To Shape and Be Shaped
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Dear Reader ~

This is the first of what I hope will be many letters to you. I will keep this one short because I don’t have much to say.

What you are to read is the labor of many; many who I hope will experience that grand feeling of fruition when this is published.

Within our growing digital infrastructure, a nostalgia for tactility has recently entered the minds and desires of many. Perhaps this year’s ‘in print’ format will remedy an otherwise digitally spent afternoon or two; and after you’re done, you can hoist it on to your colleagues and family members. Leave it for someone to find, somewhere... at a cafe table or metro stop; slipped between books in a library, on a welcome mat, in a mailbox...

Ultimately, the ask here is simple. Only that you follow the narrative laid out for you and find a truth to reckon with.

Together we will ask: what if our buildings made us healthier, and happier? how are certain people already being affected?

Together, we will lament the loss of humanity in the digital realm, our increasing isolation, and the many causes of it. But, we will also reinforce the obvious need for social resilience, of communication, of community, of participatory and inclusive planning.

Together, at the very end, we will face all of these paradoxes at once - framed by a maddeningly simple (or, simply maddening) question and you’ll find that we have just returned to the very beginning.

Cheers,
Elizabeth
It’s been five years since the publication of the conscious cities manifesto. Since then, the notion that we need to rethink the person-space relationship has gained momentum. The narrative of reshaping ourselves by reshaping our cities has become ever more pressing as we observe societies breaking down, communities dissolving and masses trapped in loneliness.

It would be naive to think that these issues emerged independently from the environments we created and the ideals we embedded into our shared spaces. Cities are a reflection of our values, and they perpetuate those that we code deepest into our environment. With the privatisation of public space, the monetisation of the architectural experience, and the manifestations of sectoral politics on the ground, what values do our modern cities represent?

Cities are also the culmination of intents, and because of that, they ignite our imagination as places of possibilities. But, we rarely ask if those possibilities are ones we desire or need, and how restricted they might be by invisible imbalances of power that ripple deep into our environment. If we are living in the manifestation of human intent, should we ask ourselves: whose intent are we living in?

We increasingly live in urban centres, and this should prompt us to take a critical look at the mindset that the city produces. Living our lives in a world built to our dimensions might be a misleading simulation of control. We admire the efficient city because it keeps things running no matter what, and we may perceive this as comforting proof of our omnipotence.

In the quest for this efficiency, we strived to create spaces that buffer us from any natural processes that threaten disruption. The same natural processes that also connect us, connect places: the cycles of climate, the ability of space to absorb memory, the organic growth of networks, and the serendipity that inconsistency brings. It should come as no surprise given our intentional disconnect with nature that humanity’s rude awakening to the climate crisis came too late. Perhaps we struggle to solve issues that require allocentric thinking because we’ve created cities that sell an egocentric worldview?

How do we find these deep-seated rules that guide our behaviour? How can we become more aware of the urban experience we create, not just in the act of design, but also in other decision-making processes that shape its outcome?

We are experiencing a critical turning point in history, a rare anthropause. It is bringing society’s painful issues closer to the surface and forcing us to reflect. When we emerge back into the streets, what do we want them to look like? What values do we want them to represent? What role does the design profession play?

A paradigm shift in the built environment requires a rethink of how designers design. But it might also require questioning the designer’s role as decision-maker. Where in the institutionalisation of this role might we [designers] be upholding and even perpetuating social issues like inequality, lack of trust, and conflict? Cognisant of this, can designers set off a healthy dialogue between person and space without being in control of its syntax, grammar, and translation?

I ask these questions in the spirit of Upali Nanda’s urging, that “we need to problem seek before we problem-solve.” How can we seek better?
What if our buildings made us healthier? What if we looked at them as living, breathing investments in the human experience instead of one-time costs? What would happen if we did?

Let’s start with the notion of shelter. Why do we build it in the first place? By definition, shelter protects us from the elements. It offers us refuge and houses our lives. More importantly, shelter becomes a lasting cultural mark we construct for generations to come. Today, we spend over 90% of our lives indoors. With global shelter in place orders we’ve witnessed as a result of COVID-19, this number jumps even higher. It’s time we redefine what shelter means for us in the 21st century. While we’re at it, let’s reframe what we should expect our buildings to do for us. What if shelter went beyond protecting and housing our lives to actively improving our existence? What if the over 90% of our lives we spend indoors did something more for us?

Whether we are aware of it or not, our surrounding environment is continuously impacting our biology. The built environment forms an essential base layer in our lives, similar to the operating system on a computer or smart device. In every space we inhabit, our five senses are continuously taking in real-time environmental data. It’s as if our surroundings are live-streaming directly to our brains and bodies. From the direction and quality of the lighting, down to microscopic changes in indoor air quality (something that can be optimized to mitigate the spread of diseases such as COVID-19), each variable impacts us measurably. Adding it all up, we begin to understand just how significant a role the built environment plays in our health and everyday lives. Thankfully, through the latest science, research and technology, we’re able to quantify its impact more than ever before. This increases our ability to fine-tune the design and technical parameters of buildings to improve lives. We can now capture and quantify data and insight on what we design in real-time using biometrics. With the use of virtual reality, we’re able to optimize design and predict outcomes before a building is even built. These data streams can be channeled into further optimizing building design through the use of feedback loops.

Looking at the significant economic impact of COVID-19, the relationships between population health and the economy have never been more clear. From this, we’re seeing a rise in ESG (Environmental, Social, and Governance) investing. The pandemic has also further illuminated the way business and health are interconnected. More than anything else, these types of situations remind us just how vital elements such as shelter are to our health.

Now more than ever, we must look at buildings and their economic value in a new light. More than this, we need to redefine how their ‘value’ is added up to begin with. Up until now, buildings have mostly been looked at as one-time costs. Bigger picture metrics such as return on investment (ROI) related to building impacts (human impacts, operation/maintenance costs, environmental impacts, etc.) are largely unconsidered in the planning and decision-making processes behind them. Increasing research to date demonstrates the measurable impact of building design on the people, operations, and resources of an organization. A building’s impact on human capital is not only one of its most significant impacts, it’s also the biggest missed insight in the decision-making processes behind design and construction. Further underlining this, design and construction costs are only a small fraction compared with human capital and operations costs over a building’s lifecycle. Connecting these links is critical in developing a plan that engenders elevated outcomes through building design. If we want our buildings to do more for us, we must look at them as though they actually can.

Reshaping Buildings: Dynamically Supportive Investments in Health

Ryan Shindler
We live in an age where it’s possible to make the notion of human capital more quantifiable than it currently is. “Human capital” is defined as an ‘intangible’ asset or quality that isn’t quantified on a balance sheet, and is related to the economic value of what people bring to an organization. To quantify this metric as it relates to building design, we can pose scenarios. If the built environment I work in augments my health and wellbeing, how much more effective am I at what I do? Utilizing inventive research methodologies, we can quantify a building’s impact on health and human performance to help answer this question. It’s now possible to measure how much each design decision contributes to improved outcomes. In isolating the right variables, we can unearth the degree to which humans are able to do better at what they do because of their environment. Ultimately, we can come to define just how much the design of buildings is able to elevate outcomes in both the users and organizations that inhabit them. This example is just one among many other building types and uses.

When we look at a building as a strategic asset tied to human outcomes instead of a one-time cost, the value of channeling resources into optimizing its design becomes more clear. A better built environment, and buildings that both actively and passively support our health, don’t necessarily have to cost more. The visioning and processes behind them simply need to have proper goal alignment. When we’re able to quantify the true value of a building based on its significant impacts, we can then reshape the vision and goals of building design. With project teams aligned on achieving improved human outcomes through design, the sky is the limit for improving lives. From here, the vision-to-reality process can be enriched with meaningful insight from subject matter experts. In this process, design teams are empowered to make optimal design decisions aligned with the vision. This allows measurable positive outcomes to be fostered through the final built product.

So enter this: buildings that dynamically support us, acting as living investments in our health. Structures that provide resilience to changing conditions. Spaces that are perpetually optimized through feedback loops. Think this is far off? With the right vision and action, this can be a reality today.
There are many parallels between choice architecture and more traditional forms of architecture. A crucial parallel is that there is no such thing as a “neutral” design.

-Thaler, Sunstein
We live in the world of ‘nudging’. Most of us experience ‘nudging’ every day in the context of marketing, social media or public policies and in the built environment, whether we are aware of it or not.

Sidewalk Labs’ Quayside project shed light not only on the problem of data harvesting but also on the potential risk of influencing human behaviour in the city space. The Quayside was a smart city proposal for Toronto, run by Sidewalk Labs, a subsidiary company of Google focused on urban innovation through technology. Sidewalk Labs intended to develop affordable housing, effective transport, heated and illuminated sidewalks, public Wi-Fi, and a myriad of cameras and sensors to monitor traffic and street life. (1)

In May this year, the company announced they would not pursue the project anymore. (2) It is unclear whether the growing critique against the project contributed to its end. The community members, technologists and business owners, who formed the #BlockSidewalk campaign, were pointing out the lack of transparency on data ownership and management systems, and the risk of privacy breaches. (3) More interestingly, the project critic and venture capitalist Roger McNamee, warned that Google could use data to make behavioral predictions and sell them to marketers. (4) He described the current practices of Google Maps, as an example: "Google also accepts payment from merchants in exchange for routing potential customers past their location. Consumers are not aware that Google may route them suboptimally due to load balancing or commercial considerations". (5)

Similar actions have been carried out, for instance, in case of the popular AR game Pokémon Go. Restaurants paid the game owners for locating pokemons close to their establishments in order to lure unaware players for a meal. (6)

Shoshana Zuboff presents a bigger picture in regard to such practices in her recent book ‘The Age of Surveillance Capitalism’. She points out how all the digital infrastructure including our phones and laptops is being used in order to “nudge and tune and herd our behaviour towards guaranteed outcomes’. (7) The problem is that most of us are not conscious about it.

BEHAVIOURAL ECONOMICS, DECISION MAKING AND NUDGE THEORY

Behavioral economics arose in the second half of the twentieth century by integrating insights from economics and social and cognitive sciences. (8) It has become increasingly influential (9) in understanding and engineering environments that shift human behaviour towards being more sustainable and positive. (10)

Behavioural economists assume that people, irrespectively of their age and intelligence, “are rather myopic with respect to what is best for them” (11) and “make poor and rash decisions, even though it is clear there are better options that will improve long-term outcomes.” (12) The theory of operant or instrumental conditioning, the process of associative learning through which reinforcement or punishment are used to modulate the occurrence of a behaviour in future, is also adopted. Such a view challenges the idea that humans possess autonomy of thought and it stresses the importance of environmental influences on human behaviour and decision making processes, i.e compliance with certain social standards. (13)

Our salience bias, an example of cognitive bias, predisposes us to focus on features which are more prominent or emotionally striking, i.e. we might feel attracted by an intense smell of unhealthy food and as a result we ignore its negative effects on our health.

People are more likely to behave in an irrational manner under conditions of greater pressure, uncertainty, distraction or fatigue. (14) Regardless, deciding is tiring. What to eat for breakfast, what to wear, how to get to work — all these considerations deplete our already limited mental energy and information processing capability. (15) The more choices we make daily, the harder each of them becomes for our brain. Eventually we experience so-called decision fatigue, which leads to poor decisions. (16)

Aware of our limitations in regards to decision-making, behavioural economist Richard Thaler and legal scholar Cass Sunstein

Choice architecture refers to the skilful use of environmental cues that can alter people’s behaviour in a predictable way without forbidding any options. (27) Thaler and Sustein note that “there are many parallels between choice architecture and more traditional forms of architecture. A crucial parallel is that there is no such thing as a “neutral” design.” (28)

The manner space is designed determines our choices. Space has the potential of directing our behaviours towards healthier practices, hence it can play a significant role in the promotion of health and well-being.

