

idea

investigating
design in
architecture
2023 edition

edited by
Gaia Leandri

foreword by
Angelo Schenone



Conference Proceedings
IDEA – Investigating Design in Architecture
2023 Edition
April 17, 2023
Università degli Studi di Genova. In presence and Online.

This meeting stemmed out from studies, investigations and PhD lectures, in particular:

- 2022, Departamento de Expresión Gráfica Arquitectónica, Universitat Politècnica de València (UPV) and Dipartimento di Neuroscienze, Riabilitazione, Oftalmologia, Genetica e Scienze Materno Infantili (DINOEMI), Università degli Studi di Genova (UNIGE): Gaia Leandri, PhD thesis *Freehand digital drawing: a boost to creative design the observer's eye and the draftsman's brain*;
- 2022, Dipartimento Architettura e Design (DAD), Università degli Studi di Genova (UNIGE), lectures to PhD students in Architecture, Design, Digital Humanities and Neuroscience;
- 2023, Post Doc Consolidator Scholarship: *Ideazione dell'immagine e neurofisiologia: l'apporto creativo e gli strumenti per la comunicazione visiva*, Dipartimento Architettura e Design (DAD), Project Supervisor: Prof. Ruggero Torti; Research Fellow: Dr. Gaia Leandri.

The promoting committee is composed by professors, lecturers, PhD students and researchers from Italy, Spain, the US and the UK:

Angelo Schenone, Marco Testa (DINOEMI, Unige); Maria Linda Falcidieno, Andrea Giachetta, Gaia Leandri, Linda Buondonno, Elisabetta Canepa (DAD, Unige); Francisco Juan-Vidal, Susana Iñarra Abad (UPV); David Sunnucks (Queen Mary University of London).

Scientific Committee

Niccolò Casiddu, Maria Linda Falcidieno, Andrea Giachetta,
Enrica Bistagnino, Gaia Leandri, Linda Buondonno
(DAD)

Angelo Schenone, Marco Testa, Lucio Marinelli
(DINOEMI)

idea

investigating
design in
architecture
2023 edition

edited by
Gaia Leandri

foreword by
Angelo Schenone



è il marchio editoriale dell'Università di Genova



I contributi qui pubblicati sono stati selezionati dal Comitato Scientifico del Convegno.

Impaginazione, editing e revisione del presente volume a cura di Gaia Leandri.

© 2023 GUP

I contenuti del presente volume sono pubblicati con la licenza
Creative commons 4.0 International Attribution-NonCommercial-ShareAlike.



Alcuni diritti sono riservati

ISBN: 978-88-3618-215-2 (versione eBook)

Pubblicato ad aprile 2023

Realizzazione Editoriale
GENOVA UNIVERSITY PRESS
Via Balbi, 6 – 16126 Genova
Tel. 010 20951558 – Fax 010 20951552
e-mail: gup@unige.it
<https://gup.unige.it>

INDEX

Foreword Angelo Schenone	10
Part I - Body, Mind, Emotions <i>Anatomy, Neuroscience, Psychology, Creativity</i>	12
Neural correlates of object and spatial visual cognitive styles. Psychological and electroencephalographic assessment Linda Buondonno, Gaia Leandri, Manila Vannucci, Carlo Chiorri, Andrea Giachetta	13
Scene perception of urban projects from architects and non-expert population: their verbal and visual responses Susana Iñarra, Maria Luisa Nolè, Francisco Juan, Carmen Llinares	24
Art and rehabilitation. Movement clues in signs and image structures as facilitators in paediatric motor rehabilitation processes Beatrice Intermite	34
Electroencephalogram in freehand and CAD drawing discloses different cognitive involvement Gaia Leandri	49
Assessing Architecture students' "in the moment creativity" and emotive response during design tasks Alexandra Mesias, Bob Condia	66
The Drawing Hand David Sunnucks, Gaia Leandri	84

