Effects of Design on Health and Wellbeing
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Beyond White as a Neutral Color

Sarah JOYCE[a,1]
[a] *School of Civil Engineering, University of Leeds, UK*
ORCiD ID: Sarah Joyce https://orcid.org/0000-0001-8050-7327

Abstract. This discussion paper explores the complex relationship between color and healthcare spaces, starting with the emerging prominence of white surfaces in early twentieth-century European hospital design. It examines the sociopolitical and sustainability implications of an apparently neutral color preference, noting case studies such as the mining of ilmenite ore in Madagascar, where the production of white pigment for titanium dioxide in paint correlates to ecological habitat degradation. The narrative also examines the global implications of mass-produced design practices and the hegemony of whiteness as something replacing colorful local color traditions with neutral hues. By exploring the interior design, materiality, and sensory qualities of white healthcare spaces, the paper discusses the association with hygiene and global influence on healthcare environments. The paper also examines the role of architectural education in shaping designers' preferences for white and neutral color palettes in general and in healthcare settings, questioning the artificiality inherent in the prevailing white aesthetic. It also questions the latent remnants of racism in the preferential use of white, rooted in its historical association with 1930s modernism and rejection of "primitivism" in design. It further explores the role of color used as bright primary hues juxtaposed with white, in functions such as in wayfinding and a sense of "scientific" precision to how designers use color within these architectural contexts from applying principles from environmental and psychological science. In conclusion, this narrative unravels the historical, environmental, and sociocultural dimensions that led to white as a neutral color in design perceived as objective fact. It advocates for a more nuanced approach in healthcare environments and for design choices that prioritize diverse needs, experiences, and cultural sensitivities. The paper will encourage readers to critically assess the hegemony of white in healthcare design compared to the vibrancy of color in indigenous design traditions worldwide.

Keywords. Hegemony in design, sustainable ethical practices, historical precedent, color, hospital aesthetics.

1. Introduction

This paper explores the widespread use of white in healthcare architecture, design, and everyday life. It examines the origins of white design in Anglo-American and European societies, as well as cases in Global South countries. The paper also explores its environmental and sociocultural implications, revealing a darker side to the seemingly neutral color. The research aims to help practicing architects, engineers, and designers enhance their designs and prioritize diverse needs, experiences, and cultural sensitivities in healthcare buildings. This discursive paper emerges from research process of scholarly narrative derived from reflective practice and a literature review methodology of

[1] Corresponding Author: Dr Sarah Joyce, s.joyce2@leeds.ac.uk, School of Civil Engineering, The University of Leeds, UK.

situational analysis [1] and is presented as a valuable approach for enhancing healthcare design outputs globally.

I test out an emerging methodology for analyzing historical architecture, focusing on its socio-political-economic context and impact on users, rather than just styles. An approach to "*architectural scholarship on ideas and practices that undo entrenched and intrinsically unjust ways of knowing and doing*" [2, p.1], that I apply to the use of white in healthcare architecture. The academy's production and reproduction of architectural knowledge, particularly through teaching and research, should adopt a feminist stance for a more diverse profession, emphasizing collaboration, cross-disciplinary exchange, and interdependency. Architecture's conservative roots and traditional hierarchical structures hinder its ability to adapt to modern living and often maintains traditional hierarchical and patriarchal structures, and notions of individual mastery [3]. Like Iossifova et al., in this paper, I acknowledge the need to consider global challenges such as environmental collapse, a post-pandemic world, and conflict in architectural research.

You are likely reading this as black text on a white screen or printed on white paper (assuming you not using a screen tint or color paper to make reading more accessible). Have you noticed the white 'blank space' margins around the blocks of text to provide an elegant and clearer read? Were you aware of the whiteness of this 'blankness' before you observed it? Around 100 years ago, mass production of many white objects started including bleached papers for printing that inspired how we read text on screens. Ever since our technological age has sought ever whiter versions of white. White in design is ubiquitous across the globe, replacing more colorful localized palettes. We should question this trend because it symbolizes an Anglo-American and European architectural past obsessed with using 'whiteness' to purify people and buildings.