Nudging strategies have proved to be effective in fields such as marketing or public policy. Within the built environment, however, they have not been widely explored yet.

CHOICES

In the built environment, cognitive overload and its effect on decision making have been investigated on examples of wayfinding and spatial navigation. (29) Especially large-scale, complex, multifunctional and multi-storey buildings, such as airports, hospitals or shopping malls pose navigation problems. (30, 31) Limiting navigational choices is often recommended in order to improve people’s wayfinding ability.

On one hand, having too many choices in the surrounding can be problematic, on the other hand too little choice often causes dissatisfaction. (32) In an urban environment, people’s everyday physical activity can be hampered by a lack of choice in means of transport. How many transportation options do we have on a daily basis, when we move between specific locations in a city or between different levels in a building? If we inquire which of the available alternatives supports our health and well-being, we realize that the choice is very limited or non-existent.

To design a healthier urban environment through choice, the following questions could be asked during the urban planning, architectural, ergonomic design process:

* Can one get to work or travel by: bicycle, walking, public transport, mixed transport or car only?
* Does one have a choice between stairs or an elevator?
* Does one have other possibilities for physical activities in a building?
* Can a person choose between a sitting and standing table while working?

Architects and planners do engage with such questions, however, it rarely happens in a systematic manner and the answers are often compromised by other factors.
Choices
SALIENCY. STAIRS AND ELEVATORS

Saliency of choice in the built environment can be increased by factors such as visibility, accessibility, natural light, greenery, outdoor views and perceived appeal of design. The Human Experience Lab at Perkins + Will investigated the frequency of staircase usage analyzing physical qualities in comparable buildings. (33) It was revealed that stairs were four times more frequently used when they had access to natural light and outside views. If the stairs were additionally open to a shared space, their usage increased up to six times.

Staircases are frequently placed in the middle of a building due to various considerations: bearing structure, floorplan’s efficiency, fire and emergency regulations. As stairs also do not require access to natural light, daylight is often reserved for more prominent spaces.

While positioning elevators in the most central, visible place in a high-rise building may be a reasonable choice, the same decision in mid-rise buildings, can negatively affect people’s physical activity. Giving elevators the best visibility, prompts people towards a short-term comfort instead of improving their physical health.

Furthermore, staircases in buildings are frequently designed to have a minimum necessary surface in order to maximize a rentable or saleable floor area. Under the pressure of maximizing profit per square meter/foot the value of staircases as attractive shared spaces that promote social interactions is being compromised.

A fun experiment by Volkswagen increased stairs over escalator usage in a Stockholm metro station. (34) The regular metro stairs were transformed into an interactive piano keyboard and played musical notes whenever pedestrians stepped onto them. The usage of the stairs increased by 66%. (35)

The above mentioned studies and examples introduce the quality of human experience as an important design factor that should be taken into account apart from safety and efficiency. (36) Spacious, attractive and well-positioned staircases can be an effective nudge towards physical activity and social encounters.

DEFAULTS

When we operate in 'default' mode due to energy depletion or time pressure, we lean towards default choices. Designers can make the healthier choices more likely to become the default through skillful use of environmental cues. Most simply, by making the healthier choices more obvious, visible and accessible.

If the stairs are the first thing we notice in a building, we are more likely to use them. If a water dispenser is closer to our work station than a coffee machine, we might become more hydrated.

A healthy default can be also considered at a city level. The well-known Danish urbanist Jan Gehl, when referring to cycling and walking, underlines that in a well-designed city physical activity is part of everyday life. (37) To make sure that most of the city’s inhabitants move on a regular basis, the default means of transportation should encourage physical movement. In Copenhagen, for instance, 62% of the city’s inhabitants commute daily by bicycle, which is also a result of a long standing planning strategy of the city. (38)

CONCLUSION

Many behavioural insights teams have been created with the intent of improving government’s policies and supporting evidence-made decisions. (39) Governments and public institutions are becoming increasingly aware that simply informing people doesn’t suffice to change human behaviour. (40)

Nudging is a powerful technique that can effectively influence people's behaviour in the built environment. The example of the Quayside project highlights the risks of spatial nudging driven by commercial interests. Nonetheless, nudging carries a great potential to improve human experience in physical space and the quality of our choices. It can play a significant role in the promotion of health strategies. Buildings can provide spaces for restoration where we can slow down and regenerate from cognitive overload, as well as be designed to be easily navigable, and provide healthy default choices, such as taking the stairs. Thus, we can be more conscious about creating a ‘choice architecture’ in urban environments which nudge people to make healthier choices. ~
Urban renewal and urban area development projects are by nature highly complex processes involving a multiplicity of professionals, stakeholders, and conflicting interests. Adding to this complexity are the formulated ambitions and societal challenges projects have to answer to. One of these ambitions emphasizes a more inclusive planning process, involving the inhabitants in all stages of the planning process. In terms of design, another challenge is to create environments on a human scale while building in high density such as with tall residential buildings.

The metropolitan area of Amsterdam intends to have 100,000 new dwellings by 2025. Most of these dwellings have to be added within the existing urban fabric, planned on obsolete inner-city brownfield locations, at the waterfront, nearby highways whereas others are going to be built in deprived neighborhoods. The deprived neighborhoods are mainly located in the postwar areas of Amsterdam, on its northern, western, and south-eastern sides. The deprived neighborhood called the Blijmermeer located on the south-eastern side of the city, for instance was the first high-rise development project in the Netherlands. It was designed as a single project with identical high-rise buildings in a hexagonal grid surrounded with large green spaces.

These deprived, modernistic neighborhoods lack the classic housing block structures with a clear articulation of buildings and street spaces. They appear to be responsible for an ‘inhuman’ scale and demonstrate the lasting impact critical design flaws can have on the daily lives of inhabitants. Hence, the question is how to develop liveable environments where people feel fully supported by building architecture and streetscape configuration.

To prevent new urban area developments that will again fail to incorporate human scale, scientific methods and user input are needed to inform the practice of planning and design, and their applied design solutions. Building on two research projects (one on participatory planning and the other on neuroarchitecture research), we explore how the newly emerging field of neuroarchitecture - and the eye-tracker in particular, might enhance urban area developments on a human scale.

**HUMAN SCALE DEVELOPMENTS**

In the spring of 2020, officials in charge of urban design for the Netherlands’ four largest cities (Amsterdam, Rotterdam, The Hague, and Utrecht) were interviewed by AUAS. All four cities aimed to develop new high-density environments while ensuring their streetscapes retained a human scale. One of the new high-density typologies (fig. 1) proposed...
Figure 2: A ground floor with a triple-story height and right oriel windows in the Benjamin Brittenstraat, Amsterdam. They intend to reduce the scale of the tall buildings. Image by Kees Versluis.

Figure 3: Google StreetView image of aggregated eye-fixations of 40 participants of W 49th street in New York. Artwork displayed at Christie’s drives the attention to the ground floor of the right building. (Author’s image).
(cont’d from 13) is based on a pattern of old, horizontally developed city structures, following the pattern of Dutch block style housing. Dutch housing blocks are configured with narrow units and with a vertical rhythm of parceling to create irregular facades and lively side street rhythms.

Translated and implemented in urban development schemes, these characteristics are prescribed as street facades with maximum heights of six to eight stories, depending on the general building height in each city. The tall buildings are set back on the street, receded from the viewer’s eye-level perspective.

At street level, facades are often articulated with active ground floors: this ensures a connection between indoors and outdoors for social exchanges and encourages “eyes on the street” for social control. The active ground floor is frequently designed with a double-story height and distinguished from the upper floors to reduce the scale of the (tall) buildings to a manageable human scale at eye-level (see fig. 2). The facades and street spaces are intended to relate further to humans by consisting of ornamental attributes and the use of tactile materials such as cobblestones as paving.

If these design solutions reduce the scale of the (tall) buildings to a manageable human scale at eye-level remains to be explored.

EXPLORING HUMAN VISUAL EXPERIENCE

Neuroarchitecture can either affirm some of the commonly applied design solutions explained earlier, while others might be replaced by solutions that measurably increase human well-being. (1) Neuroarchitecture technology such as Mobile Electroencephalography Mobile (EEG), Galvanic skin response (GSR), and Eye-tracking (ET), offers new biometric pathways to directly measure the impact of the design of the built environment on its users. Eye-tracking technology, in particular, is a promising means of recording users’ visual experiences and investigating how a design solution contributes to creating a streetscape that reflects human proportions.

The Sensing Streetscapes project (www.sensingstreetscapes.com) investigated the user’s visual experience and appreciation of different streetscapes through eye-tracking technology. Although follow-up research needs to be conducted, the three studies part of this project provided promising indications to unravel the relations between applied design solutions and users’ visual experiences.

The outdoor eye-tracking study with ten participants in the H-Buur, a deprived neighborhood of the Bijlmermeer in Amsterdam, showed the impact revitalization projects can have. (2) Since its construction, the development has been part of an almost permanent ongoing urban renewal process aimed at improving the livability by reducing the scale of the dominantly tall apartment buildings through (colorful) low- and medium-rise development. The clearly defined entrances of these developments with active ground floors drew the attention of several participants.

The next test in a laboratory setting — included showing 31 participants 15 images of streets in existing high-rise environments in the Netherlands four largest cities (3), and 19 images of streetscapes in Western cities (see fig. 3 for W 49th street) were shown to on 40 participants and their eye movements tracked. (4)

It seems that besides an active ground floor, also the horizontal-vertical rhythms, and variety and tactile materials play a significant role in people’s visual attention and appreciation of the streetscape. Especially in the first two seconds, attention is unconsciously captured by the presence of human-scale attributes. Streetscapes with a lack of these attributes show more scattered ‘searching’ eye-movement patterns. This indicates that a coherent design of streetscapes in high-density environments indeed may contribute to a human scale at eye-level.

CONCLUSION

Technology and theories from the field of neuroarchitecture can potentially deliver more scientifically proven design solutions for the development of high-density typologies on a human scale. The outdoor test with a mobile eye-tracker (5) provided a lens to discuss the existing spatial qualities and challenges of the physical environment with inhabitants at eye-level.

Building on the different explorative research studies, the eye-tracker makes it possible to test design solutions by the end-users during the design process. Systematic testing of design solutions in lab-settings provides a scientifically proven relationship between assumed streetscapes with a human scale and the actual visual responses of users.

Neuroarchitecture, and in particular, eye-tracking technology, can be a valuable addition to the participatory planning and design process. It evaluates design solutions possible even before they are implemented on the conscious and unconscious visual experience of its users and opens the door for a full user-centric approach.
Design thinking, or ‘human-centred
design’ is a problem-solving approach that
empowers individuals or teams to deliver
products, services and experiences that
address the core needs of final recipients.
(1) Multiple fields use this method to create
iterations and tackle even social issues. Focus
on human experience allows designers,
architects, builders and relevant authorities,
to design responsively built environments.

The City of Sydney Council (COS)
identified the need to include a library in the
Green Square Town Centre (GSTC) in their
Social Plan 2010. (2) Their Library Network
Strategy assessed the need for about 6000
sqm of library space by 2012 as the number
of visitors to the state’s public libraries were
rising significantly. (3)

To ensure they delivered a high-quality
intervention, the council announced a two-stage,
open-call international design competition. An
early consultation with the local community
helped to understand their expectations from
the new Library and Plaza. They wanted the
plaza to be capable of accommodating public
events and markets. Rather than formal
community buildings, residents considered
open spaces as significant locations for social
interactions. They expressed the need for a
place to gather, linger and dine, an outdoor
space with shade and shelter as well as spots
to enjoy the sunlight. Considering their needs,
the competition brief specified the aim to
create an ‘urban living room’ at the heart of
the urban renewal area. (4)

Libraries in the 19th century were
vast institutional buildings with monumental
grandeur. Libraries in metropolitan cities
today emphasise on proximity to the public
and other less formal spaces. (5) The Green
Square Library and Plaza - designed by Studio
Hollenstein in association with Stewart
Architecture - has won several prestigious
awards. It represents a contemporary library
that addresses the current needs and future
aspirations of people.