Performance and improvisation in graphic works: new theoretical perspectives	98
Michele Valentino, Fabio Bacchini, Enrico Cicalò	
Technology and neuroarchitecture	109
Mario Ivan Zignego, Alessandro Bertirotti, Paolo Gemelli, Laura Pagani	
Part II - Technology and Human Perception	119
<i>Artificial Intelligence, Virtual Reality, Software</i>	
Imagination and digital media in the architecture design process	120
Linda Buondonno, Andrea Giachetta	
Mental imagery and digital media in architectural design process. An experimental study	126
Linda Buondonno, Manila Vannucci, Carlo Chiorri, Andrea Giachetta	
Architecture and Metaverse: Virtual and Augmented Reality technologies for spatial planning	137
Angela Martone, Michela Artuso	
Digitizing Empathy. Embodiment techniques for architectural representation in the Digital Age	146
Alexandra Mesias	
More-Than-Human research using the ChatGPT tool	150
Isabella Nevoso	
The role of Virtual Reality in the predisposition to design foreshadowing: a testing proposal	162
Gabriele Oneto, Maria Canepa	
Purification rituals and AI technologies as key in the performative policy around the human body. 7 Configurations by Marco Donnarumma	173
Angela Zinno	

Part III - Shaping and Experiencing Spaces <i>Neuroaesthetics, Design for All, Society</i>	180
Design for active public spaces: a review Francesco Burlando, Federica Maria Lorusso	181
Architecture as Atmosphere Elisabetta Canepa	191
Visual perception and architectural composition: an introduction to the cognitive method Maria Linda Falcidieno	195
Spaces where concepts click. Designing Fab Labs for education Xavier Ferrari Tumay	201
Inclusion of “Made in Italy”. The role of accessibility for the valorization of cultural heritage Isabel Leggiero, Claudia Porfirione	208
Healing environment: the impact of physical environment on patient outcomes Evelin Marchesini, Simone Battista, Marco Testa	217
Space, vision and aesthetic. When form follows emotion Alessandro Valenti	228
Authors	236
Afterword Maria Linda Falcidieno	242

Space, vision and aesthetic. When form follows emotion

Alessandro Valenti

Università degli Studi di Genova

What happens within us when we enter certain architectures, perhaps even iconic buildings? Why are some of them able to move us? Can they really influence our physical and mental wellness, transmitting, as Alan De Bottom would say, a positive state of mind? According to the noted writer and philosopher, architecture, even the noblest and most emblazoned, «can sometimes do less for us than a siesta or an aspirin» (De Bottom, 2006, p.15) and «even if we could spend the rest of our lives in the Villa Rotonda or the Glass House, we would still often be in a bad mood» (De Bottom, 2006, p.16).

Today, De Bottom's cultured disquisition dating back to the early aughts, based on a wealth of case studies, joins an increasingly respected consideration – supported by research in the cognitive sciences, not to mention field evidence – of how the built environment impacts perceptions, emotions and capacities for interactions between human beings, not as a race but as individuals. According to recent neuroscientific studies, which link the everyday experience to multi-sensorial perceptions and the way in which those are transformed into empathy and complex behaviors, all of these processes – whose mechanisms architects have long intuited – find their underlying foundation in our nervous system.

To understand the phenomenon, we have to disrupt neuroaesthetics, a branch within the neurosciences whose interdisciplinary approach connects fields that have long been considered separate, such as science and humanities. This approach looks to the future and stems from the consideration that the human body – when speaking of architecture – is a sensible entity and no longer solely an element for measurements. The invitation, extended to designers and architects, is to explore new interactive technologies as creative tools helpful in determining the

aesthetic and function of the inhabited space in response to the emotional component of those who will move, look and touch within it, seen through its subjectivity.

First and foremost, then, are the five senses, which «are not passive recorders, but the result of interaction between mental modules that communicate with one another and in which each sensory impulse itself becomes syncretic with all others: a world of sounds, colors and sensations where synesthesia and integration create the colorful multi-sensorial reality in which we operate» (Buiatti, 2014, p.11).

Before continuing, I must mention, with regard to theories that can be translated into innovative design practices through osmosis and transitive properties, the work of Semir Zeki beginning in the 1990s, a professor of neurobiology at the University College of London considered a pioneer of modern studies on the visual brain, whose research based on the relationship between aesthetic and vision gave life to the aforementioned field of neuroaesthetics. Coined in 1999, the term indicates the field of experimentation that engages the cognitive sciences and aesthetics, applying a neuroscientific approach to the analysis of the experience linked to the production and enjoyment of artworks.

In other words: an inquiry aimed at understanding what is set in motion within the human brain, searching for «an understanding of the biological basis of aesthetic experience» (Zekir, 1999, p.189).