The "*chronic whiteness*" [4 p.1,] in modern objects, including healthcare buildings, pills, bedsheets, bread, painted walls, sanitary ware, and cosmetics, is a status symbol due to the high production costs and constant maintenance needed, underscoring the enduring social and environmental costs associated with the pursuit of whiteness. As an architect training in the late Twentieth Century, I was inspired by white modernist buildings and created white card models, leading me to design numerous white interiors without truly considering the reasons behind why.

Architectural research and education cannot remain indifferent to global socio-political issues in materials and construction choices and chose to address practices that exploit labor, resources, and lives [5]. Architecture can create, solidify or transform power structures that produce inequality, injustice, environmental loss, and repress certain social groups. Focusing on style and type while overlooking global discrimination and domination in local architecture production contributes to the problem. The practice and scholarship of architecture perpetuate "*globally circulating knowledges*", hegemony in design, biased views, and "*disproportionate attention to individual architects, often white and male"* [2, p.1].

2. White as a meaningful color for purity, hygiene and health

The color white has a long history of association with societal concepts and values, with the church using it to symbolize purity and purification from diseases and moral impurities. This symbolism evolved with changes in materiality and manufacturing, transferring meanings from fabrics to tiling and walls. White holds high significance in Anglo-American and European culture due to its difficulty in reproduction or

manufacturing. In the sixteenth and seventeenth centuries, wealthy Europeans chose bleached white linen over natural browns, leading to the development of Holland by Dutch cloth workers, a fine white linen that became a status symbol of wealth and cleanliness [6]. In the eighteenth century, wearing linen undergarments became a popular "purifying" trend due to French medical advocacy [7]. White ruffs and cuffs symbolized wealth as a hint at expensive hygienic underwear. Changing white undergarments was seen as better than frequent washing due to poor water quality and a believe that line drew out impurities from the body.

Wearing white garments led to gendered and exploitative patterns of being, with white garments being attributed to the exploitation of women in Europe. The need to wash white undergarments more frequently than brown linen provided employment opportunities for single women. Working as laundresses may not have signaled emancipation, because returning white garments to a clean state included other roles like housekeeping, nursing, and sex work as independent wage earners. Late eighteenth-century medical advice saw linen laundering as part of nursing and women's work [6]. Cotton replaced linen as a better fabric for bleaching, "*establishing 'whiteness' as a sign of gentility and superiority*" as "*the evolutionary event of early modern body history*" [8, p.686]. During the Industrial Revolution, male coal workers in Shropshire, UK, maintained similar gendered roles by wearing the now cheaper linen shirts to protect them from unhealthy and dirty conditions [9] while their wives washed their work clothes back to white every day.

White linen symbolized cleanliness, refinement, and civility for European colonizers when they met indigenous peoples. This whiteness bias is also evident in early hospital buildings, where cleaning jobs were reserved for non-white employees from the colonies when the UK National Health Service was created. White linen supported the mind-body dualism of emerging medical practices by concealing the nude body's skin; distancing the intellect from the sinful, animal essence body. Personal decency was closely linked to the cleanliness and quality of undergarments, with non-white undergarments often causing shame [10]. The connection between white cloth's status and the purifying qualities of linen established the connection between whiteness and hygiene, which is now evident in healthcare buildings.

Early hospital buildings used white sheeting for cleanliness in clinical rooms. Records from 1797-1805 show that St Thomas' Hospital in London using the most expensive color white for bed linen. Cheaper linen colors were used elsewhere in the hospital [11]. The American Munsell color system (1905) standardizes color values for industry, with absolute white at the top of the scale. White was established as a hygienic covering and remains a symbol of cleanliness in healthcare.

The white coat, worn by doctors over work suits from the late nineteenth century expressed this concept of a protective layer of white [12], symbolizing science, purity, modernity, authoritative knowledge, "*and supernatural power*" of the color [12, p. 115]. White became associated with healing institutions and hospital buildings and in color-coded uniforms separated medical staff from others [12]. The public perception of hospitals shifted from places where poor people died to being the only place where the sick could be healed. This symbolism likely attracted architects to use white wall surfaces and furniture too. Although doctors now wear colorful scrubs in surgery to hide bodily fluids and aid vision, the white coat still holds the same connotations of a professional science-based doctor.

