrate social nodes into circulation areas to encourage informal encounters | Strengthening of social bonds; increased emotional support; improvement in self-esteem and coping resources; promotion of psychosocial reintegration |
| <b>Safety and Spatial Predictability</b> | Ensure legible and predictable environments to facilitate spatial understanding and reduce disorientation<br>Incorporate visual landmarks and references to assist navigation and environment identification                                                                                                                                                                                                                  | Reduction of disorientation, sensory overload, and aggressive behaviors; increased sense of safety; greater environmental mastery                    |

**Source:** The authors.

The findings of this study reveal a critical gap between the therapeutic potential of architecture and the reality of mental healthcare institutions in Brazil. Despite the scientific advances promoted by Environmental Psychology and neuroscience applied to architecture, it is observed that a large proportion of Brazilian facilities still occupy adapted buildings and lack specific architectural guidelines, which often limits humanization to superficial interventions, such as isolated color treatments and poorly designed green spaces.

Furthermore, Tavares (2022) emphasizes that greater care should be taken in environments intended to accommodate individuals with sensory sensitivities, such as those with schizophrenia or those on the autism spectrum, since these individuals exhibit heightened sensitivity to the stimuli that surround them. Therefore, the architectural configuration of mental healthcare environments should prioritize safe settings rather than environments that may encourage aggressive behavior.

## 5 Final considerations

This study demonstrated that architecture plays a fundamental role in mental healthcare, recovery, and the promotion of mental health, extending beyond its traditional function of providing shelter and supporting healthcare activities. The historical analysis showed that the evolution of psychiatric care was accompanied by transformations in treatment environments, which shifted from prioritizing isolation and surveillance to valuing humanization, social integration, and patients' well-being.

In the contemporary context, this discussion acquires particular relevance in light of the worsening mental health indicators, especially in Brazil, a country with the highest rate of anxiety in the world. Although the Psychiatric Reform movement represented a milestone in overcoming the asylum-based model, many spaces dedicated to mental healthcare still operate in adapted buildings and lack specific architectural guidelines.

This scenario reinforces the importance of incorporating scientific advances related to the influence of the built environment on mental health into architectural practice.

The findings indicate that factors such as access to daylight, visual quality, adequate ventilation, thermal comfort, integration with nature, acoustic comfort, positive sensory stimulation, privacy, opportunities for social interaction, and spatial predictability may contribute to reducing stress and anxiety, thereby supporting recovery processes. The analysis of the case studies demonstrated that these strategies can enhance occupants' spatial experience and improve therapeutic outcomes.

Finally, this study's main contribution is to bring together and systematize scientific evidence supporting the relationship between the built environment and mental health, thereby providing a foundation for the development of design guidelines to improve care environments. It is therefore argued that the design of such environments should be carried out through a multidisciplinary approach, integrating architects, healthcare professionals, managers, and other stakeholders involved in the care process. As a future direction, further investigations are recommended on the application of these guidelines in different contexts and types of care facilities, contributing to the advancement of design practices that are more closely aligned with users' needs and the principles of humanized care.

## References

- AL-GHAZAL, S. K. *The origin of Bimaristans (hospitals) in Islamic medical history*. Manchester: FSTC Limited, 2007.
- ALVAR AALTO FOUNDATION. *Paimio Sanatorium Conservation Management Plan 2016*. [s.d.]. 05 imagens. Disponível em: <https://www.alvaraalto.fi/wp-content/uploads/2023/04/PaimioSanatoriumConservationManagementPlan.pdf>. Acesso em: 20 nov. 2023.
- AMARANTE, P. *Loucos pela vida: a trajetória da reforma psiquiátrica no Brasil*. 2. ed. Rio de Janeiro: Fiocruz, 1995.
- ARCHDAILY. *Phoenix Children's Hospital/HKS Architects*. [2012]. 02 imagens, color. Disponível em: [https://www.archdaily.com/220749/phoenix-childrens-hospital-hks-architects?ad\\_medium=gallery](https://www.archdaily.com/220749/phoenix-childrens-hospital-hks-architects?ad_medium=gallery). Acesso em: 03 ago. 2023.
- ASSOCIAÇÃO PAULISTA PARA O DESENVOLVIMENTO DA MEDICINA (SPDM AFILIADAS). *Centro de Atenção Psicossocial*. São Paulo, s.d. Disponível em: <https://caps.spdmafiliadas.org.br/#>. Acesso em: 06 jun. 2023.
- AUGUSTIN, S.; FRANKEL, N.; COLEMAN, C. *Place advantage: Applied psychology for interior architecture*. New Jersey: John Wiley & Sons, 2009.
- BRASIL. Ministério da Educação. Empresa brasileira de Serviços Hospitalares. *Ações realizadas pela Rede Ebserh/MEC buscam conscientizar sobre a importância da saúde mental*. Brasília: Ministério da Educação, 2022.

