

Opinion

The Importance of Domestic Space in the Times of COVID-19

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Abstract: This essay discusses a deep malaise of contemporary architecture, made more obvious by experiencing COVID-19 lockdowns for several months. Evidence-based arguments urge society to improve human health and well-being by re-considering the design of interior and exterior spaces. So far, predictions of how design will “improve” after COVID-19 just continue business-as-usual, ignoring accumulated evidence. Yet, the negative emotional experience of families cooped up during the pandemic reveals the failure of the standard approach to designing spaces. An architecture that adapts to human biology and psychology starts with the relatively new understanding of people interacting unconsciously with their environment and broadens it. A traditional design toolkit, augmented by the latest technology, can generate healing spaces as judged by their ability to enhance users’ subjective well-being. We recommend implementing specific design innovations to achieve this goal—replacing industrial-minimalism with biophilic and neuro-based design and using documented patterns that trigger feelings of happiness in users.

Keywords: biophilia; design patterns; interior design; spaces; neurodesign; healing environments; domestic architecture; COVID-19



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1. Introduction

The obligation to stay in our homes—dictated by governments responding to the COVID-19 pandemic—and the fear of going out onto the street have added new value to domestic spaces. These troubled times have transformed the domestic space into the setting for the most obvious human actions and reactions in the context of a capitalist and sexist system.

Social problems have become more widespread—such as gender-based violence, lack of and/or miscommunication between couples, abusive power relationships, verbal bullying, and a sense of helplessness in confronting our anxieties and fears. [1]. On the other hand, people have also begun to develop the capacity to face their own selves and to confront others through increasing tolerance and sensitivity.

New neurological data can help to support basic intuitions on adaptive spaces. This mandatory self-observation enhances awareness and creativity, boosting the practice of leisure activities. Compulsory confinement has pushed people into manual crafts, more inventive housing arrangements, enriching conversations with others, close and empathetic contact with children and adolescents, and the many activities that, triggered by sheer boredom, spring from one’s imagination.

Studies on the impacts of living environments on health tend to focus on environmental pollution, pathogens, and toxins [2]. This essay is concerned instead with the geometrical and visual aspects of the environment, and how those influence human health and well-being. In a classic study, the biophilic healing effect of viewing trees from a hospital window significantly reduced post-operative complications, recovery times, and the need for painkillers in hospital patients after surgery [3,4]. Visual details and the shape of the built environment, along with physical and visual access to a natural environment, affect human health, findings that are very important in hospital design [5].

The methodology of this essay is to hint at problems that are felt emotionally, and are thus directly linked to human biology and neurological responses. Since this effect occurs through “feelings”, the usual technological investigative approach tends to ignore them, and consequently misses important mechanisms that shape the body’s responses. A more holistic approach is expressed by *The Canmore Declaration*: “... scientific discovery and illumination of the ways in which the total lived experience (emotional experiences and physical/sensory exposures, both positive and negative) and environmental quality can manifest in immune and physiological parameters of health, disease and dis-ease” [6]. The scientific question is to what extent environmental health effects are due to the visual mathematical content of the surroundings. We refer to medical and psychological experiments, as well as to anecdotal evidence corroborating these observations.

Some unfamiliar terms are explained here in a brief glossary. Biophilic design uses our instinctive attraction to biological forms—both animal and plant—and the artificial patterns that mimic them [7–10]; people connect psychologically to color surfaces, which influence mood, and could be painted, ornamental, or artworks [11]; natural forms show fractal subdivisions with nested components on every scale, while we hardly ever see any empty natural object [12–15]; interior spaces permitting easy and psychologically “protected” movement are abundant in traditional architecture yet absent from contemporary interiors that privilege abstraction in a floor plan; ornament on walls, moldings, and frames surrounding doors and windows implement richly complex designs [16–21]. Industrial-modernist typologies have the opposite aspects: colorless grey surfaces; frameless openings with no borders; glass curtain walls; oppressively low flat ceilings; sharp glass, metal edges, etc. [22–25].

2. Severely Inadequate Interior Spaces

It is clear that domestic architecture is not prepared to satisfy a person or a family with multiple activities, changing constantly through the transfer of actions, feelings, and thoughts. Keeping families cooped up during lockdown has almost driven everyone crazy, because design has never addressed the multiplicity of emotions [26–29]. While this is a problem of architecture in general, the widespread social disruption in these difficult times exposed domestic architecture’s inability to respond to complex human needs. The new reality imposed by COVID-19 brings to focus the importance of housing space in its multiple typologies, from single-family housing to shared housing, in rural and as well as in urban settings.