The exploration of libraries as a
building type was central to their proposal. The
role of a library has evolved from a place of
information to a hub for community activities.
With rapid changes in technology, people’s
ability to access information has changed
but the library exists as a physical source of
knowledge and a multifunctional space that
broadens the scope of learning through digital
and physical interactions.

Recognising the need to address this
evolution, the winning team deinstitutionalized
the library building through their design and
interlinked it with a plaza, preserving open
space for future generations. (6) Judged
against libraries across the globe since 2013,
the project was awarded the Architectural
Review Library Award 2018.

THE WINNING ENTRY

Considering the given site would soon
be surrounded by residential towers, the
winning team deemed that the ‘most valuable
commodity’ that can be provided to the
public was ‘space’. (7) A space that was open,
communal, inclusive, and free to use all day.
This challenged the typical library design by
putting forth a strong argument for burying a
large portion of the building underground and
placing the plaza above it to maximise public
open space. (8)

Architectural elements are deliberately
arranged loosely across the plaza to eliminate
strict boundaries between multiple uses. The
design encourages the evolution of a library
from a place for books to a civic space that
can host other community activities.

This loose arrangement continues
across the plaza and into the library itself.
Unlike conventional libraries, this project has
multiple entries and offers interior views from
different levels. The triangular entry pavilion
and tower read as external volumes piercing
through the plaza. The amphitheatre and the
sunken garden read as punctures or open
volumes for the library underground. “The
overall effect is urban – it doesn’t offer the
experience of being in a single building.” (9)

The fragmented design allowed access
to parts of the building without keeping the
Community
Proposed massing and 'Green edge' by Studio Hollenstein. (23)

Library plaza at night. (24)
the International Association for Public Participation (IAP2) spectrum) were brought in to consult.

Focused feedback was effectively sought through targeted workshops with different user groups. (12) Owing to the broad interest in this project, the public was able to provide feedback at the ‘SydneyYourSay’ portal. Schematic floor plans were made available and an online discussion forum was set up, attracting about 1400 viewers. A subsequent report on the key outcomes was also made available for the participants.

The objectives hoped to be gained by the community’s feedback and the workshops were to:
1. Inform the community of the jury’s decision and to explain the winning proposal’s relationship to the other projects in the GSTC.
2. Reflect about how the proposal addressed the key criteria recommended by the community during earlier consultation.
3. Highlight the architect’s enthusiasm for an open design process by ensuring community involvement at project milestones.
4. Test ‘design assumptions’ and understand the community’s perception of the project’s proposed indoor and outdoor spaces.
5. Involve a broad range of user groups who would potentially use the premises.

The design team was able to address or at least consider most of the feedback provided by the community. The involvement of architects in the consultation sessions provided them the opportunity to directly hear from the community (13), thereby decreasing the chances to hamper data collected during the consultation process.

STAKEHOLDER CONSULTATION AT DEVELOPMENT APPLICATION STAGE

Post-concept stage, the council established the need to amend existing planning and development controls. The built form of the winning proposal was substantially different from what was originally envisaged for the site in the GSTC Local Environmental Plan 2013 (LEP). (14) The LEP and Development Control Plan (DCP) are frameworks - land use and development controls of a particular site are indicated here. However, a proposal can be slightly inconsistent with these controls and may need the council to make amendments.

In this case, the library building was imagined (in the LEP) to be a large structure above ground. The winning proposal placed most of the building underground and so required the council to make minor changes to height restrictions and other access routes. However, the proposed design offered better public amenity because it overshadowed the open...
(cont’d from 19) plaza less. This gave rise to a Draft Planning Proposal which justified to the stakeholders the need to amend current controls. The proposal, along with the draft amendment to the LEP and DCP, were placed on public exhibition for 28 days. (15)

Exhibition materials were made available for public at the Green Square Library, customer service centres in the suburb and on the Council website. 300 landowners were sent notification letters and an invitation was advertised in a local newspaper. These proposed amendments to the LEP and DCP were required to facilitate the execution of the winning design:

1. the LEP to allow a maximum Roof Level of 46m instead of the 44.5m restriction. This allowed the seven-floor tower to include roof services within an eight-storey volume.
2. Main changes to the DCP included the flexibility to locate and design a transit corridor along the northern side of the Plaza, use of Barker St to serve Plaza activities instead of allowing through-traffic.

Following the exhibition, the council received submissions from key stakeholders like Transport for NSW, and two adjacent landowners - Urban Growth NSW and The Green Square Consortium. Their submissions expressed support but raised minor issues regarding bus lanes and bus stops, parking facility, vehicular routes and management of potential noise and light pollution. (16)

These concerns were addressed and the proposal was sufficiently deliberated before the architects lodged a Development Application (DA), a formal request for consent (from approval bodies - State Government and Local Councils) to execute the proposed development.

Stakeholders (according to the IAP2 spectrum) participated to the degree of involvement. Participants included local businesses, neighbouring site developers, neighbouring residents, etc. The feedback objective here was to facilitate the development of the winning design proposal.

CONCLUSION

The winning entry was executed on site without many changes to its design - the result of a clear design strategy informed by the public. Together, the design team and the council had a clear design strategy and the commitment to deliberate with the community.

With global cities rapidly expanding to accommodate increasing population densities, many industrial lands are being subjected to urban renewal. Governments are developing new town centres through large green-field or brown-field projects and they are investing heavily on delivering world-class social infrastructure. Human centric approaches are being adopted at the urban scale to ensure the city’s vision aligns with the population needs.

For example, COST invited public feedback on a proposal to grant a licence for a market at the Green Square Plaza. (17) In 2014, an intensive community survey was conducted to gain people’s views on the ongoing developments in Green Square. While such methods of engagement help the designers and give the community a sense of responsibility and ownership, technology can facilitate better participation and performance measures. In the case of this project, all competition entries and relevant information throughout the project was made available online and feedback was sought through discussion groups.

Although the council’s intention to include the community in the decision-making was good, better engagement methods could have attracted more participants. It is a tedious task to review so many entries or to read text-heavy files about amendments. Attendance to public consultations and focus group workshops is often low unless people feel deeply concerned or have an inclination to provide inputs. (18) Strategies such as provision of childcare and incentives in the form of cash or prizes reduce such barriers to community participation. Survey reports are an old-fashioned way to measure performance. (19)

Through technology, we can find scientific and accurate ways to measure people’s preferences in built environments. Augmented reality, for example, could allow people to visualise the potential transformation of a space. Additionally, it would allow for real-time monitoring and measuring of behavioural changes of people while they virtually experience a proposed space. (20)

Evidence-based or insight-driven interventions take time, but also result in a more conscious design which eventually benefits the space users. Project deadlines and budgets can prevent designers from spending the time needed to understand community dynamics. (21) The timeline of Green Square Library and Plaza indicates the challenge of community consultation in large-scale public projects. Everyday places should be designed innovatively but by using a human-centered approach. The training of design professionals does not include the basics of human perception which can help designer’s understand the impacts of their work. Frameworks and guidelines that analyse through a human-centred lens can help designers, clients, and stakeholders understand that they are accountable for the decisions made. (22)
The Early Years in Cities

Julien Vincelot

1 billion children are currently growing up in cities, of which an estimated 380 million are under 5 years old. (1) Around 1 million neural connections are formed every second in a young child's brain. (2) This means an incredibly high amount (roughly 380 trillion) of new neural connections happen in the brains of babies and toddlers across cities around the world. These neural connections are shaped by:

- The quantity, frequency and duration of warm, stimulating and responsive interactions between caregivers – most often parents – and young children.
- The quality of the immediate environment in which they take place.
- The quality of urban spaces influences babies' and toddlers' development directly by shaping their spatial experiences, and indirectly by modulating the quantity, frequency and duration of child-caregiver interactions in cities.

Urban planners, designers, managers, decision-makers and all those involved in the maintenance, upkeep and usage of urban environments are brain builders too, and can support caregivers in giving urban babies and toddlers the best chances in life.

Scientists, public health specialists and economists alike are unequivocal: babies and toddlers are the best learners on the planet, growing and learning fastest before their fifth birthday. During this window, their brains develop more quickly than at any other time of life, and their experiences carry a profound, lasting impact on their physical and mental health and their capacity to learn and relate to others.

THE MOST POWERFUL INFLUENCERS ON CHILD DEVELOPMENT: PARENTS AND OTHER CAREGivers

What parents and other caregivers do during this time helps to build the brain architecture that lays the foundation for good health and learning in later childhood and adulthood. A baby or toddler's relationships with the adults in their life are the most important influences on their development. These relationships begin at home, with parents and other family members, such as grandparents and siblings, and then extend outside the home onto the street, the neighbourhood, and the wider city. Caregivers are responsible for a child's safety and health, as well as what they eat and how they perceive the world. When parents and other caregivers talk, sing and play with their babies, they help to build a healthy brain wired
(cont’d from 21) to learn and interact with others. Studies show that warm, stimulating, responsive caregiving is one of the best predictors that children will do well in school, and be happy and healthy adults.

**URBAN ENVIRONMENTS SHAPE BRAIN-BUILDING.**

Urban planning and design that incorporates the experience of babies, toddlers and their caregivers helps children thrive and empowers caregivers; it also carries benefits for other members of a city’s population characterised by limited range and unhurried pace, such as disabled and elderly people. Family-centred urban planning and design is not only about building more playgrounds. Families are disproportionately challenged by poor public transport, as well as food, healthcare and childcare ‘deserts’.

- Families with babies and toddlers typically need to access more services such as childcare or healthcare, and more frequently than most other residents.
- Access to nature and play opportunities are crucial to the development of children and the well-being of caregivers.
- The mobility range of caregivers with young children is restricted by their slower pace, their need for more space on transit and on sidewalks, and the necessity to pause and rest more frequently.
- Caregivers tend to rely on support networks for caregiving – formal such as childcare, or informal such as grandparents or neighbours.
- Caregiver mental health plays a key role in the healthy development of their children, as it impacts their ability to provide warm, stimulating and responsive care.

Such a recognition of the spatial experience of caregivers with babies and toddlers rests on the shoulders of the socio-ecological model of human development (3) which places the healthy development of the child within its larger context (household, education, policies and cultural norms). This model can be applied spatially to understand how the larger environment in which babies and toddlers grow-up influences their development.

**WHAT DOES THE CITY LOOK LIKE FOR A TODDLER?**

If we adopt the perspective of toddlers and their caregivers - which can be done in various ways from playful workshops to more rigorous spatial assessment - we notice that their experience of the urban environment can be radically different than for adults. (4) For example:

- The smallest features, such as a step or a pattern of tiles on the sidewalk, invite play and exploration.
- Young children depend on their caregivers to move around the city. Making it easier and faster for families with strollers and on little legs to reach key destinations is one of the best things cities can do to ease stress and make it more likely that those families will make use of services.
- Travelling long distances between well-baby clinics, maternal health services, childcare, green spaces and places to buy healthy food can be especially difficult – and expensive. Toddlers’ shorter height places them consistently close to passing car exhaust fumes.
- Waiting (for buses, appointments and in queues) is a challenge. Designing features that allow for exploration and play make waiting easier and create valuable opportunities for learning and interaction.

**COMBINING EMPATHY AND DATA TO ACHIEVE CHANGE**

Understanding and experiencing the city as a toddler or a caregiver help us empathise with them. Combining this empathy with data and evidence on how urban environments affect babies and toddlers helps us identify the concrete opportunities of urban design to act as a powerful brain-building tool, and is core to initiate and sustain positive change in the way we design, plan and manage our cities.
Barriers and Pleasures of the Urban Space for Children

Beata Patuszyńska

There are almost 1.4 million children aged 7-12 living in urban areas (1) in Poland, who constitute 6% of the population. It is a big group of people who experience limited independence, cannot vote (so are rarely asked for opinions by politicians), but at the same time, advise their parents on purchases of apartments, cars or electronics. (2) The period between 7 and 12 years old marks a big change in children’s social development. At the age of 7, they begin compulsory education and are legally permitted to travel on their own.