The results have allowed us to enter the cognitive processes and understand the neural mechanisms that connect the senses to emotional, creative, cognitive and operational states of the human brain. As a scientist, Zeki was among the first to have initiated the process of theorization – which is still ongoing – that affects, by extension of the method, the disciplines of architecture and several interesting applications that we will discuss later on. The topic, considering the contemporary experimentations aimed at responding to the needs of an evolving society, is part of a broader picture that places wellbeing at the center of a renewed interest.

We are talking about relationships between interior architecture and the human body, understood in its entirety of both mind and physique.

The genesis of this – in respect to the issues we would like to introduce – can easily be traced back to modern examples cited by Beatriz Colomina in an essay from the volume *Anybody* (Davidson, 1997) before landing on a very recent project (from which this paper was partially born) carried out by a giant of online services working on personalized neuroaesthetics.

That said, to speak of the body, as Fernando Pérez Oyarzun claims, is to speak of something dynamic in both time and space, whose perception is constantly changing along with physical conditions, contexts and gestures. Above all, it means to speak of «a multitude of bodies and the

multitude of understandings and representations that surround them» (Pérez Oyarzun, 1997). Among these, without a shadow of a doubt, is the world of science, whose connection with interior architecture and furniture design, especially when speaking of medicine, is nothing new.

Referring once again to the text by Colomina (Colomina, 1997), we need only look at the experiences of two vastly different architects like Le Corbusier and Frederick Kiesler, whose thoughts are intertwined on various occasions with the topic of health – including mental health. It was the early 20th century, coinciding with an obsession for the healthiness of domestic architecture, evoked through constant concern for social hygiene, correct ventilation and sun exposure. Le Corbusier writes at the beginning of *Toward an Architecture*: «men live in old houses and they have not yet thought of building houses adapted to themselves. [...] Engineers fabricate the tools of their time. Everything, that is to say, except houses and moth-eaten boudoirs» (Le Corbusier, 1984).

Not long thereafter – entering the era of sanatoriums, from that of Alvar Aalto in Paimio to José Luis Sert's anti-tubercular dispensary in Barcelona – there is sickness and a debilitation of the body. It's a body that, as Colomina points out, is not just physical, referencing, as proof, writings published by doctors Alendy and Laforgue in the magazine *L'Esprit Nouveau*, evidently referring to the intertwining of psyche and body, which dealt with Freudian psychoanalysis and French psychiatry (Colomina, 1997, p.235).

After all, Le Corbusier himself spoke repeatedly of an intimate relationship between the body and mind, and how new homes should be machines for the recovery of our physical and nervous energy. Kiesler, for his part, described man as a «complex biological, psychological and socio-political being who has to restore the general and complex meaning of living through creativity» (Bottero, 1999, p.10) introducing the concept of psycho-function by linking various colors and materials (glass, leather, wood, metal) to different psychological effects. The emphasis is to meet the needs of inhabitants, whose bodies cannot be separated from the mind. In doing so, the home becomes «a place to regenerate the vital forces and therefore a product of the daily and metabolic activity of those who inhabit it» (Bottero, 1999, p.10).

In respect to the functionalist dogmas of the International Style, it represents an interesting critical position, expressed for the first time by Kiesler in 1949 through the essay *Pseudofunctionalism in Modern Architecture*, aimed at undermining the theory of the standards – the very same promoted by Le Corbusier who maintained that needs were identical for all humans who «from the earliest ages we know, were all made from the same mold» (Le Corbusier, 2015, p.112).

Kiesler, on the other hand, speaks of emotions and dreams belonging to

the single individual. This leads us back to two simultaneous instances that we'd like to introduce here as generators of possible ideas for the design of interiors – and not only domestically – imagining a red thread that links the recent past with the present, considered a stage for innovations, especially of the technological variety, which give new meaning to what has already been experienced.

This is because our body has always been intimately connected to the architectural body through a series of relationships that are manifested with greater or lesser evidence depending on the cases and eras – something both ancient and variable. Occasionally, like now, the body reclaims its own importance within the architectural landscape more than in other periods, testifying to the depth and permanence of this connection.

The first instance, which has to do with individuality, concerns the issue of the on demand, specific to digital culture: a service provided on request, tailored to the user, of which platforms like Netflix for TV, Spotify for music, and Flipboard for publishing are the most widespread examples. Since aesthetics is a personal matter – meaning different things for different people – there is, according to neurasthenics, no one-size-fits-all answer to the wellbeing of those who inhabit the spaces.