CIBRÃO, E. R. S. S. *Janela da Mente - A Influência da Arquitetura na Saúde Mental*. 2019. Dissertação (Mestrado Integrado em Arquitetura) - Faculdade de Ciências e Tecnologia, Universidade de Coimbra, Coimbra, 2019.

DE PAIVA, A. Neuroscience for architecture: how building design can influence behaviors and performance. *Journal of Civil Engineering and Architecture*, Wilmington, v.12, n.2, p.132-38, 2018.

DELFINI, P. S. S.; SATO, M. T.; ANTONELI, P. P.; GUIMARÃES, P. O. S. Parceria entre CAPS e PSF: o desafio da construção de um novo saber. *Ciência & Saúde Coletiva*, Rio de Janeiro, v.14, n.1, p.1483-1492, 2009.

DIA Mundial da Saúde Mental: uma oportunidade para dar o pontapé inicial em uma grande escala de investimentos. *Organização Pan-Americana de Saúde*, Brasília, 27 de agosto de 2020. Disponível em: <https://www.paho.org/pt/noticias/27-8-2020-dia-mundial-da-saude-mental-uma-oportunidade-para-dar-pontape-inicial-em-uma>. Acesso em: 02 ago. 2023.

DUBOSE, J.; MACALLISTER, L.; HADI, K.; SAKALLARIS, B. Exploring the concept of healing spaces. *Health Environments Research & Design Journal*, California, p.1-14, 2016.

FUNDAÇÃO DE AMPARO À PESQUISA DO ESTADO DO RIO DE JANEIRO (FAPERJ). *A tortuosa trajetória da loucura ao longo da história da medicina brasileira*. [2018]. 1 imagem, pb. Disponível em: <https://siteantigo.faperj.br/?id=3578.2.9>. Acesso em: 20 nov. 2023.

FELIPPE, M. L.; SILVEIRA, B. B. Diálogos entre a psicologia ambiental e a arquitetura para o cuidado da saúde. In: SILVEIRA, B. B.; FELIPPE, M. L. *Ambientes restauradores: conceitos e pesquisas em contextos de saúde*. Florianópolis: UFSC, 2019, p.23-37.

FOERSCHNER, A. M. The History of Mental Illness: From Skull Drills to Happy Pills. *Inquires Journal*, Boston, v.2, n.9, p.1-4, 2010.

FONTES, M. P. Z. *Imagens da arquitetura da saúde mental: um estudo sobre a requalificação dos espaços da Casa do Sol*, Instituto Municipal de Assistência à Saúde Nise da Silveira. 2003. Dissertação (Mestrado em Ciências em Arquitetura) - Faculdade de Arquitetura e Urbanismo, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2003.

GOTTSCHALL, C. A. M. *Medicina hipocrática: antes, durante e depois*. Porto Alegre: Stampa, 2007.

GURGEL, M. *Projetando espaços: guia de arquitetura de interiores para áreas residenciais*. São Paulo: Senac, 2004.

HOLMA, M. *Entrance*. ©2017-. 1 fotografia. Disponível em: <https://www.alvaraalto.fi/en/architecture/paimio-sanatorium/>. Acesso em: 02 ago. 2023.

HOREVICZ, E. C. S.; DE CUNTO, I. A humanização em Interiores de Ambientes Hospitalares. *Revista Terra & Cultura: Cadernos de Ensino e Pesquisa*, Londrina, v.23, n.45, p.17-23, 2007.

HOSPÍCIO de Pedro II. Dicionário Histórico-Biográfico das Ciências da Saúde no Brasil (1832-1930). Online. Disponível em: <http://www.dichistoriasaude.coc.fiocruz.br>. Acesso em: 06 jun. 2023.