Being professionally involved in the property sector and simultaneously being a mother in Warsaw, I got interested in the extent in which urban space is open to receive children. Three years ago, I started researching the topic with my daughter, who was 8 years old at the time. She could legally travel on her own - she knew how to get to school but she refused to do it. In order to find out what were the barriers in children’s independent travelling in a big city, I started conducting “accompanied interviews” with her and her younger brother.

I decided to concentrate on the way to school, as it was the route she covered every day. It was repeatable, familiar, and therefore easy to be taught and practiced. For example, which tram goes to school, the need to be more careful in specific places, as well as potential deviances, such as the tram turning instead of going straight and broken street lights, were all familiar aspects of the route. I followed my children. I observed, asked questions, and discussed things that were funny, pleasant and easy, as well as difficult and scary. I also asked them to take photos, so I could see how the city looked from their perspective.

Eventually, my research developed into a bigger project, where I conducted workshops for 8-year-old children in my daughter’s school. I chose that school because the urban experience of children differed there. It is a public school in the centre of Warsaw, easily accessible by bicycle, public transport (bus, tram, metro) or a car. Because it has a high ranking, there are many children commuting from further parts of Warsaw, and not just local children attending.

I was interested to find out how children perceive urban space. The workshop started with an introduction, which was aimed to familiarise children with the topic of the workshop as well as with me, who was new to them. I wanted to avoid them attempting to impress me and give “right” answers that they would think I expected to hear. We discussed their attitude to independent travelling and their way to school (they were explaining and drawing maps showing how to get from school to their home). Later I took them out – equipped in cameras and regular maps – for a walk in a neighbourhood. Their task was to mark and photograph things they liked and did not like. They really enjoyed taking photos, but to my surprise they had difficulties with translating their 3D world into a simple 2D map showing streets and buildings. Upon the return to school, I asked them to look at their photos at home, choose one that was the most important, and send it to me with an explanation.

This was partly because we had no time to go through all the photos and partly because I wanted to give children time to reflect on what we did during the workshops individually. As a result, I did not get photos from everybody, but the outcome was more personal – I received comments they would not give me in front of the group.

I shortly noticed that although infrastructure is very important, in the centre of Warsaw where we live and where school is, it was not a key factor in my daughter’s dislike of independent travelling. Even when the infrastructure was a little difficult or illogical, she was covering the way from home to school and I could teach her where to be careful or prepare her for possible deviances.

Initially, I had planned to analyse the inclusiveness of urban infrastructure - pavements, road lights, bicycle paths, city transport. Talking to children during my research, I became fascinated with their perception of the city, and I discovered a whole range of other issues. Most notably, children’s developmental needs of safety and play are translated to urban space.

MENTAL MAPS

During workshops, I realised it was difficult for 8-year-old children to use regular maps. They explained their perceptions to me by drawing their own maps, and describing how to get from one place to another. Their maps of cities were not made of a net of streets with names, but of orientation points and experiences as well as smells, sounds, views and textures. (This is not much different from the way streets were originally named – after landmarks, typographic features or the places...
they led to).

My children, when asked how to get from home to a tram stop do not say that “it is on a square north from our building,” as I would do. They explain that “one needs to go past a bread shop, (which smells nicely of cakes), pass a bank with big door that opens every time someone passes, then turn and cross the street where a little puddle from washing fire engines always is (and which has ice to break in the winter), and lastly pass the cafe, where we usually have our birthday breakfasts”.

**NEED OF SAFETY**

Children need to feel safe, and in urban space, safety means friendly and pleasant surroundings. That conclusion confirms what I have heard from researchers all over the world. Children, regardless of where they live, always talk of the same likes and dislikes. They enjoy green areas, spaces they can meet and interact with others and have the freedom to discover things; and they dislike cars on streets, vandalised spaces, aggressive adults, and rubbish.

Another aspect of feeling safe is predictability; the world, including adults and non-living things, need to follow pre-established rules. Unfortunately, often the first rule that children in Warsaw learn is: there are no rules. During workshops, they pointed out the lack of security which came from adults not observing the rules which children were taught at home or school. Such as, parents and deliveries driving, parking, and reversing on zebra crossing outside of schools, cars driving through green lights for pedestrians, the inability to cross a street or get off a tram or bus because adults are not observing the rules of walking on the right and letting people out before getting in. Additionally, children also expect predictability from non-living things such as city lights or transport systems.

During one of her independent trips to school, my daughter noticed that a digital board on a tram stop was announcing tram arrivals of many different trams. She chose to walk to school instead of waiting for her tram. For adults, these boards are only representations of timetables but in a child’s world, especially in situations where they have to count on themselves, the fault of one element can make the whole system appear unsafe.

Safety means also feeling included and welcomed. In Warsaw, children often get the message that they are not important in an urban space. Warsaw is a city dominated by adults who are not used to looking down to notice children, and who, by breaking the rules, exercise their physical dominance.

The children I spoke to talked of adults either blocking them from getting off a crowded bus or, when biking, from starting first on a green light, even though they were waiting in the first line. Another common complaint was traffic lights prioritising drivers.
A tram with high steps is difficult to get on especially with a school bag on (photo by Author’s daughter).

“’The photo shows a terrifying place, which is a squat. I like the photo because it shows a rainbow which gives a smile to the place.’ (Workshop photo).

A green man turned like that means a challenge to walk a crossing copying the pictogram. (Author’s photo).

Exercise of Bernard van Leer Foundation during Place-making Week Europe 2019 (Author’s Photo).
Children’s perception is that it takes ages for lights to change, and sometimes children have to wait more than once to cross to the other side because big road crossings are usually divided into two or three sections, and are impossible to cross during a single green light. Children also pointed out that trams or buses with high steps (though they are being replaced by low floor vehicles), are difficult to enter, especially with a heavy school bag on.

Another core need of children is the need to play, which they also introduce into urban space.

Children are in a constant dialogue with urban space. Either by using the city’s infrastructure as a playground or by telling tales in order to build connections with places.

The most obvious way for children to introduce play into urban space is to respond to the infrastructure. Observing children on streets, it is easy to see that they use benches, walls or steps as opportunities for physical exercise, climbing, jumping, and running. Other parts of infrastructure are invitations to play as well. My children, for example, used to play a game of avoiding broken pavement slabs or the black tarmac while on a zebra crossing. Non-typical situations also create opportunities for play, like the green man on a crossing light turned 30 degrees. To a child, that presents a challenge to walk the crossing crooked, copying the pictograph.

Another component of play in urban space are ‘tales and magic spells’, which give a sense of control. My children love to use ‘magic’ to change things they do not like -- they feel it is the only way for them to get a sense of influence on the city. For example, spells can speed up the change of lights or make a bus come quicker.

Apart from helping to establish where places are, stories are important in comprehending the incomprehensible organism of the city. Sometimes, they are stories of the past, or they involve animating non-living objects to build connections with places. Sometimes they are stories of places children find scary.

This squat (top right) is near my daughter’s school and serves an alternative culture and social centre. The building is painted black, has wood in place of some windows, and has much graffiti on it. Workshop discussions showed the place grabbed children’s imagination – they were inventing scary stories about the building and its inhabitants, some even walked the other side of the street to avoid passing it.

After the workshop, I organised a visit for children there. They had a chance to see the place, meet its inhabitants, play instruments in a concert room, paint graffiti, and become familiar with the space. As a result, children stopped fearing the place and the squat gained faithful ambassadors!

We can also experience some of what children feel to connect with them more deeply. There is an easy exercise proposed by the Bernard van Leer Foundation where participants go out into city space with 95 cm high sticks and masks to experience the city from that height. I recommend this exercise to everybody. It helped me experience what I knew from children’s stories: to sense how bad car exhausts smell, how dirty streets are and how scary grown-up people might look.

CONCLUSION

I wish children could feel important and influential in urban spaces. I believe the answer to that is to ask, listen, and react both on a micro scale - as caregivers - and on a macro scale by including children in the planning process. We should talk to children without presumptions and an attitude of ‘knowing better’ about their experience and validate their experiences. Although my initial plan had been to study the inclusiveness of urban infrastructure, my assumptions were tested, and I discovered that safety and play are very important in the perspective of children and the infrastructure was adequate. By challenging our assumptions and engaging with children, we can more fully realize their perspectives which will allow us to create more accessible cities for children, but also for all of us.
Rosario is also its older adults

Ignacio Foyatier

The life expectancy of the world population is increasing. It is expected that by 2050, the population over 60 years of age will double. (1) As of today, older adults represent 15% of the Argentine population, and it is estimated that by 2050 they will reach 25%. (2)

Currently, most cities are not prepared or designed to accommodate the physical limitations of older adults. As we age, our cognitive and executive functions are diminished and present a challenge to living independently.

Neuropsychiatric disorders represent 6.6% of total disability in older adults; 15% of adults aged 60 and over suffer from a mental disorder, radically impacting public spending on healthcare and treatment. (3) Older people are the most likely to be affected by dementia, which is accelerated by reduced mental and physical stimulation, and loneliness. The World Health Organization (WHO) estimates that the number of people living with the disease will be close to tripling by 2050, implying a high demand for public health services. (4)

At the same time, urban design unintentionally excludes the active participation of older adults. The shortage of ramps, well-lit spaces, and designed accessibility for older adults demonstrates that the isolation of older adults is not elective, but consequential of a lack of inclusive design and urban planning.

How can urban design reduce isolation and loneliness? How will we face the coming pandemic of mental illnesses resulting from long days of quarantine and loneliness? For older adults, it results in significantly longer periods of time in solitude. As a consequence, older adults become increasingly more prone to illnesses associated with poor mental health and a sedentary lifestyle.

Rosario is also its older adults has become a pilot and benchmark experience for the use of public spaces in the city for the elderly and people with reduced mobility. It has been recognized by the Municipality of Rosario as an Activity of Municipal Interest according to Decree No. 58.086. (5)

When we design our cities with urban equipment catered to our older populations, we create spaces promoting psychological well-being for all urban dwellers by promoting human contact and social interaction. Rosario is also its older adults is the placemaking project seeking to address these questions; this is a starting point in designing suitable spaces for our older adults.

The main objective of the intervention was to invite older people to have access and activities (6) in the public spaces of the city according to their necessities. This was attended by more than 50 seniors from 20 to 80 years old. During the journey, we collected information through surveys and a “public whiteboard” where the participants and passerby could express their ideas about what needs a good public space. There were also card games, Jenga towers, darts, motor coordination and memory games. There was a whiteboard with space to write ideas on “how we imagine our city,” and books, snacks and drinks. Most importantly, there was easy access to chairs and tables for the older members where participants could enjoy a simple conversation.

All of these small activities in a green public space prevent cognitive deterioration and encourage light exercise and mental stimulation. These can help prevent the onset of dementia and manage symptoms, improving cognitive abilities, building physical strength, increasing confidence and independence, and reducing feelings of isolation. This intervention shows that environments can enhance social ties, produce adaptable spaces for interactive mental stimulation and community building.

ANALYSIS

The surveys (7) were accessible to everyone who wanted to fill one out. The data released by the surveys showed a great interest in promoting quiet, accessible, and safe meeting spaces. 92.3% of respondents would return to participate in this type of event weekly, while 93.1% would go to places designed for adults, if available. 60% of respondents want to have outdoor events, like cinema, festivals, and art creation among others. 51% wished to have quiet spaces for meeting, and adults tours inside the city. This demonstrates the great interest of adults in participating in public space.

Spaces for having conversations, spaces without noise, places for chill and relaxed meetings with friends, include better accessibility for older adults, public events, level pedestrian crossings, sidewalks in good condition, and more benches and gaming tables among others.
We should recognize that every detail in the physical composition of the built environment has the potential to deliver comfort, convenience and connections to others. We have to create a state of mind.