3. Evolution of titanium white paint and white buildings

The twentieth century saw significant technological advancements linked to two world wars, and inspiring the development of modern art and architecture. White became a defining icon of modernism, popularized by Le Corbusier in his 1920s architecture and Kazimir Malevich's 1918 painting *White on white* [4]. Discovering how to mass manufacture titanium white paint, a composite pigment made from titanium dioxide white, barites, and extenders, was fundamental in establishing whiteness in buildings. Industrialized mass production aligned with emerging modernist white tuberculosis sanatoriums in Europe as early design templates for healthcare architectural designs. Titanium white pigment outperformed all other whites available for paint, offering excellent opacity and high tinting strength. The ban on toxic lead paint following the White Lead (Painting) Convention, 1921 [13], led to an ironic shift of white paint from health hazard to symbol of hygiene and modernist architecture.

Le Corbusier first talked about the need for a *law of whitening* (*loi du blanchiment*) in an early 1923 interview that presented it as a cleansing moral act to expunge decorative art in favor of a 'purity' of body, eye, and brain:

> "*This is a necessity both moral and material. It is necessary to establish the law of whitening. This cleanliness makes one see the objects in their sincere truth: hence in perfect purity. Remember the term: it defines a whole discipline. It implies a certain nudity. These trifles, these small pieces of furniture, these futilities of decorative art, are intrusive and indiscreet.*" [14, p.64]

Le Corbusier and other twentieth-century architects criticized nineteenth-century architecture for its perceived unhealthy aspects, suggesting sun, light, ventilation, exercise, roof terraces, hygiene, and whiteness as ways to prevent or cure diseases like tuberculosis [15]. Whiteness, symbiotic with modernist imagery from the 1930s, embodied cleanliness, draining, and the "*upkeep of the human machine*" [16, p.5].

Modernist tuberculosis sanatoriums, designed with white as a therapeutic element, emphasizing both inward and outward purification for patients. The Swiss Einfried sanatorium is depicted in German writer Thomas Mann's novel, *Stories of Three Decades* (1936) featuring white-faced and white-handed patients wearing white hats and jackets, sitting in white-enameled armchairs, in white rooms with white folding doors, in a white building in a white region covered in snow [17]. The white architecture aimed to evoke ideals of sterility and hygiene, with sunlit spaces and optimal ventilation. However, some patients succumbed to despair, leading to instances of suicide in sanatoriums, requiring staff to be vigilant to prevent patients from jumping from sun terraces [15]. The Swiss Wald-sanatorium, depicted in Thomas Mann's *The Magic Mountain* (1924), is a white-wrapped and glass structure elevated above the disease-prone ground and full of white-wrapped patients undergoing hydrotherapy [18]. The stark whiteness of these structures may have contributed to a sense of sterility and potential dehumanization in later hospital designs.

White has been a significant color in modern architecture, often used as a form of "*visual hygiene*" denoting that in modernity, "*death is hidden*" [15, p.89]. Many sanatoriums had elaborate networks of secret tunnels to remove the dead bodies of patients for whom the treatments were not successful. This concept, combined with the idea that hospitals were machines for birthing and dying, led to the logical extension of making homes mimic hospitals for the healthiest experience of living; an aesthetic that

persists today. White is the fifteenth favorite color among adults, with better performance in clothing and being the number one choice in physical environments like living rooms, bedrooms, offices, and meeting rooms [19]. In the medical landscape, white remains symbolic, demarcating purely medical spaces such as operating theaters, and other colors are expected to justify their presence, such as color-coded wayfinding referenced against white corridor walls.

4. The evolution of white and color palettes in hospitals

In the 1880s, Maw and Company Limited in Staffordshire, England, as a global leader in tile manufacturing, emphasized the importance of white tiles in sanitation as part of the "*Advance of Modern Times*" [20, p.1]. In the 1920s, washable white gloss replaced whitewashed walls above dado height and dark brown below which concealed dirt, an aesthetic chosen due to limited cleaning methods. In the 1930s, all-white walls and white tiling were used to demonstrate cleanliness, with white tiles having the perceived 'magical' dirt repelling qualities of being both white and shiny.