- KARLEN, M.; ROBERTS, S. H.; TUCKER, K. K. *Healthcare Design Basics*. New Jersey: John Wiley & Sons, 2023.
- LIMA (LELÉ), J. F. Sarah Brasília Lago Norte. Centro Internacional de Neurociências. *Vitruvius*, São Paulo, v.13, n.153.01, 2013.
- LISBOA, T. C. *História dos hospitais*. São Paulo: IPH, 2021.
- MACDONALD, M. *Mystical Bedlam: Madness, Anxiety, and Healing in Seventeenth-Century England*. New York City: Cambridge University Press, 1981.
- MARTINS, A. K. L.; SOARES, F. D. S.; OLIVEIRA, F. B.; SOUZA, A. M. A. Do ambiente manicomial aos serviços substitutivos: a evolução nas práticas em saúde mental. *SANARE-Revista de Políticas Públicas*, Sobral, v.10, n.1, p.28-34, 2011.
- MIQUELIN, L. C. *Anatomia dos edifícios hospitalares*. São Paulo: CEDAS, 1992.
- MOSER, G. *Introdução à Psicologia Ambiental: pessoa e ambiente*. Campinas: Editora Alínea, 2018.
- OLIVEIRA, M. R. S.; PINHEIRO, V. C. Emoções, sentimentos e arquitetura pela ótica da neurociência. *Cadernos PROARQ*, Rio de Janeiro, n.37, v.2, 2021.
- PACHECO, M. V. P. C. Esquirol e o surgimento da psiquiatria contemporânea. *Revista Latinoamericana de Psicopatologia Fundamental*, São Paulo, v.6, n.2, p.152-157, 2003.
- PAIMIO Sanatorium. *Alvar Aalto*, Helsinki, ©2017-. Disponível em: <https://www.alvaraalto.fi/en/architecture/paimio-sanatorium/>. Acesso em: 02 ago. 2023.
- PHOENIX Children's Hospital. *Color Kinetics*, Massachusetts, ©2018-2023. Disponível em: <https://www.colorkinetics.com/global/showcase/phoenix-childrens>. Acesso em: 03 ago. 2023.
- PHOENIX Children's Hospital Treating the Entire Family, Not Just the Patient. *HKS Inc*, Atlanta, ©2023. Disponível em: <https://www.hksinc.com/what-we-do/case-studies/phoenix-childrens-hospital/>. Acesso em: 03 ago. 2023.
- PIMENTA, T. Teste de depressão, ansiedade e estresse: DASS-21 revela que 86% dos respondentes têm algum transtorno mental. *Vittude*, s.l., 05 de agosto de 2019. Disponível em: <https://www.vittude.com/blog/?s=63%25+possuem+sintomas+de+ansiedade>. Acesso em: 16 mar. 2022.
- RAMSDEN, E. Designing for Mental Health: Psychiatry, Psychology and the Architectural Study Project. In: KRITSOTAKI, D.; LONG, V.; SMITH, M. *Preventing Mental Illness: Past, Present and Future*. Berlin: Springer Nature, 2019.
- REBOLLIDO, A. B. *A evolução e influência do desenho arquitetônico no hospital psiquiátrico*. 2014. Dissertação (Mestrado Integrado em Arquitetura e Urbanismo) - Escola Superior Gallaecia, Vila Nova de Cerveira, Portugal, 2014.
- RIBEIRO, G. P. Conforto ambiental, sustentabilidade, tecnologia e meio ambiente: estudo de caso Hospital Sarah Kubitschek-Brasília. In: *FÓRUM DE PESQUISA FAU.MACKENZIE*, 3., 2007, São Paulo. Anais... São Paulo: Mackenzie, 2007.
- ROE, J.; ASPINALL, P. The restorative benefits of walking in urban and rural settings in adults with good and poor mental health. *Health & Place*, Amsterdam, v.17, n.1, p.103-113, 2011.