The second instance refers to the emotional sphere, a field of neuroscience used to prove, through demonstrable data – and this is where another distinctive aspect of the contemporary world comes in with big and small data – that design is not just a matter of aesthetics but something that affects our wellbeing. It makes little difference whether it's home interiors, hotels, offices or nursing homes – where in reality this issue is in full swing – the question is: why does a room, or an environment, inspire us while another induces lethargy or anxiety? And how does our daily aesthetic experience inform our physiology?

This is where, speaking of methods, subjective human perception interpreted to create spacial narratives with colors, materials, patterns, textures and shapes flanking traditional design can intervene as a modern atout. Why, then, not try to harness these results to understand how to improve our way of living within interiors? And once an interior has been set up, how do we gather that information? Some studies rely on in situ assessments of people's reactions, measured by wearable devices that mark physiological reactions. There are also smartphone applications exploring the emotional state, and electroencephalographic headsets that detect brain activity related to mental states and mood, all to assess physiological wellbeing in relation to space and to understand how design can influence our bodies. This is what Google presented in Milan during the Salone del Mobile 2019 at the *A Space for Being* installation hosted in Spazio Maiocchi, spearheaded by Vice-President of Hardware Design Ivy

Ross and developed by applying the principles of neuroaesthetics to the interiors of domestic contexts in order to analyze and study how the mind and body respond to different stimuli of a physical and visual experience¹.

At the center of the experiment sits the interior design of three rooms, characterized by exact proportions, colors, lights, textures, music, artwork and materials, all distributed along a single path. In order to evaluate the personal reaction to individual rooms, each visitor was provided with a wristband designed by Google Hardware and the Advanced Technology & Projects Division, equipped with four sensors programmed to record physiological responses based on heart activity, respiratory rate, skin conductance, temperature and body movements. Each of the rooms was set up with a customized design, featuring subtle but intentional differences implemented to make people feel comfortable.

The spaces were curated by a team formed between Suchi Reddy of the US-based architecture firm Reddymade, and Susan Magsamen, founder and director of the International Arts + Mind Lab at John Hopkins University in Baltimore, a trailblazing research center for neuroaesthetics founded in 2016, whose contribution within the three set ups was fundamental in understanding how to better explore the effects of design on human biology. In order to limit the variables that might affect the results, organizers decided to outline all the spaces like living areas in a house, using the Scandinavian designs of Muuto for furnishings. The first room, *Essential Room*, was defined by soft, almost uterine shapes, warm materials, soft lighting and the smell of burnt wood; the second, *Vital Room*, featuring dynamic lighting, housed brighter, even playful hues, and a vibrant citrus scent; the third, *Transformative Room*, designed with soft lighting and higher walls, explored lighter tones complete with a series of mirrors and a musky aroma. Before starting the tour, and even before passing from one room to the next, is a neutral “preparatory” space to recalibrate the visitors’ senses.

The experiment, in which I participated as a guest, consisted of inviting a few people at a time, gathered in small groups, to explore the rooms by moving around within them, touching materials, sitting on sofas or around tables, and flipping through books, spending five minutes of their time without using cell phones or conversing. Upon exiting, every visitor, after placing their respective wristband on a tray, received a visualization of their data processed by an algorithm capable of reading the biomarkers, which displayed their lived experience in the three rooms, rendering the invisible visible.

¹ Cfr. Valenti, A. (2019). *Welcoming (Interior) Architecture: l’ospitalità on demand come emozione*, «Area», (165)2019. <https://www.area-arch.it/> (visited on November, 5, 2019).

The data was represented through a circle marked with watercolor ink blots, which were nothing more than a clock-like mapping of their five minutes spent in each room. The colors of the circle – each with a customized report – lit up when the person had more active moments based on their biofeedback, or faded away when they registered a calmer phase. Also included in the personal results was a list of the elements present in each environment with which everybody felt better.

The purpose of the entire operation was to show, at the end of the sensorial journey, which of the curated spaces was aligned with the senses, regardless of taste or style. It was then revealed that, according to the data, it wasn't uncommon for someone to feel the most comfortable and relaxed in the room they seemed to like the least.

In examining this discrepancy, an interesting phenomenon emerges, prompting us to reflect on the fact that what our mind believes is not always what our body feels. Of course, when entering into an architecture whose aesthetic satisfies us, perhaps we are more inclined to say that it's our favorite space, or that we feel more relaxed there, only to discover that, in reality, our body is telling a completely different story from the mind. Today, it seems neuroscience is capable of demonstrating that we can positively condition our mind and body through interior design and the objects we choose. It is a matter of awareness that redesigns and updates the map of potential relationships between the body and architecture, charting ulterior trajectories.