“
(Above). Older adults interacting on the recreation day “Rosario is also its older adults.

(Below). Filling out the survey.

(Below). Games between adults and young people. Photo Positive (2012).

(Above). Books to donate.
Seniors members of the recreation day “Rosario is also its older adults”.

**FINAL REFLECTIONS**

The implementation of quarantine as a preventive measure for the spread of COVID-19 has generated anguish and frustration in many, causing, for some, emotional destabilization, which has brought along both physical and psychological symptoms. The reduction of physical activity and its negative implication for sleep quality, insomnia and daytime sleepiness, has already been demonstrated in different investigations. (9) Increased cognitive impairment due to having stopped carrying out cognitive stimulation activities such as workshops, gatherings, group therapies, volunteering, and associations, negatively affects emotional and mental states, indicating an increase in depressive symptoms and loneliness. (9) Loneliness also increases the risk of sedentary lifestyle, cardiovascular disease, inadequate nutrition, and the risk of death. (10) The quantity and quality of sleep can also be affected in people who suffer from loneliness, causing greater fatigue during the day. (11)

The pandemic has evidenced that human beings are social creatures. The loneliness and confinement that we feel during quarantine is part of an episode never collectively experienced by so much of humanity. We should recognize that every detail in the physical composition of the built environment has the potential to deliver comfort, convenience and connections to others. We have to create a state of mind. (13)

It is plainly important that public spaces conducive as meeting places and recreation are needed in the daily lives of citizens, as they allow for activities that decrease cognitive decline, but which also allow for social distancing. The value of active mobility, where safe social distancing can be achieved, has revealed serious problems in the design of sidewalks to avoid the crowding. Adaptations have already begun: special hours have been established for the vulnerable population and bicycle paths have begun to propagate across cities as alternatives to safe and preventive mobility to prevent the spread of COVID-19. These urban interventions in response to the pandemic further validate and emphasize the necessity of the findings of Rosario. As urban planners, we must begin to implement design changes in our cities to develop behavioural changes that can facilitate the activities of older adults.

This is just the beginning in designing suitable spaces for our older adults. When we complete our cities with urban equipment catering to our older populations, we create spaces promoting psychological well-being for all urban dwellers by promoting human contact and social interaction.
Social capital in cities: a need for urban resilience

Emma Vilarem

Studies show that an individual’s ability to mobilize her social capital, as well as the presence of places that foster social cohesion within a neighbourhood, are key resources for coping with ecological, economic and health crises. How can we reduce inequalities of access to these resources between urban spaces, mobilize them in uncertain times, and better prepare our cities for future crises? Inequalities in terms of social infrastructure influence the neighbourhood’s capacity to cope with crises.

In 1995, the city of Chicago was hit by a deadly heat wave. Two neighbouring areas, Auburn Gresham and Englewood, showed radically different mortality rates despite their similar demographics. In order to find out the causes, the American sociologist Eric Klinenberg studied the social infrastructure present in these two neighbourhoods.

In his book *Palaces for the People*, Klinenberg defines social infrastructure as “the physical spaces and organizations that affect the way people interact.” (1) These physical spaces include public institutions such as libraries, schools, playgrounds, parks, sports fields, swimming pools – but also sidewalks, building yards, community gardens, green spaces. “Organizations”, according to Klinenberg, refer to community organizations (civic or spiritual) as long as they are based in a physical place, as well as markets and certain businesses (cafés, restaurants, barbershops, bookshops, etc). Social infrastructure plays a key role in the ability of neighbourhoods to be resilient in the face of health, climate or economic crises, i.e. to absorb and recover from the shock. It is closely linked to contemporary issues of social isolation, crime, education and health. When it is well developed, the social infrastructure encourages contact, mutual support, and collaboration among friends and neighbours; when it is degraded, it inhibits social activity, leaving families and individuals to fend for themselves.

The Auburn Gresham neighbourhood, which benefited from a social infrastructure developed through many places and community organizations, recorded far fewer heat-related deaths than Englewood. Klinenberg demonstrates that the social infrastructure led to the establishment of mutual aid mechanisms between neighbours, and that some of these places open to all became vital shelters for a part of the population.

The current health crisis raises several questions: will the human consequences be greater in neighbourhoods with a fragile social infrastructure, reflecting a lower capacity to mobilize a social network in times of crisis? Furthermore, how can urban communities meet the challenge of mobilizing social resources in times of crisis, despite the fact that access to these physical spaces is restricted for health reasons in some parts of the world?

### ACCESS TO SOCIAL CAPITAL, A FUNDAMENTAL ISSUE FOR INDIVIDUAL RESILIENCE

The social infrastructure is indeed the physical support for the expression and mobilization of social capital. From a behavioural science perspective, social capital refers to the social resources available to individuals to support each other, help each other, or act together. It refers both to the social networks available (e.g. density and strength of social ties), and to the shared values and social norms within these networks (e.g. level of social trust, perceived reciprocity).

Research has long been interested in social capital because it plays a crucial role in the well-being of individuals and communities. At the individual level, it can be measured by indicators such as social participation (in a vote, an event, etc.), social trust, attachment to the neighbourhood or the sense of belonging to a community. The stronger the social capital of an individual or organization, the more involved it is in social dynamics, social groups and collective actions. Moreover, when social capital increases, the stress and the rate of psychiatric pathologies decrease, and physical and mental health improve. (2) Epidemiologists have indeed established a robust relationship between social connections, health and life expectancy. (3)

Thus, individuals benefiting from a strong social capital are more likely to be healthy, but also more likely to benefit from a cohesive social environment, which provides them with a sense of security and helps them manage their daily problems. (4) Conversely, social groups with weaker social capital are often those that are marginalized or insecure. But what shapes the construction of this social capital? The statistics show that social trust varies considerably from one country to another (e.g. 40% difference between Scandinavia and Brazil), but that these differences are also significant within territories. (5) Among other factors, the
environment in which one lives could have a significant impact on social capital: some studies suggest that living in a large city tends to be associated with greater social stress than living in a small town or in the countryside (all other things being equal). (6)

Indeed, although city dwellers are on average more affluent and benefit from better sanitary conditions, access to food and health care, urban life is also associated with an increased risk of chronic diseases, a more demanding and stressful social environment, and greater socio-economic disparities. The level of social stress would therefore be associated with a territory’s urbanicity score, i.e. its degree of urbanisation. One study has shown that the activation of certain brain regions under social stress is exacerbated in individuals who grew up, or live in a large city, compared to a provincial town or rural area. (7) These effects are potentially related to a more diffuse and less supportive social network in cities and, paradoxically, to a greater social isolation in these more densely populated environments, which expose individuals to more social adversity. (8)

Also, variations in socio-economic levels within a city would appear to be associated with variations in social capital. For example, studies in England indicate that communities living in deprived neighbourhoods tend to have lower social capital, reflected in lower trust in others and low rates of civic participation. (9, 10) Conversely, other research suggests that deprived neighbourhoods would benefit from more supportive social networks. (11, 12) Although the relationship between social capital and socio-economic level is complex, it requires very particular attention, especially in times of crisis where vulnerable populations are often the first victims. (13)

THE CRUCIAL NEED FOR LOCAL CONVIVIALITY UNDER CRISSES

Understanding how to preserve and foster the development of social capital is therefore critical as it enables individuals and communities to live better together. Our living spaces, and their infrastructures, support our social interactions and thus appear to be one of the main potential facilitators of neighbourhood life.

In times of crisis, what solutions are or could be mobilized to preserve the social capital of our neighbourhoods? Conversely, is the current health crisis a source of new local life that could be mobilized in future critical situations? What concrete solutions can be implemented before, or during crises, to build human and urban “resilience buffers”? (14) During the crises, the sudden proliferation of social initiatives brought neighbours together across age groups and demographic divides. Whether these groups will outlive the current crisis is open to question, but the good news is that no matter what happens, one cannot un-know one’s neighbour.~
The Human-Environment interaction can be conceptualized as a dynamic system governed by three principles:
1. Communication,
2. Self-regulation,
3. Adaptation.

We will focus on communication here. No integrity of biological and social lives can be maintained in the absence of communication. We constantly gather information about our inner state (microscopic level) and our environment (macroscopic level) in conscious and unconscious ways. On a macroscopic level, we communicate by processes of information production and reception. Information might be encrypted in a form of language (speech and voice), writings, signs, gestures (non-verbal communication) and symbols (artifacts). A process or an act of communication is always a two-way process: there is always a receptor and effector, sender and receiver, designer and user. Thus, design is a form of communication, most readily, the language (or vessel) through which we communicate. However, this language is too often misinterpreted.

INTUITIVE DESIGN
We all make decisions instinctively, relying on a feeling of ‘knowing’ what decision to make. This kind of decision making prevails especially in uncertainty and in conditions of extreme time pressure. Such ‘spontaneous judgment’ is called intuition.

Intuitive design is a series of subjective understandings and actions, relying on ‘this feels right’ or ‘this is natural’ to justify design decisions. Intuitive design, defined, “is a process of intentional self-leadership that both inspires imagination and informs how individuals interact in the world.” (1)

Still, the concept of intuition means different things to different people; it has been discussed by philosophers for centuries, and has been described as a reflexive and inner kind of knowing. Others have proposed “lists of the features of intuition, including such attributes as holistic, associative, fast, and automatic,” an increasingly popular view is the ‘learning perspective’; that intuition “relies on mental representations constructed on prior experiences and it is assumed to capitalize on these stored representations to often provide direct access to the criterion to be judged.”
Intuitive solutions take precedence in design professions compared to evidence-based disciplines. (3) Designers are inclined to display particular cognitive styles and ways in which their world is sensed. (4) Cognitive differences between designers and other professionals have been observed in divergent vs. convergent thinking, synthesis vs. analysis and subjective vs. objective thinking. In engineering, for example, convergence is preferable for problem solving.

Acknowledging the designer’s need to rely on intuition is beneficial, however, we cannot solely rely on intuition to justify design decisions because intuition isn’t always enough to empathise with the user. One way to circumvent these shortcomings is with affordances which provide the bridge between designer and user.

**SOUND IMAGES AND AFFORDANCES**

The implication of utilizing affordances as a ‘standard language’ is tested every day through sound-images. These ‘images’, or rather, the very essential basis of language, are clear evidence that a common language which respects subjective and objective experience, interpretation, and opinion, is necessary to foster communication. Saussure writes, "The linguistic sign unites, not a thing and a name, but a concept and a sound-image. The latter is not the material sound, purely physical thing, but the psychological imprint of the sound, the impression that it makes on our senses." (6)

The sound image here will be used as a metaphor for affordances, and we consider it to be a yet unexplored metaphorical paradigm of why a common language (in the shape of affordances) between designers, scientists, and users is necessary.

The term ‘Affordance’ was coined by James Gibson, and he provided his most expansive definition in his 1979 book, The Ecological Approach to Visual Perception.

The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. (...) As an affordance of support for a species of animal, however, they have to be measured relative to the animal. They are unique for that animal. They are not just abstract. They have unity relative to the posture and behavior of the animal being considered. (7)

Gibson uses the example of the ecological niche to further his point about affordances: that they (both affordances and niches) are “an invariant combination of variables.” (8) Gibson's definition is rooted in the holistic perception of the object, distinguished from all of its components. (9) He also posits that perception is purely visual; that is enough to determine an affordance (relative to the user). (10) This is problematic because according to contemporary neuroscientific models perception is an interpretative top-down and bottom-up process that recognizes and organizes multisensory information to formulate a mental representation of an environment. (11, 12)

In his 1988 book The Design of Everyday Things, Donald Norman famously incorporated the concept of affordances as part of a conceptual design model to help guide the design process. (13) He saw affordances as communicative user guides that were inherent within the object and were understood without “pictures, labels, or instructions.” (14) Usage of directions to explain ‘simple’ things mean the design was a failure. (15) Essentially, this contested Gibson's understanding of a hegemonic visual perception and reappropriated it to more accurately use the “experiences of the observer” rather than “referencing an observer through an object,” as Gibson did. (16) This made affordances less transactional, as Norman also accounted for socio-cultural constraints of affordances; meaning, affordances could not be called truly subjective as the cultural and thus behavioral and social norms influenced each other cyclically, impacting the ‘common’ affordance perception. This is furthered by the notion of affordances as ‘embodied perception’ and ‘embodied concepts’, as sensory-motor analyses of environment are universal among humans. Yet simultaneously, the evaluation of an affordance remained subjective to the user (within the behavioral and sociocultural sphere).