- ROSEN, G. *Uma história da saúde pública*. Tradução: Marcos Fernando da Silva Moreira. São Paulo: Hucitec/Editora UNESP/ABRASCO, 1994.
- RUBIN, H. R.; OWENS, A. J.; GOLDEN, G. *An investigation to determine whether the built environment affects patients' medical outcomes*. Martinez: The Center for Health Design, 1998.
- SACRED FOOTSTEPS. *Bimaristan: The house of Healing*. [©2022]. 02 imagens, color. Disponível em: <https://sacredfootsteps.com/2023/07/17/bimaristan-the-house-of-healing/>. Acesso em: 21 nov. 2023
- SÁNCHEZ-MORENO, I.; BARREIROS, B. Quem vigia os vigilantes? A análise crítica do panoptismo na construção de asilos psiquiátricos: Hospital de Rilhafolles (Lisboa) e Hospital Mental de Santa Creu (Barcelona). In: FERREIRA, A. A. L.; MACHADO, F. M.; FIGUEREDO, B. F. *Governamentalidade e Práticas Psicológicas: A Gestão pela Liberdade*. Rio de Janeiro: NAU Editora, 2020.
- SHORTER, E. *A historical dictionary of psychiatry*. New York: Oxford University Press, 2005.
- SHORTER, E. *A history of psychiatry: from the era of the asylum to the age of Prozac*. New York: John Wiley & Sons, 1997.
- SILVEIRA, B. B.; KUHNEN, A. Psicologia ambiental e saúde na relação pessoa-ambiente: uma revisão sistemática. *PSI UNISC*, Santa Cruz do Sul, v.3, n.1, p.89-105, 2019.
- STERNBERG, E. M. *Healing spaces: the Science of place and well-being*. London: The Belknap Press of Harvard University Press, 2009.
- TAKAYAMA, N.; MORIKAWA, T.; BIELINIS, E. Relation between psychological restorative-ness and lifestyle, quality of life, resilience, and stress-coping in forest settings. *International Journal of Environmental Research and Public Health*, Basel, v.16, n.8, p.1456, 2019.
- TAVARES, B. Lugares que curam. *Revista Estética e Semiótica*, Brasília, v.12, n.2, 2022.
- TOLEDO, L. C. M. *Feitos para cuidar: a arquitetura como um gesto médico e a humanização do edifício hospitalar*. 2008. Tese (Doutorado em Ciências da Arquitetura) - Faculdade de Arquitetura e Urbanismo, da Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2008.
- ULRICH, R. S. Aesthetic and affective response to natural environment. In: ALTMAN, I.; WOHLWILL, J. F. *Human Behavior and Environment: Advances in Theory and Research*. New York: Plenum Press, 1983. v.6, cap.3, 85-1 25.
- ULRICH, R. S. Evidence based environmental design for improving medical outcomes. In: *THE HEALING BY DESIGN: BUILDING FOR HEALTH CARE IN THE 21ST CENTURY CONFERENCE*, 2000, Montreal. Proceedings... Montreal: McGill University Health Centre, 2000. p. 3.1-3.10.
- ULRICH, R. S. How design impacts wellness. *The Healthcare Forum Journal*, San Francisco, p.20-25, 1992.
- ULRICH, R. S. View through a window may influence recovery from surgery. *Science*, Washington DC, v.224, n.4647, p.420-421, 1984.
- van der VOORDT, T. Designing for health and wellbeing: various concepts, similar goals. *Gestão & Tecnologia de Projetos*, São Paulo, v16, n4, 2021.

UNIVERSIDADE FEDERAL DE OURO PRETO (UFOP). *A reforma psiquiátrica*. [©2024]. 1 imagem, pb. Disponível em: <https://saudemental.ufop.br/reforma-psiquiatrica>. Acesso em: 20 nov. 2023.

VASCONCELOS, R. T. B. *Humanização de ambientes hospitalares: características arquitetônicas responsáveis pela integração interior/exterior*. 2004. Dissertação (Mestrado em Arquitetura e Urbanismo). Universidade Federal de Santa Catarina, Florianópolis, 2004.

VIECELI, A. P. *Lugares da loucura: arquitetura e cidade no encontro com a diferença*. 2014. Dissertação (Mestrado em Arquitetura) - Universidade Federal do Rio Grande do Sul, Porto Alegre, 2014.

VILLAROUCO, V.; FERRER, N.; PAIVA, M. M.; FONSECA, J.; GUEDES, A. P. *Neuroarquitetura: a neurociência no ambiente construído*. Rio de Janeiro: Rio Books, 2021.

VRKLEVSKI, L. P.; ELJIZ, K.; GREENFIELD, D. The Evolution and Devolution of Mental Health Services in Australia. *Inquires Journal*, Boston, v.9, n.10, p.1-2, 2017.

WELIN, G. *Patients in the top floor terrace in 1934*. ©2017-. 1 fotografia. Disponível em: <https://www.alvaraalto.fi/en/architecture/paimio-sanatorium/>. Acesso em: 02 ago. 2023.