In the 1950s, color selection in hospital design was a serious technical issue, requiring knowledge of artificial lighting, architecture, and color laws. Men were considered better suited to specify color than women, whom men assumed would make unscientific and subjective choices. Under the title *Architecture*, Wilson states that "*indiscriminate breaking up of wall surfaces may upset the architectural balance, but if color is used with knowledge, it can emphasize good architectural lines*" [21, p.319]. White was the default color for architecture, and small rooms were made to seem larger using light colors. Color meanings were considered fixed, scientifically derived, not culturally influenced or changeable over time. Wilson suggested four characteristics to consider in a hospital space: light, color, maintenance, and cleanliness with white achieving all of these. This 1950s advice did not consider patient experiences but did consider the impact on staff working conditions [21, p.320]. In the late 1950s, UK hospitals began repainting programs to create a bright, cheerful environment for patients. This marked a shift in taste from the extreme whiteness of the early twentieth century, where white operating theatres were "*literally a pain in the eyes for the doctors*" [22, p.118] due to glare from white paint, tile, furniture, uniforms, and linen in daylight rooms. Some surgeons experimented with dark green scrubs and wall paint, and increased artificial lighting reduced glare and improved the color rendition of white walls.

In the 1960s, color therapy was used in hospitals to stimulate patients, based on research on its impact on mental health patients. The Royal Institute of British Architects approved a common terminology for contractors, doctors, and architects, with color choice being a scientific activity to produce therapeutic effects [23]. A Kuwaiti hospital building was repainted using British architects' knowledge, highlighting a hierarchy of Anglo-American knowledge over local knowledge. The hospital's sanitary annexes, services rooms, ward treatment rooms, sanitary fittings and French windows were painted white, while technical medical services departments had marled red tiles. The historical study suggests that a multicolored system with contrasting elements was starting to be seen most effective for hospital decoration, with bright colors being favored due to their modernity: "*pale pastel complementary colours can only be regarded as a sop to modernity and are used by those who are timidly modern*" [23, p.1689].

White remained the top of a color hierarchy in healthcare design through the 1990s, with hospital design advice still asserting that "*color and light are synonymous. There*

cannot be one without the other" [24, p. 79] for creating healthy interior spaces and mimicking natural daylight and circadian rhythms. Pale pastel colors were still dismissed for clinical spaces because they no function in enhancing daylight or artificial light. There are examples of colorful non-medical spaces such as hospital corridors painted warm yellow with wooden floors, while pink rooms with green chairs were used for meditation [24]. White coats for doctors were removed from UK hospitals in the 1990s as a political move to reduce doctors' power, not due to uniform infection rates [25]. White remained synonymous with building cleanliness, but recognition started that other colors may actually be more practical to wear in surgical spaces.

5. Sustainability loss and damages due to whiteness

> "[High modernism] *is best conceived as a strong, one might even say muscle-bound, version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and, above all, the rational design of social order commensurate with the scientific understanding of natural laws*." [26, p.89]

White, often associated with health and hygiene, is not healthy for the planet, especially in the construction industry, which currently emits 37% of global emissions of greenhouse emissions [27]. The *House Without Walls*, a 1997 Japanese architectural masterpiece, exemplifies high modernism's anti-ecological attitude. Its sterile white roof, protruding floor, and glass walls evoke an artificial science fiction scene with a natural landscape backdrop. It is an evocative icon for the negative impact of whiteness and modern aesthetics on global sustainable development. Continued preferences for hospital architecture's whiteness and modern aesthetics are also problematic in countering climate change and promoting sustainable development.

In this section, I consider three cases to discuss and illustrate loss and damage due to climate change. The United Nations (UN) defines loss and damage as irreversible impacts of climate change, despite mitigation and adaptation efforts. Low-lying islands face biodiversity, ecosystems, property, cultural heritage, and livelihood losses, with the world suffering $2.8 trillion in damage between 2000-2019 [28].