In times when some people speculate about catastrophic dystopia while others respond with a lyrical and optimistic vision of human change, one thing is certain: this could be an enlightened opportunity to overcome the destructive relationships we create with ourselves and with all other species. Society can reverse anthropocentric action and thinking in order to participate in a world interconnected with nature that shows proper respect for other living forms. Researchers who view a holistic ecosystem that includes humans together with all other life forms have the correct approach: “natural laws of interdependence, mutualism, and interconnectivity underpin life in all forms” [30]. Conversely, an antiseptic, smooth, transparent environment implements the belief that humans are not part of the biosphere. An intent of the dominant design style of the past several decades was to ideologically isolate people from the story of life.

Why is it imperative and urgent to think about domestic space right now? Because visibly, domestic architecture is no longer centered on the emotional and material needs of human beings. The COVID-19 pandemic shattered the pretention that Industrial Modernism can provide a nourishing living environment [31]. Unfortunately, that reflection was over and done with more than a century ago. Domestic architecture ceased to take into account important concerns such as the intimacy of each family member; it stopped feeling that space nurtures moments of encounter and leisurely activities, but also of work; it stopped thinking of the need for a space of bereavement and death; it stopped considering space for religious and/or spiritual rites; it stopped thinking of space as a place for healing.

A majority of persons—or to be more accurate, the design establishment supported by architecture schools, professional associations, and the media—chooses oppressive environments for us to live in [31]. If users cannot get happiness from their built surroundings because the design style is emotionally distant and off-putting, this affects their well-being in the short and long terms. A tired and superseded visual and tectonic vocabulary severely limits our unconscious interaction with the environment, and this emotional starvation has negative consequences on our psyche [32].

3. Can Minimalist Design Reduce Babies' Intelligence?

Because of its deliberate emotional detachment, some sensitive architects argue that an industrial-minimalist world is no place for raising children [33]. Nevertheless, from academia, to architectural education accrediting agencies, to the media, to politicians making decisions in approving projects, to professional organizations, everyone went along in a decades-long denial of the child's private and public realms. It was the "modern" and "progressive" thing to do.

However, more is at stake here than positive emotions. Aesthetic formalism removes the ordered visual complexity needed to wire new neurons in the child's developing brain. If a child receives little sensory stimulation, synaptic development and the optimization of connectivity can be affected. Mental development is reduced in minimalist environments, and may be also in randomly complex environments, since those are pattern-free and do not exhibit visual relationships.

In what has the potential to become the scandal of the century, our society criminally neglects the architectural stimulation necessary for the brain to develop from birth through the late teenage years. Human intelligence depends upon neural wiring stimulated predominantly by environmental complexity, since a baby's brain at birth is only 25% of its fully-realized adult size [34]. Architectural culture discredits itself by ignoring those findings, published openly in the medical literature, and brought to the specific attention of the design profession [35,36].

An American study found that babies born during the COVID-19 lockdown have significantly lower motor, verbal, and overall cognitive performance compared to those born before the pandemic [37,38]. Genetically normal babies compare to the developmental score of Down syndrome infants. So far, the reasons for this alarming finding remain mysterious. The measured effect has nothing to do with the virus itself, as the children in the study were not infected; suspicion therefore falls upon the physical environment.

Earlier data showing low intelligence as a result of growing up in minimalist environments come from Romanian orphanages [39]. Those cases were characterized by severe sensory deprivation, and with social isolation and stress. By contrast, many of the babies studied in the recent American study lived with and were emotionally connected to a loving family. What both groups have in common is reduced exposure to natural organized complexity and low visual stimulation from artificial complexity that mimics nature.

4. Practices That Consistently Produce Bad Results

Domestic architecture that also heals requires tools accessible only to a few people today, not because of any scarcity, but because official architecture condemns those known tools. The space inside a house must be psychologically nourishing, yet most often is not—by design choice. Narrow and sterile corridors, flat and oppressively low ceilings, and windows placed according to an illogical geometry that ignores the path of the sun are all alien to nutritive space and generate constant stress [31,32,40,41]. The "universal style" taught in schools does not adapt to human life.

In a series of writings, Christopher Alexander pinpointed the malaise that industrial-modernist architecture inflicts on human sensibilities. Industrial shapes, spaces, and surfaces cut us off from connecting emotionally to the world, isolating us in a constant state of low-level anxiety [11,16,40,42]. Today's prevalent hostile environment contrasts

with the spontaneous, welcoming attraction that we feel with self-built and traditional structures [43,44] (Figure 1).



Figure 1. House in Argentina, architect: Marco Aresta, 2016. Photo: Marco Aresta.

The authors are not alluding to one or two design errors but claim instead that almost everything is wrong: non-enveloping and splintered indoor volumes; the circulation between rooms; the connection among distinct spaces; sadistic surfaces that slavishly follow minimalist fashion loved by academics; kitchens that do not allow mobility for the body to prepare food, and so on. Mechanical efficiency was allowed to override the complex feelings that nourish people’s humanity, and for this reason, the standard designs generate stress [32,40,41].