If we utilize a ‘designer only perspective’, we fall prey to disconnecting from our users. Bryan Lawson in, How Designers Think? The Design Process Demystified writes, "The primary purpose of a greenhouse is clearly to trap heat from the sun, so we can begin by measuring or calculating the thermal efficiency of a whole range of possible greenhouses. Unfortunately, we are still some way from describing how satisfactory our greenhouse will appear to individual gardeners. They may well also want to know how much it will cost to buy, how long it will last, or how easy it will be to erect and maintain, and probably, what it will look like in the garden. The greenhouse then, must satisfy criteria of solar gain, cost, durability, ease of assembly, appearance and perhaps many others." (17)

We could consider the greenhouse as solely a functional entity; to say that it would be ‘successful’ as a design if it just efficiently traps heat, and we could only consider this quality of it. However, to do so, would be to disregard the utilization of the space in order to allow it to function.

How the gardener feels inside of the building is important, as well as the other operational factors of the greenhouse which the gardener must use to successfully complete their tasks.

A designer who is not a gardener will not understand the nuances that exist with the job, and this reinforces the need for a common language between the user and designer of a space.

This example drives the idea that design is a practice and a communication; it is reliant on responses to the design and thus, the usage of the design, and a communicative channel must exist.
We practice creating a series of sound-images in logical formats respectively, that are reciprocally deterministic, that are. This is language and thus this is design, is it not?

We practice language or a way of speaking, a way of carrying across images or purposes to communicate.

The characteristic role of language with respect to thought is not to create a material phonics meanings, for expressing ideas but to serve as a link between thought and sound, under conditions that of necessity bring about the reciprocal delimitations of units. Thought, chaotic by nature, has to become ordered in the process of its decomposition. Neither are thoughts given material form nor are sounds transformed into mental entities; the somewhat mysterious fact is rather that “thought-sound” implies division, and that language works out its units while taking shape between two shapeless masses. (20)

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The link between ‘thought and sound’ that Saussure identifies is semiotic and morphologic, “that is to say, it is based on viewing the word as a meaning-making tool that unites a sound image and a concept, not a name and a thing.” (21)

LIONS AND TIGERS AND CHAIRS, OH MY!

Tiger.

You probably just imagined a tiger. How could you not have done so? Your mind just offered you an image of one. What was your tiger doing? Standing? Growling? Sleeping? Is it an image or a film? Is it an adult or a cub? How many stripes does it have? How many whiskers? How big are its teeth? Is it superimposed on a blank background or is it in a landscape scene? In a zoo? Roaming around a city? Is it alive or a graphic representation? Is it an image or a concept, not a name and a thing.” (21)

AFFORDANCES AS EMBODIED PERCEPTION

Affordances are not purely conceptual. The embodiment theory is important as it offers an explanation on why the world and its representations become meaningful to us. Our sensory and motor capacities, next to our sensorimotor knowledge (cont’d from 36) depend on more than just the workings of the brain and spinal cord; they also depend on the workings of other parts of the body, such as the sensory organs, the muscles, sensory organs, the musculoskeletal system, and relevant parts of the peripheral nervous system (e.g., sensory and motor nerves). (22, 23)

Bruner, a cognitive psychologist who was concerned with how knowledge is represented and organized, assumed that all perceptual experience is the end product of a categorization process. However, Ulrich Neisser, often referred to as the father of cognitive psychology, has argued that some kinds of perceptual experience (such as visual tracking) may be more analogue than categorical. Nonetheless, many forms of perception are based on pattern recognition which is about classification of stimuli and categorization. (24)

Eleanor Rosch represented the successive generation of cognitive psychologists and proposed that categorisation is embodied - given by our interactions - not just by objective properties of objects in the world, as a long philosophical tradition had assumed. (25) Without us — without the way we sit and the way we form images — the wide range of objects we have called “chairs” do not form a category. Our concepts must also be characterised relative to such a body-based understanding.

Gallese and Lakoff argue “that the sensorimotor system not only provides structure to conceptual content but also characterises the semantic content of concepts in terms of the way that we function with our bodies in the world.” (26)

This discourse is based on the finding that imagining and doing use a shared neural substrate: canonical neurons.
Lions.

Tigers.

And chairs.

Oh my.
The same neurons fire for a given manner of grasping as for merely observing an object that, if grasped, would require the same manner of grasping. For example, if a small object is presented, no matter what its shape is, then the same neurons fire as would fire if that small object were being picked up with a precision grip (as afforded by a small object of any shape). ‘(...) Thus, imagination is not separate in the brain from perception and action. (...) These data all (cont’d from 36) together show that typical human cognitive activities such as visual and motor imagery, far from being of a disembodied, modality-free, and symbolic nature, make use of the activation of sensory-motor brain regions. (27)

Our understanding of language depends on our ability to imagine objects, our actions, and other people’s actions.

Consider a simple sentence, like “Harry picked up the glass.” If you can’t imagine picking up a glass or seeing someone picking up a glass, then you can’t understand that sentence. Our hypothesis develops this fact one step further. It says that understanding is imagination, and that what you understand of a sentence in a context is the meaning of that sentence in that context.” (28)

Our imagination of sensory-motor experiences is both embodied and enacted. (29) Our ability to imagine grasping apples makes use of the same neural substrate as performing and perceiving grasping. Thus, imagining is a reaction to simulation; a mental simulation of action or perception.

Language, similarly, externalises thoughts and encodes knowledge structures that represent the language users’ experience of their physical and socio-cultural surroundings. For example, the expressions ‘He is boiling with anger’ and ‘He is furious’ encode the conceptualisation of the experience of “anger” as “heat” and of the “body” as a “container” for emotions. (30)

It’s proposed that the grounding process should consider the full environmental context. Furthermore, “affordance grounding,” is similar in stipulating that affordances ‘ground the agent’, which allows for it to adapt to new settings. (31)

Design affordances are analogues to sound-images; they are, largely, mental representations that result from embodied perception and unified understanding of purpose. (32)

CONCLUSION

Affordances are an adolescent language. But just as language evolves with use, so will affordances if they become widely accepted and used. There is an example of this evolution: cognitive affordances. The immediate drawbacks of adopting affordances as a design language is that object affordances from the Gibsonian or Normanian perspective, while they start to take into account different users’ perception, don’t give a model for the evolving nature of affordances. The user is attached to the object, rather the other way around.

This is analogous to only being able to use the word tiger in one sentence:

The tiger ululated vociferously as its pulchritudinous prey was snatched by another, more sanguine feline.

A child reading this sentence will only understand some words: tiger, prey, maybe snatched. The rest of the sentence is lost to them, and thus, useless, as you cannot derive the meaning of the sentence from those three words alone. This is how the current understanding of object affordances operates with Gibson’s or Norman’s understanding. If we evolve the language of design affordances to resemble something more amorphous, something like:

The tiger cried loudly as its beautiful prey was caught by another, more confident tiger.

Or even,

The tiger was sad because another tiger caught her dinner.

The meanings of the sentences are essentially the same. That is the power of language; we can make it accessible or we can make it inaccessible, language has the ability to flow and carry the same meaning to everyone or very few, and it has the flexibility to accommodate different levels of understanding, as design should be able to accommodate different levels of ability and understanding in how it communicates and is communicated about. Again, this does not abolish either the unintelligible or the simplified, but gives them their appropriate place to flourish as they need to. However, this comes with the evolution of language. It starts simply then grows more complex, just as the concept of affordances and its dictionary will grow and evolve as more come to use it.

~
“Didn’t we use to look at people’s faces, sometimes stumbling on a friendly gaze, a gentle smile, or catching the tail end of an implicit compliment?”
Before the COVID-19 pandemic introduced the term “social distancing” to our lexicon, a percentage of Americans had already endured a similar type of social distancing. This collective phenomenon did not so much impact our conventions of physical proximity as it did our social disposition. Our public spaces had become inundated with people attuned elsewhere. Go for coffee anywhere and you’d be lucky if anyone spared you a glance, let alone a smile. Most faces were locked to their mobile devices or wireless gadgets.

And while we’re grateful that smart technology keeps us connected during this extraordinary time when physical distancing is necessary, mobile usage worked in the opposite direction during ordinary times. It had become a major cause of social distancing. So what will happen after the pandemic? Will the threat of recurring pandemics alter the way we interact in public or will architects and designers address the social distancing being encouraged and facilitated by smart technology before our normal lives were upended?

As we experience this singular period of extended social isolation, our homes may lend the proper perspective to ponder the widespread costs of this mostly unspoken, but surprisingly corrosive social phenomenon. Will we return to business-as-usual or will we restore a measure of civility in public?

2019—A GLANCE AT PRE-PANDEMIC TIMES

Though it now seems like a dream, think back to last summer when we travelled to and fro without a care in the world. Think about what it felt like to arrive in any city. Something had seeped into the design of our public spaces. Something had slowly, albeit relentlessly, changed the way we behave, interact and experience in public. What happens to the atmosphere of a place when it surrounds patrons with data ports, directing their attention into their own individual digital worlds?

The peculiar habits of behavior that smart technology inculcates has led scholars in multiple fields to question its wholesale acceptance in communal, and even some public, architectural spaces.

Have wireless technologies altered our environments—and our collective behavior—to the point where designing a sense of place has been rendered meaningless? Does the apparent urgency for smart buildings and smart technology really dovetail with our underlying biological and cognitive needs? Or is it fools’ gold?

This has become a disquieting, but burgeoning theme among leading architects and interior designers: an existential tug of war between competing visions of the profession’s future.

One camp eagerly embraces digital technology—smart buildings, ubiquitous interconnectivity, and the Internet of Things (IoT)—with its promise of personalized convenience and fully interactive environments. A second camp favors human-centered design with its emphasis on occupant wellness and social awareness, an approach based on empathy, collaboration, and multidisciplinary solutions that aim to deliver equitable, sustainable spaces.

Designing equitable spaces, in particular, has struck a deep chord as smart technology often creates a wedge between people and a shared environment. For example, who hasn’t entered a service business in any major city where a point-of-sale display prompts you to expedite your order or appointment by downloading a mobile app? This apparently benign migration to digital services is efficient, but carries a cost. Those who opt for expediency also unwittingly opt out of a shared experience. Rather than relate to the communal space just entered—whether picking up a fresh loaf of bread at the local deli, browsing wares, or waiting to see the doctor—mobile app users rarely lift their heads from their device. They remain glued to their screens waiting for their turn and once prompted proceed as if the place were empty.

Such convenience fosters a digital divide between the apps and the apps not. The former funnel their attention into digesting mobile updates while ignoring the space and those around them. The latter find themselves alone in a roomful of absent citizens. Yet, there was a time not too long ago when waiting with a group of people was a time of pleasant small talk or simply an opportunity to people-watch.

Such occasions galvanized a shared sense of time and place. But with smarter, faster commerce, a growing number of commercial interiors are optimized for digital autonomy and isolation, rather than creating a shared feeling of congregation. So it begs the question: Is this really smart design or just smart technology in the absence of meaningful architecture? Perhaps it’s time to return to the architecture of embodiment, one proficient in deploying those pre-cognitive cues that invite our physiology to imbibe and contribute to the atmosphere of a shared space.
More public spaces seem designed for self-isolation than communal interaction (Photo by Caleb Minear).