5.1. Environmental loss and damages

White, as a manmade pigment, significantly impacts the environment due to its non-natural composition from lead, lime, titanium dioxide, zinc oxide, and artificial compounds. It is used in various products, including paint, textiles, paper, sunscreen, toothpaste, and cosmetics. Rio Tinto, a multinational company, owns mines in Madagascar, producing ilmenite, a major white pigment used in titanium white [29]. The company's environmental impact includes land access commodification, dam construction, population relocation, deforestation, and restricted resource access. Biodiversity conservation efforts Rio Tinto/QMM are criticized as a "*performance of sustainability*," with compensation framed as "*development gifts*" [30, p.447]. This has led to a process of inversion, with local Malagasy people being mediated as the main perpetrators of degradation. All to export white pigment for global use.

Architects should be aware of their individual and collective responsibilities when specifying white pigment sourced from such "*green grabbing*" [30, p.450] mining practices, as we could be complicit in the environmental 'othering' of indigenous peoples as a form of Foucault's biopower concept [31]. Here, I focus on one mining company contributing to white paint raw materials. It is unlikely to be the only one using such practices in environmental significant part of the world.

5.2. Societal and cultural loss and damages due to whiteness

Viewed through a critical lens, white in architecture symbolizes white manufacturing, economic dominance, and industrialized power, originating from Europe and the USA. White buildings, in their starkness, represent this power in places distant from the colonial power. We can use Amie Siegel's artwork, Double Negative [32], to explore the cultural loss and damages caused by whiteness in architecture. The piece explores the tension between Le Corbusier's white Villa Savoye in Paris (1929) and its black doppelgänger, the Australian Institute for Aboriginal and Torres Strait Islander Studies (2001). It features two silent, black and white 16mm films and a projector showing a series of French landscapes and the Australian Institute for Aboriginal and Torres Strait Islander Studies' digital duplication of its extensive collections. The work highlights a rendering of otherness that has spread globally with modern architecture because indigenous culture is represented as the negative or inverse of an iconic modernist building.

The Australian Institute's design aims to express the wrongness of modern architects' whitewashing of indigenous culture and practices in the International Style. Ashton Raggatt McDougall (ARM) Architects built a black replica of Le Corbusier's Villa Savoye in Canberra, aiming to connect Aboriginal culture to the imported European establishment [33]. However, the challenging binary polarization of white and black is not critiqued, and the work of Le Corbusier, Daniel Libeskind, Eero Saarinen, and others is scattered across exhibition spaces as European references in the new museum of indigenous culture. The ARM intentionally appropriates European architecture, museums, and their cultures, but this does not represent reparation for how Europeans remove indigenous culture. The doppelgänger building is self-referential and only meaningful for Europeans and architects, as many people would not recognize Le Corbusier's work in Paris. This is a parallel lesson to white hospital designs spreading across the globe. as a medical and theological-philosophical ritual, purifying architecture from diseased elements and hiding cultural references, akin to a putting on a white coat to make all things neutral [4].

Rejecting white in healthcare design could lead to a re-culturation of rich colors, recognizing the role of social-cultural experiences in health. A study at Tripoli Medical Center, Libya, found that patient involvement in designing single-occupancy hospital rooms increased satisfaction and well-being. Islamic design elements, such as Islamic art, were used to fulfill Middle Eastern users' wellbeing and psychological needs. Patients valued the aesthetic components of Islamic artwork, color, texture, and brightness, and personalized hospital rooms, with the placement of symbolic and religious elements "*ordinarily meaningful to Muslims*" [34, p.318]. In this instance, localized culturally relevant healthcare design is shown to be beneficial, and white as not the only color that maintains wellbeing.