This accusation is not a wild exaggeration: aggressive design novelty taught in architecture schools does include an underlying component of pleasure at inflicting alarm, anxiety, and even physio-psychological pain on the users [45]. The “Frankfurt Kitchen” was an industrial-modernist scheme that cramped together what were assumed to be the necessary “functional” necessities of a working-class kitchen in 1920s Germany—eagerly copied by the Soviets in building dreary new industrial towns—into an uncomfortable typology that we have inherited today [46]. The “Existenzminimum”, a German social experiment in the 1920s, defined minimal spaces for low-income housing. The focus was entirely on economy, efficiency, and packing, not on emotional well-being [47]. Ironically, those *minimum* standards were immediately adopted by the building industry as highly convenient *optimum* standards.

The results of a comprehensive comparison of dimensional standards of indoor living spaces in the European context are instructive: these apply everywhere with only local modifications [48]. Reducing minimum dimensional standards generates a host of health problems. The quality of living spaces, including their physical details and geometry, impacts the users’ health. Designing inadequate living spaces follows concerns of economy (of the builder and designer), but never considers the physical and psychological well-being of the inhabitants.

All the factors of human perception and bodily movements were replaced by dehumanized ideas of aesthetic formalism clinging to an image of oppressive and sectarian utopia. The worst part of this is that, after decades of failed experiments, the profession stubbornly insists on continuing these same experiments against human nature. The ones who suffer most are children, victims of a mentally unhealthy design ideology, the result of architects who disdain paying attention to the child’s developing brain [35,36]. It is only

recently that the causes of major adult pathologies have been traced to events occurring during infancy and early childhood [49].

5. Designing for Industry, Not People

This situation can be blamed on the major architectural movements of the twentieth century being driven by an industrial-mechanistic mentality, where houses were conceived as “machines for living in” [22–25]. Those machines were designed not for intelligent and sensitive human beings, but for other dumb machines; for soulless bodies with no autonomy to feel and think. Global housing models isolated people in concrete cubes, distancing human beings from their own protective spaces, as well as from all other species in the world.

We need to know, in detailed terms, the consequences that inadequate, emotionally awkward living spaces have on the health of the inhabitants. Funded programs for new research are urgently required; and what data do exist need to be gathered and correlated for easy access. Homes and above all living spaces should be built around the human being, and for the human being, and should adapt to all the changes that can be generated in the life of individual inhabitants. Outdoor spaces cannot in any way replace the living spaces inside our homes. Outdoor spaces have a different social function.

The coldness of the contemporary dwelling transcends its interior space to infect street spaces, where it is nowadays impossible to find a shadow that allows us to cry in privacy, or a place outdoors with partial shade where we can fall in love among caresses. Urban exteriors have become spaces of social control policed by official power.

Currently, domestic architecture is the victim of a vast and long-term real estate business that makes all the same houses for everyone regardless of climate and place. Adopting housing according to minimum standards coming from 1920s Germany reduces spaces to a prison—even though it increases the builder’s benefit incredibly [50]. This action is directly linked to a mercantilist logic of housing, where real estate speculation in the hands of a small group imposes economic codes of habitation regardless of human individuality. Housing ceased to be associated with people’s needs, and their fundamental right to obtain protection and develop family life inside a physical container of well-being. Instead, it became an economic object with harmful environmental impact. The house no longer belongs emotionally to each family and each family member, acting henceforth as a mere container of mandatory actions such as cooking, eating, sleeping, and defecating/urinating.

If the reader senses an implicit capitalist-socialist dualism in these arguments, it is unintentional. The objective is to show the inadequacy of “industrial” built spaces while demonstrating that construction and design mistakes have no direct relationship with any ideological reading. Gigantic housing complexes originated from the need to house thousands of workers in a short time, resulting in identical tiny units, not adapted to emotional use. These are terrible choices for built spaces, regardless of the political alignment of the governments that implemented them [23–25].

This whole process has led to the construction of homes being carried out on a large scale today with an excessive environmental impact, without involving the human being as a determining factor of the generated space. Many of the homes built on speculation are not inhabited, and when they are, they may just as well serve as disease incubators in a pandemic.

6. Design Tools That Give the Freedom of Self-Construction

Domestic architecture should once again lead as the result of self-construction practices (helped by sympathetic powers), using local materials, and adapted to the climate and place. This is of extreme importance to ensure a change in the ways of creating healthy human feeling and thinking about the environment. A space mediates human behavior through these three responses. Domestic space has to be the extension of the biological

body so as to ensure well-being [40,51]. Housing is our shell, our second skin, and also our soul connecting with the ancestrality of being human.