I SENSE, THEREFORE I BOND

Embodied architecture lies at the forefront of architectural theory, neuroscience, and cognitive psychology. It recognizes that our ingrained habits of perception pick up pre-cognitive, contextual cues from our surroundings. This new body of knowledge recognizes that the body soaks up the atmosphere of place in a cascade of chemical and neural reactions that even preempts thoughts we entertain at the conscious level.

Embodied design recognizes the preeminence of multisensory stimuli in molding the emotional tone and mental disposition that an environment evokes in our physiology. What happens if these cues disappear from the places we occupy—especially in larger cities where people spend more time with others that they don’t already know? Could smart technology’s uneasy shift permanently impoverish the social quality of public, cultural, and commercial spaces?

Well, let’s go back to the common modern experience of grabbing coffee. Whether you ventured to the local bistro or a branded franchise in pre-pandemic times, one thing stands out: patrons are hooked on much more than caffeine. Glued to tablets, laptops, or mobiles with branching earbuds, their attention is, more often than not, elsewhere. And if you catch a nearby conversation, it’s someone talking to someone, somewhere else. People rarely look at one another; their gaze, funneled into a smart screen. Didn’t we use to look at people’s faces, sometimes stumbling on a friendly gaze, a gentle smile, or catching the tail end of an implicit compliment?

Yes, we did. And it was no accident! Neuroscience tells us our brains are hardwired—more than anything else—to read faces, to mirror their tale-tell emotions, to empathize. This is called the primacy of affect. McGilchrist (2009) cites fascinating research noting that “affective judgement is not dependent on the outcome of a cognitive process.” (1) He also points to A.R. Damasio’s influential book, Descartes’ Error, where the author points to “the primacy of emotion in neurological terms.” Damasio notes that “the apparatus of rationality, traditionally presumed to be neocortical, does not seem to work without [the apparatus] of biological regulation, traditionally presumed to be subcortical. Nature appears to have built the apparatus of rationality not just on top of the apparatus of biological regulation, but also from it and with it.” (2)
In our age we are responsible for reading facial emotion, prosody (vocal intonation), and gesture. (6) But smart technology’s relentless ability to hold attention captive elsewhere impoverishes the development of atmosphere and experience of place.

Increasingly, the enriching experience of going out to the great communal experiences like the theatre, a concert, or a cultural festival, finds more people checking their smart phones during intermission, recording the event for posterity, or otherwise engaged with someone not present at the event, than devoting themselves to the shared experience with those around them. “In our age we have come to underestimate architecture by exaggerating its utility. We often think of buildings not as spaces where human life takes shape, but rather as sites for certain functions and activities,” notes Hisham Matar, the American-born British-Libyan writer.

“Siena [for example] resists this,” he says. Matar’s memoir, A Month in Siena, recognizes that the great public plazas and markets of the past excelled in their ability to make one feel part of a larger living body, even if one ambled along, alone, in a crowd. He narrates the unalloyed experience that Siena’s world famous town center, the Piazza del Campo, has on those that grace its grounds. “No matter where we were in the square, we were able to see the entire place. Not one person was hidden. This strange effect was made possible by Il Campo’s unusual fanning shape and by the way the ground dips dramatically toward the long side where the civic and secular heart of the city, the Palazzo Pubblico, raises its tower high to compensate for the hill and achieve its ultimate goal, which is to be the tallest building in the city, taller than any church.”

“It was as if I had become, by simply walking into the square, an all seeing eye. But, because I could see every person in the square, this meant that each of them could potentially see me too. It was a space of mutual exposure. Whatever it is that creates that elusive bond between strangers taking account of one another in a public space was present here but in such a crisscrossing of currents that the whole place seemed electrified. And so, although we had entered a recess, a sort of giant pit, Il Campo also appeared, like a lit-up stage, to be suspended. To cross it is to take part in a centuries-old choreography, one meant to remind all solitary beings that it was neither good nor possible to exist entirely alone.”

The passage depicts the transformative power of attention to place. So what happens when we allow smart technology, by design, to siphon away our attention to place, and rob public spaces of that potential bond between strangers?
PART II - THE TYRANNY OF COMMERCIAL UTILITY

At the heart of this pressing debate between smart technology and embodied design, lies a far more consequential point. Beyond the loss of irreplaceable social bonds, the ubiquitous push of mass communication technologies into our collective spaces betrays a lack of appreciation for the benefits that accrue from attending to our physical surroundings while in the company of others.

Furthermore, what hasn’t yet been recognized by either camp is a tectonic shift in understanding being ushered in by the biological sciences. Studies in cognitive neuroscience and neurobiology suggest that we may need to develop a new architectural theory: one that no longer treats occupants and their environments as variables that exist independently of each other. Architectural scholar and author Sarah Robinson points out that when it comes to architectural design, “our technology has outpaced our epistemology. We are applying new materials and technologies with outdated ways of thinking. Until we come to terms with our utter interdependence with our environment and with each other, our technological solutions will only be half-measures.”

Foreshadowing Hisham Matar, she notes that commercial design’s economic imperative is predicated on utility and expediency, overshadowing architecture’s traditional mission as demiurge or artisan; a proponent force capable of infusing materials and spatial relationships with a lasting sense of place wherein people experience palpable atmospheres as a meaningful extension of mind and body, as well as an embodiment of their culture. Further, purely utilitarian space lacks the distinctive roots born of the particular history, geography and cultural aesthetic of its location. Utilitarian spaces driven by smart technology reduce people and spaces to data points and wireless transactions: the public plaza for the 21st Century. Yet, something huge is lost: lacking a shared social experience, such spaces become sterile, less equitable, and devoid of meaning. As others have begun to notice, these spaces no longer make any contribution to life and culture. Notable observers worry that the trend might be irreversible.

In this light, perfunctory, function-based buildings tend to lack the artistry and craftsmanship that provide its occupants with a meaningful experience of place. And architecture must (according to leading scholars in architectural theory and neuroscience) generate a meaningful experience of place in order to command the emotional, cognitive, and social allegiance of its occupants. Buildings imbued with such a sense of place are infused with the aspirations of its populace. Those buildings call to us and fulfill architecture’s deeper function as embodied extensions of ourselves.

What are we to make of prototypical commercial interiors that stand out for their transactional and impersonal design, optimized for transient occupancy and exposure only to new technology? “When things are organized in a coherent and integrated way you get these emergent properties so the whole is better [greater] than the sum of its parts,” noted the late Stephen Kellert, biophilic design scholar and a consummate advocate of a holistic approach to design. Kellert thought that the checklist approach to construction best exemplified by our predominant building standards often betrays a fragmented approach. He would insist that “good design has an atomic quality.”

This line of thinking appears to be supported by neuroscientists like Dr. Luis Pessoa, Director of the Maryland Neuroimaging Center at the University of Maryland, who notes that “parcelling the brain into cognition and affective regions is inherently problematic and ultimately untenable.” (7) Like Robinson, other scholars and researchers agree that the way we integrate sensory stimuli and generate our perception of the world reveals that our fragmented approach to design is in need of a holistic theory of knowledge; one that shows the underlying unity beneath apparently separate components.

Academic thought may lead the charge, challenging us to think about architecture in a more elemental way. For example, Finnish Professor Keijo Petäjä defines architecture “as a materialized expression of mental space.” This materialization is mediated by the senses and our sensory processing systems that generate distilled perceptions. These, in turn, give rise to memories laden with emotional valence. And these memories of experienced spaces are what resonate with new sensory stimuli and generate an environment’s familiar sense of place.

Conversely, Petäjä also asserts that “our mental space itself is structured by architecture,” an argument that has found a remarkable body of evidence that confirms how our surroundings impact our health and performance. According to Terrapin Bright Green, an environmental consultancy based in New York City, employees with views of trees and landscapes take 15% less sick leave (59 hours/year) in comparison to employees with no views to nature (68 hours/year). (8) Additional studies have established that a child’s immune system becomes more robust (as noted by lower asthma prevalence) when exposed to more foliage and trees whereas their inner city counterparts—residing in high density urban areas devoid of green spaces—develop weaker immune systems. (9)

Another renowned architectural scholar Juhani Pallasmaa argues that “this inter-penetration of the world and physical space, on the one hand, and the self and mental space, on the other… has made the artistic and architectural phenomena unattainable for the empirical scientific approach; the artistic meaning exists fundamentally in the experience.” And experience of place, like cognitive perception, is much more than the sum of its parts.
Piazza del Campo in Siena, Italy, invites visitors to linger (Photo by Mateus Campos Felipe).

Smart technology can often remove us from the experience of communal place (Photo by Unsplash).
This perspective is echoed by Harry Francis Malgrave, Distinguished Professor Emeritus at the Illinois Institute of Technology and Advisory Council member of the Academy of Neuroscience for Architecture (ANFA), who notes that niche construction, a realm in biological theory, postulates that “just as we alter our physical and cultural environments, so do these changed environments alter the genetic structures and behavioral patterns of who we are. Our brains, bodies, and environments are no longer seen as entities to be independently investigated, but as highly dynamic and interacting systems connected with each other biologically, ecologically, and socially.” (10)

The atmosphere we absorb and catalyze from our multisensory experience of interior design then, can now be understood, in light of the neurobiological feedback between occupant and the environment. Our pre-cognitive assessment of any environment is the result of an embodied appreciation that is part and parcel of personal rumination. We need room to explore, assess, and feel the space around us. Our biology is also hardwired to model the affordances or action potentials of a given space. Affordances, as defined by perceptual psychologist James J. Gibson, in his book The Ecological Approach to Visual Perception, refers to the advantages or disadvantages that a given environment offers the occupant; essentially what the environment provides either for good or ill.

In this light, our brain simulates the advantages or disadvantages related to what our body can do in a given environment: Is that leather sofa comfortable for two? Can I manage that steep and narrow spiral staircase? Is the balcony safe despite the buffeting rain? Our brain simulates what the body could do based on such “affordances.” However, the body’s sensory exploration and attunement to new spaces appears to be short-circuited by smart technology’s task-oriented prerogatives that seize our attention with perennial prompts and neurologically taxing feedback.

How does smart technology impact the atmosphere of a place? Unfortunately, more often than not, smart tech’s unintended effect is that it superimposes its own atmosphere: multi-directional, extemporaneous interference at any time, from any place. Consider any public space with a Wi-Fi connection. There is no atmosphere of place or social interaction. There are isolated “users” dotting the space “connected” through headphones and mobiles to their own virtual realms. As for the space itself, lacking the contextual cues necessary to generate a communal sense of space, smart design appears to foster just the opposite. It mediates behavior that disengages people from the moment and their surroundings, smart design’s hyper interconnectivity countermands what good environments do, which is to strengthen social bonds around a shared experience.

Furthermore, as both experience and new research confirms, we need room to think and space to breathe; these are features that facilitate higher thinking and emotional balance. And such faculties blossom where high-tech is generally not present—in wild, undisturbed nature. If our most memorable experiences are of spaces where our social bonds are strengthened and enriched through vivid connections to nature, then smart technology’s very objectives would appear to be poorly aligned with architecture’s traditional role as the galvanizing force that shapes and molds our collective experience into a meaningful and lasting sense of place.

Rather than embrace the technological imperative to supply more content to wired users, perhaps exploring the inherent, embodied disposition—how we feel, project ourselves, and respond to others—within the architectural context of a shared experience, would yield more meaningful and restorative environments.

PART III - NEUROAESTHETICS: RESPONSIVE DESIGN FOR OPTIMAL WELLNESS

Neuroaesthetics is an emerging field that explores the neural basis for the experiential contemplation and creation of works of art. This sub-field also delves into the mechanics of cognitive psychology that emerge from the sensory cues and patterns that we find intrinsically beautiful and that enhance well-being. Hence, there’s also keen interest in applying the emerging knowledge of Neuroaesthetics to architectural design.