5.3. Economic loss and damages due to whiteness

> "*White is not durable in any form, be it light, whitewash, lead paint, acrylic or even marble. The surface requires cleaning or repainting to remain pristine. Neither is white stable as a symbol of purity, nothing is guaranteed and yet white remains in constant use*." [35, p.ii]

The industrialized whiteness in healthcare buildings has increased cleaning costs, particularly in medical, surgical, and sanitary spaces. Historically, colors were used to hide dirt, but white paint symbolizes a sense of 'forever new' and requires constant maintenance. Owning white objects signifies economic high status, as constant maintenance makes it costly. The *Hygiene Hypothesis* suggesting a direct link between cleaning and allergies is now refuted, but overly cleaned buildings reduce exposure to microorganisms that support healthy immune system development [36]. Hsiao-Hung Pai studied cleaners at Canary Wharf in London in the 1980s, observing that shiny neo-white marble floors reflect the building management's pride in economic dynamism. Meanwhile, unseen Nigerian, Ethiopian, Ghanaian, and South American workers maintain this unsustainable level of cleanliness for a low standard of living [37].

After World War Two, British Commonwealth immigrants to the UK were encouraged to increase the UKs workforce numbers. Women from British colonies were recruited to train in nursing at British hospitals and found that even as nurses they mainly cleaned; expected to perform dirty, low-status work like cleaning sluices. Post-war withdrawal of middle-class women from traditional female professions, particularly nursing, led to a significant number of Caribbean nurses recruited into lower-grade nurse training programs in the newly created National Health Service. This relegation was attributed to discrimination based on skin color, nationality, and migrant status [38]. Black Caribbean nurses recognized their status in the hospital environment and wore "*beautifully starched and white aprons*" [38, p.54] to fit in and be accepted in a color-based hierarchy, while more senior white nurses wore colorful uniforms.

There is a sense in which we apply the same cleaning and whitening ideas to our bodies as well. Dental expert Ronald Perry reports a rise in people seeking whiter teeth through teeth-whitening procedures, which contain carbamide or hydrogen peroxide, which can cause tooth sensitivity and gum irritation. This does not make teeth healthier and is another example of applying a white coat illusion of health [39]. The Western world's obsession with whiteness is clashing with science and medicine, questioning the symbolic value of white for cleanliness and sterility for health. Unconsciously incorporating a misguided sense of hygiene or cleanliness with many instances of favoring the color white is a public health issue that is now harm us personally.

6. Why not colorful hi-tech healthcare buildings?

Our perception of the pure whiteness in 1920s and 1930s buildings may be due to post-war propaganda featuring original black and white images of iconic modernist buildings. Photography contemporary to the building of iconic modernist buildings like Villa Savoye and Bauhaus buildings at Dessau, do not show the color that was used alongside white. The photographic techniques of the time rendered pale colors whiter and colorful walls and fixtures as black [40]. Le Corbusier developed a sophisticated color palette, Architectural Polychromy [41], from his paintings and used it in his buildings. The

Paimio Sanatorium, designed by Alvar Aalto and completed in 1933, features an array of colors, with Aalto being particular about the shades. Artist Eino Kauria contributed to the color planning, and Aalto emphasized the use of light walls and darker green ceilings in patient rooms to create a peaceful atmosphere and consider the sightlines of a lying-down patient. Handrails, doors, and other features had their own designated color [42]. Alvar Aalto and Le Corbusier's color schemes 'betray' the idea that early modernist buildings were all white. Their interest in color merged with their own art or the work of contemporary artists. However, their buildings used painting schemes that were majority white, especially externally, and the color was always considered in relation to white.

It is intriguing to consider why contemporary Hi-Tech architecture (e.g. Richard Rogers, Norman Foster), with exposed services and colorful elements, has not had a greater influence on technology-based hospitals in the digital healthcare era. The acceptance of industrial hi-tech architecture, like the Pompidou Centre, in the realm of art but not healthcare settings prompts a need for further exploration of architectural biases and the potential influence of white power in design.

7. Critically appraising whiteness and health

Modernist architects like Le Corbusier advocated for utopian ideals of purity, which continued into the late twentieth century. Whitening and washing are a form of erasure, particularly in existing buildings, wiping out past occupancy in rental or 'for sale' apartments and perpetuating the normativity of clean surfaces and fear of messiness or disorder. Early modernists believed society was threatened by an 'epidemic' of unhealthy ornaments harboring physical, societal, and mental diseases. Today, white spaces in hospital buildings are considered dehumanizing or denoting medical or clinical spaces [43] showing the legacy of seeing the human body as impure and the importance of removing dirt for health.