For Ivy Ross, this is the future of what can be called mindful, well-thought, or even customized design; for Suchi Reddy, who along with IAM Lab and the Kennedy Krieger Institute of John Hopkins is designing treatment rooms that use neuroaesthetics to help children heal and recover, this is an opportunity to replace the popular modernist mantra form follows function with the more sensorial form follows feeling.

For both, surely, the project presented in Milan is just the beginning of a journey that marks new further practices that could engage interior architecture in unique ways. In addition to designing multi-sensorial rooms, Reddy maintains that «the field of neuroaesthetics has far-reaching effects. It can transform the way in which we even think about how our cities are built» (Dickinson, 2019). Will things really head in this direction? Will we make choices in tune with our physiology? Well aware of the fact that «the present is difficult enough to grasp [and] anticipating the future seems inevitably doomed for failure, [...] to those who object that predicting the future is a sterile exercise, we say (quoting Felix Burrichter) yesterday's dreams of tomorrow have long fueled current attempts to construct the present» (Burrichter, 2017, p.22).

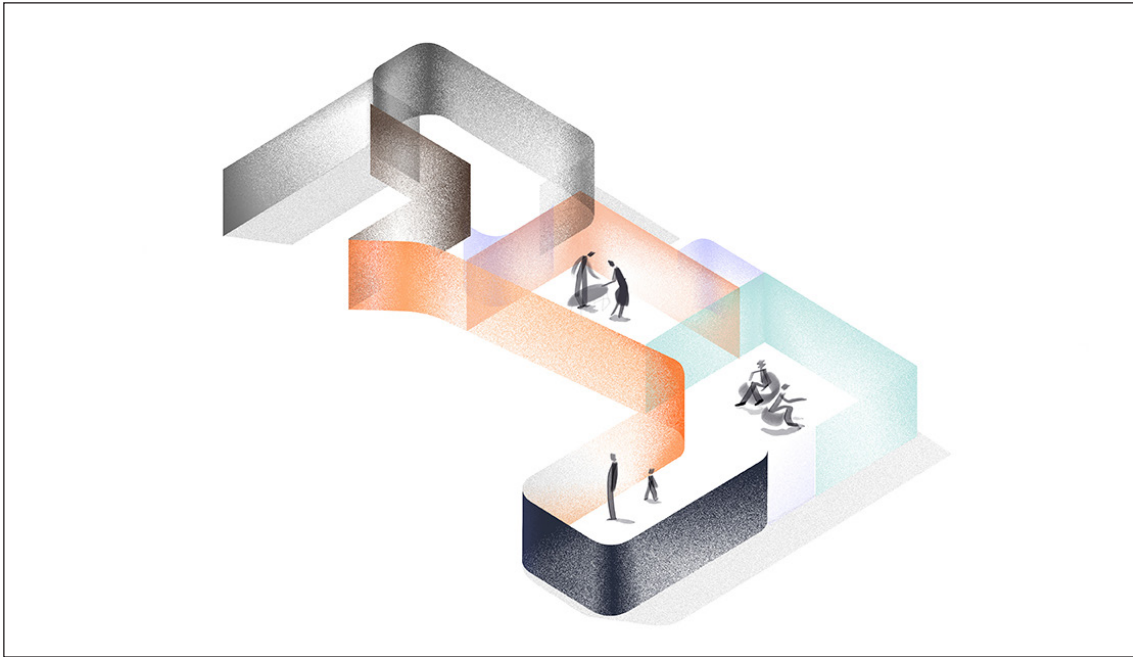


Figure 1 - In a multiroom installation at Spazio Maiocchi, A Space for Being explores the field of neuroaesthetics and how different aesthetic experiences have the potential to impact our biology and well-being. Each room will be unique in design, build, and furnishings, as co-created by Google's Vice President for Hardware Design, UX, and Research, Ivy Ross, in collaboration with Muuto's Design Director, Christian Grosen; Reddymade Architecture and Design Studio Founder and Principal, Suchi Reddy; and Executive Director of the International Arts + Mind Lab at Johns Hopkins University, Susan Magsamen. ©Courtesy Google.