Looking at healthcare design, for example, a much more artful and multisensory approach to architectural design is currently taking place. Waiting rooms have begun to move away from blaring televisions that add cacophony to such busy shared spaces. Instead, many redesigned waiting rooms introduce sensory stimuli like ambient background music, elegant nature imagery, arboretums and gallery-quality aquariums to generate a peaceful atmosphere where looking and listening are encouraged.

Further, environments that encourage reaching out through eye contact or verbal exchange acknowledge the personal, as well as institutional use of the space, thereby imputing value and leading to recognition of each person’s presence. With tacit visual acknowledgment of other occupants, a spontaneous remark might not be far behind and even a brief acquaintance. Getting to know someone facilitates shared experience.

Good design makes visitors feel integrated (individually and with their environment), which, in turn, leads to reduced levels of anxiety and distress. Further, when people break out of their self-absorption, share experiences, and become familiar with one another: time flies.

There’s a reason for this subjective distortion of time. Fascinating research indicates that we measure the passage of time in terms of the space around our body. It is also the case that space-time interactions in human vision are asymmetrical. Spatial cognition has a larger effect on temporal cognition than the other way around. (11)

These mechanics reveal that physically compressed environments devoid of meaningful social connections or life-
It was as if I had become, by simply walking into the square, an all seeing eye. But, because I could see every person in the square, this meant that each of them could potentially see me too. It was a space of mutual exposure.

-Hisham Matar
affirming sensory stimuli lead to distress and boredom. These dynamics not only explain why waiting in a space filled with self-absorbed strangers is rather unpleasant, but also why some elevator trips, though usually (brief) transitory spaces, can feel excruciatingly long and unpleasant.

On the other hand, time flies in environments with emotional richness. Biophilic environments resonate with our physiology because they tap our memories and experiences of places that support life and social ties, as well as prime us to welcome harmonious life-like patterns and sensory-rich experiences that facilitate social bonding.

As we continue to map out how our pre-cognitive response to the built environment impacts our emotional and cognitive demeanor, we can expect to gain a deeper appreciation of the essential elements that contribute to a wholesome architectural experience.

In time, as more architects and designers understand and account for the interconnected and porous nature of body, mind, and environment, new ideas should lead to more meaningful spaces in the dense environments of our ever-growing cities. Identifying these pre-cognitive spatial cues and somatosensory attributes, and their importance to architecture, is certainly an important objective of biophilic design.

The adherents of smart technology in buildings might wish to evaluate the social cost of saturating architectural spaces with ubiquitous smart technology in response to a learned expectation of personal convenience. Rather than simply fulfill a function like providing streaming data or televised content to entertain occupants regardless of location within the building, a more grounding approach might ensure that smart interventions reinforce a shared sense of place among diverse populations; for example, between service providers and customers, caretakers and residents, support professionals and patients.

In deep plan buildings, isolated interiors usually lack visual richness and prospect, two of the most salient and therapeutic characteristics of biophilic design. Such compressed areas, predominant in both older and new commercial buildings, illustrate this point well. Spaces like waiting rooms, healthcare environments, and varied commercial interiors generally lack the biophilic sensory stimuli that will successfully engage occupant attention and foster open alertness. As a result, people resort to mobile devices or other distractions to stave off boredom. The result is a stressful atmosphere, subjectively longer wait times, boredom and stressed occupants attempting to extend their private, inner worlds through technology.

On the one hand, smart technology has created an expectation of uninterrupted service, allowing people to be in touch with their work or their loved ones at a moment’s notice. On the other hand, studies confirm that few situations in public are as jarring as having to listen to what behavioral researchers call halfalogue (exposure to half of someone’s mobile conversation). Our brains are designed to phone in, decipher and process information, which we do by predicting what comes next. This is easy to do when we’re exposed to both sides of a conversation, or a coherent monologue.

However, studies show that exposure to only one side of a conversation, hampers the brain’s ability to predict its direction. Furthermore, in limited shared spaces, our attention cannot disengage from the auditory stimuli. This public display of someone’s personal life makes it difficult to tune out the conversation and redirect our focus to something else. A prolonged situation of this sort creates distress and taxes emotional balance much like the blaring television.

Furthermore, even when we simply facilitate the use of mobiles devices in shared environments, we’re basically negating one of the few remaining virtues of public spaces: the shared experience. If we permit smart technology uninterrupted access to the most common public spaces, we risk not only encouraging the same self-isolating behavior that numerous studies on heavy mobile usage link to a higher risk of individual depression but also exacerbating an already worrisome social phenomenon.

On this point, it is notable that clinical depression, a condition the World Health Organization has called a 21st century epidemic, is endemic to developed economies: those with the highest rates of urbanization and ubiquitous mobile voice and data coverage.

In cities, the waiting room, the transit area, and similar transactional spaces are the last bastion of daily interpersonal acknowledgment between people. In this light, should our architectural spaces encourage acknowledging others in shared spaces? If smart technology and expediency trumps social opportunity in the public plaza, then is the memorable experience offered by Piazza del Campo a relic of historic architecture?

As more studies attest that excessive mobile usage favors antisocial and unhealthy isolation, particularly among younger users, maybe encouraging us to lift our eyes in the few public spaces where we happen to coincide for picking up groceries, stopping by for coffee, or waiting for an appointment, is good, human-centric design. Yet, some may still argue that personal convenience demands 24/7 connectivity.

If so, is there a cost to the social fabric? Before the onset of COVID-19 and social distancing, think of a crowd in any public place. For the most part, few people, if any, proffered a smile or a friendly side glance. And if we don’t observe each other anymore, or do so with less frequency, will places soon lose their ability to draw us together? Can human-centric design mitigate the palpable social distancing in transactional spaces that many witnessed before the current pandemic set in?

Consider one example of how design can alter pre-conscious behavior. Rather than opt to (cont’d from 47) distract attention with televisions or magazines, introducing an architecturally relevant biophilic illusion of nature
(a bi-sensory virtual skylight) can dramatically redefine the experience of the space by resetting the perceived zenith—the highest point directly above the observer (or above the space of the room). Such suitable spatial illusions enable designers to enliven the occupant’s embodied memories of past experiences of perceived open space and provide meaningful measure of shared, ambient relaxation.

Bi-sensory illusions, a subset of optical illusions that include both visual and spatial cues tailored to the interior envelope, employ a cognitive design framework that directs photographic capture, composition, and installation. This framework is designed to facilitate the subconscious movement of the eye through the composition, thereby connecting the observer to the much larger spatial map of their present surroundings.

A neuro-aesthetic approach has been developed explicitly to include both contextual and structural cues that mirror experienced points of view (POV) such as laying with our head at the base of a tree and looking up into the sky. This POV triggers our memory’s embedded spatial reference frames. These spatial maps, born of our long exposure to the sky, inform our memories of deeply familiar environments and spatial relationships.

Jennifer Groh, Professor at the Department of Neurobiology, Center for Cognitive Neuroscience, Duke University, notes in her book, Making Space: How the Brain Knows Where Things Are, that not only is memory an integral part of creating a sense of place, but space, in turn, serves as a kind of filing system for storing and accessing memories. She also emphasizes that the brain’s memory-space connection relies on shared neural infrastructure. Therefore, we can use memories to imbue spaces with shared experiences simply by the correct structuring of spatial relationships. In enclosed interiors, this has been found to be therapeutic and restorative.

Evidence indicates that bi-sensory illusions, those that embed both visual and spatial cues in the proper architectural context, engage the areas of the brain involved in spatial cognition. These biophilic simulations evoke a tangible and therapeutic psychophysiological effect—the autonomic relaxation response—because the hippocampal region has a profound sensitivity to one’s own spatial location in relation to past memories formed under similar sensory stimuli. And the sky, as our most universal experience of nature, illustrates how designers can trigger pre-cognitive cues in a way that enlivens our emotional disposition to a given space, enabling occupants to experience a shared atmosphere.

A visual connection to the sky stands as one of the most meaningful sights for humankind. Witnessing the same vantage point in the presence of others, just like when we watch the sun setting among strangers, creates an unspoken recognition of an event much larger than ourselves; one that invariably gives solace to those quietly attuned.

It is also possible to create illusory skies that incorporate movement (using Digital Cinema footage). However, photographic, bi-sensory illusions are quite effective in engaging areas of the brain involved in spatial cognition and depth perception. Their ability to engage peripheral vision, which encompasses 95% of our visual field, accounts for their efficacy as the installation remains in the scope of the occupant’s awareness, regardless of their intra-room movement, readily informing and re-informing the autonomic nervous system of the presence of overhead sky.

Other brain areas related to spatial mapping are also involved in locating the body within an environmental field. The success behind bi-sensory illusions may also be due to their ability to mirror the spatial cues that trigger the Parahippocampal Place Area (PPA), which is known to be active in the spatial perception of outdoor scenes of nature and landmarks, and has been found to engage even with computer-generated schematics of room renditions. Further research in this area could help confirm this thesis.

Neuroscience studies have also identified a second area, known as the Retrosplenial Cortex (RSC), which adjoins the nearby posterior cingulate cortex and seems to work with the PPA in a complementary fashion.

Russell Epstein, a neuroscientist, has noted that the RSC “supports mechanisms that enable one to orient oneself within the broader spatial environment and to direct one’s movement towards navigational targets that are not currently visible.” Architectural scholar Harry F. Mallgrave
Nurture

A bi-sensory virtual skylight above an underground waiting room in Paris, France (Photo: Sky Factory).
remarks that these brain areas “seem to enhance our navigation through familiar environments by drawing upon spatial memories.” (17) These neurological insights might also explain why some people enjoy deliberately walking through familiar environments in complete darkness. According to first-person accounts, such navigation generates a distinct experience of the spatial environment that is far deeper and richer than would be experienced if light were present. Such an ancient human experience, navigating in darkness, and the unique pleasure it affords to negotiate the unseen, can now, quite possibly, be understood clearly as an interior—mental and emotional—extension of self onto three-dimensional space.

In conclusion, the use of biophilic illusions of nature in isolated interiors offers a more sophisticated understanding of cognitive perception and the smart deployment of visual technology other than flooding architectural spaces with streaming data or discordant visual information. Science-driven, human-centric design in architecture should examine the effects of the rising trend in smart building design as it relates to human behavior and social opportunity, not just resource allocation, mechanical efficiencies, and data intelligence management.

Along with the formidable advances in AI as they relate to the future of smart buildings, a more nuanced view of intelligence acknowledges that for all its processing prowess, humane intelligence does not reside in our disembodied mental faculties. Human intelligence lives and breathes in our innate and embodied ability to introject (to simultaneously internalize reality and project the self into space) in life-affirming environments. In reciprocal fashion, we seem to introject from our surroundings—worlds full of potential and life-affirming possibility.

Embodied architecture cradles and nurtures multiple social bonds that lead to a richer and more humane existence where even a chance moment of serendipity (or unspoken solace) with fellow denizens, holds enough meaning of place to form a memory. “Few people realize what an astonishing achievement it is to be able to see,” noted British biologist and neuroscientist Francis H. C. Crick. “The main contribution of artificial intelligence has been not so much to solve these problems of information handling as to show what tremendously difficult problems they are.” (18)

“When one reflects on the number of computations that must have to be carried out before one can recognize even such an everyday scene as another person crossing the street, one is left with a feeling of amazement that such an extraordinary series of detailed operations can be accomplished so effortlessly in such a short space of time.” (19)

Unlike the hailed Smart Cities proposed by tech giants like Alphabet (Google’s parent company), Microsoft, and more, a more humane future may rest on how well we understand and honor the delicate wiring of our own mental, emotional, and physical...
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7 Own source. 58 surveys have been carried out. The age range of the respondents is from 22 years of age to 84 years, with 36% male and the remaining 64% female.

8 Own source. 58 surveys have been carried out. The age range of the respondents is from 22 years of age to 84 years, with 36% male and the remaining 64% female.


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See You Next Year.