Wigley highlights Le Corbusier's association with authoritarian, eugenic, and fascist actions are an easy target as the "*tip of the vast iceberg of whiteness*" but we must not forget the quieter, controlling and insidious "*celebrations of whiteness in other hands*" [4, p.2]. Le Corbusier's work on color palettes was subservient to white and whiteness, as hygiene began in clothing before his architectural ideas. Architecture may be the origin of sickness, as our ancestors created health challenging interior spaces which then needed to be rendered healthy again by whitewashing walls. Foucault's concept of the power of normativity [44] is evident in white spaces and walls, where anything not white disrupts the pure shadow pattern, and unplanned color interferes with the code of normalcy [45]. Whiteness sits at the top of a color hierarchy and dominated Modernist healthcare architecture, as seen in tuberculosis sanatoriums. White surfaces offer architects freedom to create forms and spaces without limits, but Foucault notes the social and political power present in whiteness in healthcare, declaring that "*freedom is not a white surface*" [46, p.63]. The power of normativity is evident in white spaces and walls, and the social and political power present in whiteness in healthcare is a significant issue.

How to free Anglo-American and European architects from the strong grip of whiteness? Architectural education often overlooks the importance of color in design, focusing on form and spatial relationships without the distraction of color representation [47] as students are encouraged to model in grey or white cards and cast in wax, clay, or plaster. 'Safe' ways to use color are seen as color inherent in materials like timber, steel,

stone, brick, and glass. Post-modern architects like Aldo Rossi, Cesar Pelli, James Stirling, and Nigel Coates used colored hand drawings to demonstrate the conceptual use of color in design and representation. However, computer-generated surface rendering in the 1990s began to be crude and unrepresentative, returning architects to using white to model form and space. Color theory is not taught to architects, and it is questionable science in its premise of universal human emotional responses to color types. Architects are not experienced users of color like painters, and clients often associate color expertise with interior designers rather than architects. The concept of whiteness in healthcare architecture is complex and constructed through repetition, symbolizing a clean start with each re-whitening, still retaining the original symbolism of white cleansing fabrics covering the disgusting human body.

Post-modern architects' use multiple colors in the same building, positioned them outside the norm of architecture, while architects using white remain representative of the current mainstream. White is relatively unquestioned as essential in healthcare architecture, representing the medical hierarchy of spaces over menial ones. White surfaces support invisibility and symbolism of hidden medical instrumentation, allowing spaces and patients to remain scientifically observable. White walls, analogous to fabric toiles in dressmaking and the white card model in architecture, suggest a testing ground for visibility and scientific observation manifested in healthcare design. These spaces represent the hope that spaces can remain untainted, hygienic, and permanently clean, allowing them to remain scientifically observable in their aesthetic of X-ray level transparency and cleanliness and forever detached from the messy, imperfect, dirty real world.

8. Conclusion

This discussion paper explored the use of white in healthcare architecture and design, highlighting its historical origins, evolution, and implications in contemporary society. White is deeply rooted in Anglo-American and European cultures, and its association with purity, hygiene, and health is deeply embedded. The examples shared from across many aspects of living has shown that the widespread adoption of white has led to darker implications, such as reinforcing power structures, perpetuating inequality, and contributing to environmental degradation. The paper calls for a transformative approach to architectural scholarship and practice that prioritizes diversity, inclusivity, and sustainability.

The evolution of white and color palettes in hospitals reflects a complex interplay between societal norms, architectural ideologies, and environmental considerations. The reliance on non-natural white pigments, sourced through environmentally damaging mining practices, underscores the need for architects to consider the broader implications of color choices in their designs. The paper also highlights the cultural and societal implications of whiteness in architecture, as it has been intertwined with concepts of power, purity, and control, often at the expense of marginalized communities and indigenous cultures.

Architects must critically appraise the role of whiteness in healthcare design and explore alternative color palettes that prioritize sustainability, cultural sensitivity, and inclusivity. By embracing a more nuanced approach to color theory and design, architects can create healthcare environments that promote healing, well-being, and social justice.

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