Since spaces generated by certain forms condition and determine our behavior, people need to ask the question: “Can we expect to have sheltering spaces for human beings that are more in line with our biological, physical, and psychological responses?” If the answer is yes, then, “how is it possible to establish scientific and/or intuitive parameters for analysis, to know the degree of impact that certain forms and spaces have on humans?”

What the architectural establishment and the dominant schools do not know is that the answers to these questions are in our hands, despite the subjective nature of the approach. This is not a judgmental analysis, but note that the invaluable design tools listed immediately below are not taught in our schools. More than anything, solutions are enriched by the number of variables that take into account the cultural and social context of each person and family. The answers are not tied to a particular characteristic, however, but instead try to draw out general traits that extend beyond any culture, family, or person. Archetypal spaces of humanity, which function as a collective and universal imagination, can be nurtured in seeking to approach the specific local and natural forms that bring us “emotional belonging”.

Tools that people can apply immediately, at least when the pandemic allows it, include biophilic design [7–10], Christopher Alexander’s design patterns and theory of geometric coherence [11,16,42–44], neuro-architecture [32,41], principles of Biological Architecture (environment, form, and human physiology) [10,17,51], rules of coherent complex structure [19–21], eye-tracking and visual attention scans [32,52,53], fractals [12–15], and so on. Each of these related techniques for evidence-based design offers descriptive texts and built examples that define a new design discipline, and it is a great shame that the world—in particular, architectural academia—continues to ignore these lessons.

7. The Idea of Space as Healing

A healing space that is related to the occupants’ wellbeing is not a new concept. Space is, above all, an idea [40,54]. The conception of space relies upon feelings, emotions, and thoughts. Those emotions directly affect our neural system, our body, and our soul. This essay proposes a revolution in judging domestic space; dropping dogmatic formalism and instead using emotions to assess living environments. Recent results in neuroscience support this program. Spaces are created and idealized based on imagination that comes from ancestral times when we began to inhabit trees and caves. Or let us go further back and try to remember our first home, that organic maternal uterus, where we all sheltered. While this could be a topic of anthropology or psychoanalysis, this essay emphasizes current concerns that call for research that can produce better house designs.

The authors dare to propose that, for most people at this time of COVID-19, housing is not an expansive space of individual and family comfort, but rather of imprisonment and an agent for obstructing our emotions and thoughts. The great pity is that it should not and does not need to be so. People can inhabit nutritive domestic spaces with the same outlay of building costs. What academics tell us about the efficiency and functionality of inhuman spaces are often lies to support an extractive global system tied to political corruption. Seeking the identity of domestic architecture begins with a primary participation of the human user.

The human being and the family must consequently be seen not from a binary, centralized, heterosexual, and sexist perspective, fitted into an architecture based on the decisions of real-estate power, but instead taking into account multiple and enriching viewpoints. Housing then becomes the product of a conscious and individual human feeling and liberating contemporary thinking, adapted to each region’s particular climate and place.

It is not necessary to invent a new architecture. Design professionals must, however, focus on and study domesticity, training new designers who will prioritize the human being as the protagonist of used space. Successful solutions from the past must be re-used, ignoring the propagandists who condemned them in order to self-promote. Essential

tools so far excluded by the system—because those threatened the exclusivity of today’s architectural figureheads—must be embraced. An enlightened society has to escape the cultural hegemony that reduced our homes to a dehumanized experience.

8. Conclusions

The domestic space is the container of human actions in a protected setting, and a place for people’s dreams, emotions, hopes, and life. Ever since the emergence of humankind, individuals unconsciously adapted the geometry of the environment to these life-affirming qualities, but then brutally wiped them out in a misplaced rush to implement an industrial-modernist conception of the world. Now, with the terrible consequences of destroying the natural habitat, some of us realize that we made a giant mistake. It is time to re-assess what was lost in erasing the sensitive human qualities of our surroundings, both artificial and natural, and to bring it back, all the while taking advantage of the most recent technological advances. Perhaps the COVID-19 lockdown gave humankind a rude awakening on the inadequacy of built domestic space to accommodate life in a truly human way.

This essay recommends moving forward to create a more humanly adapted built environment. People can re-discover the alternative to unwholesome living spaces. Rules for adaptive design, condemned as “old-fashioned”, have always been available for those wishing to use them. Several changes are suggested: (i) Abandon industrial-modernist typologies that imposed a rigid standard style for over a century. (ii) Re-derive emotionally-healthy design rules from biology and neurological responses to the environment. (iii) Rely upon scientific results to revise architectural curricula that are stuck teaching design that clashes with biology. (iv) Prioritize feelings and privilege unconscious body signals responding to design. (v) Decouple discredited ideologies from design methods, since both practitioners and teachers have forgotten the dubious origins of non-adaptive typologies. Most architects do not dare to question the stylistic prejudices of industrial modernism.

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