## Building for Mental Wellness a case for mindful cities



This report explores the interaction between mental health and the physical quality of our built environment. First, we look at the ways in which urban life can have detrimental effects on our mental health, and discuss the barriers to creating healthy places. We then present the ideal city, one that meets the psychological needs of its inhabitants, and discover current spaces that are prioritizing residents' wellbeing. Lastly, we consider how to overcome some of the obstacles to healthy placemaking, discussing the potential of collaboration and innovation in order to create resilient urban ecosystems.

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## Breaking down silos, transforming systems for wellness.

**Masawa** is the mental wellness impact platform. We're on a mission to bring mental wellness to all through impact investing, Nurture Capital advisory services, and ecosystem weaving.

Cities are microcosms that facilitate billions of interactions between people every day. They are places where serendipity enables the emergence of deep connections and groundbreaking innovations. Cities offer a breadth of opportunities for work and play, and can answer our unique needs and desires. Yet, prolonged exposure to city noise and unhealthy air quality, the hustle and bustle of city life, and the felt lack of community and nature can also negatively impact our health and wellbeing. The external environments in which we live and work have a tremendous effect on our inner lives and wellness. And our inner lives, in turn, influence our behaviors and actions, and the lives of the people around us.

The great activist and author Jane Jacobs argued that cities are "problems of organized complexity" that are "dealing simultaneously with a sizable number of factors which are interrelated into an organic whole." At Masawa, we believe that to improve the health and wellbeing of city-dwellers, we must see cities as dynamic and interconnected living systems. By taking a systems approach, we can gather deep insights into the nature of problems in urban environments, look for root causes, and make interventions with potential for transformative change. Taking a systems approach also means looking across and breaking down silos, collaborating with a wide range of organizations, from NGOs to private investors and grantmakers, and involving the people closest to issues in sensemaking and decision-making processes.

With this report, we hope to inform you about the impact, both positive and negative, of city-living. We argue that urban design needs a refreshed focus on residents' mental wellbeing. Above all, we invite you to imagine the city of the future together; a future that works for all, with all. How do we go from what is today to what could be tomorrow?

Joshua Haynes, Managing Director

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## Chapter I To what extent do urban landscapes represent a threat to our wellbeing?

Social interaction, mobility, production, and entertainment make cities places of intense stimulation and excitement. But how exactly does this stimulation affect the emotional wellbeing of urban dwellers? Given the rapidly rising urbanisation and worsening mental health of its inhabitants, a stronger focus needs to be placed on better understanding the psychological impact of our built environment.

Today, more than half of the world's population lives in urban areas. As people continue to seek improved social and economic services and benefits, the **UN estimates** that by 2050 this number will increase to two-thirds. Considering the current shift in urbanization and the natural increase of population, it is essential for us to ensure that our cities are designed for healthy living with a thriving population.

Although urbanization allows for important economic, cultural, and educational opportunities, we know today that the impact is not all positive. Living in an urban environment can have harmful effects on people's mental health, as big cities tend to strip away protective factors that foster wellbeing such as green spaces, physical activity, and social connection. **Mental health causes more disability than any other noncommunicable disease and is estimated to cost the economy \$16 trillion by 2030**. This is especially true in cities where the risk of depression increases by 40%, the risk of anxiety by 20% and the **risk of schizophrenia doubles**.

Millions of people worldwide suffer from mental health conditions and no country or city is immune. Globally, 1 in 4 people will experience a mental disorder in their lifetime potentially impacting aspects of their life such as education, employment, economic opportunities as well as diminishing their relationships, coping skills, enjoyment, and even prompting suicide. Poor mental health impedes an individual's capacity to live up to their unique potential and contribute to their community.

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Research has repeatedly demonstrated that our psychological wellbeing is influenced by everything from diet and exercise to culture and relationships, and our built environment is no exception. Today's densely packed cities are filled with monochrome skyscrapers, oversized billboards, and polluting traffic. We have created a shared urban environment

## **(**C...People make cities, and it is to them, not buildings, that we must fit our plans.

— Jane Jacobs

that fails to prioritise the human experience over other capitalistic concerns. However, multiple studies have begun to link

psychological issues to different urban conditions urging us to **pay attention to how the external built environment greatly impacts our sense of wellbeing**.



## Socialisation — The need to connect

Human beings are inherently social creatures. Connection with others is a natural part of our life-- we have spent thousands of years living in closely-tied communities enabling us to survive and thrive. Harvard's 75-year-long study on human development proved that **close** relationships are the biggest driver to long, healthy, and happy lives. Although cities are often vibrant and buzzing with people, large urban spaces tend to remove our sense of community, making us feel lonely and isolated rather than connected and united. Social isolation and loneliness have been linked to higher risks for a variety of physical and mental conditions including heart disease, anxiety, depression, cognitive decline, Alzheimer's disease, schizophrenia, and premature mortality.

Our urban environment presents us with physical barriers to fostering those much needed connections. Favouring highways and high-rises over pedestrian zones and pro-social places, cities contribute to the social isolation felt by many. Vulnerable populations are particularly at risk as they are often left out in urban planning. Built environments pose challenges to people with disabilities and the elderly as they often lack the ramps and elevators needed for transportation. These obstacles hinder a person's experience of autonomy, disrupting not only their mobility, but their psychological wellbeing too.

### Overstimulation — Bustling streets

On the other hand, our brains are not well designed for living in densely and overpopulated metropolises either. Population density is a constant threat to the social order we live in and overcrowding leads to stress and illness in a variety of species ranging from insects to rodents and primates, humans included. **Studies have linked regions of the brain involved in processing negative emotion, environmental threat, and stress regulation with time spent in a big city**. The more dense a city, the more activation was found in those regions.

Cities can indeed be harsh on the senses. Overstimulation that our brains and bodies endure from navigating densely packed spaces can have damaging effects on a person's mental health. Increased cognitive load, a product of heightened stimuli, depletes our attention capacity and weakens functions such as selfcontrol. From constantly being fatigued due to high-demanding urban scenarios, our brains can become inattentive, socially withdrawn, irritable, and impulsive. Our built environment is conducive to a fast-paced urban life, but our cognitive processes have not advanced nearly as fast as the pace of urbanization.

Pollution — Even in your sleep

It has now long been considered that air pollution is detrimental to our physical health. Recent literature seems to link exposure to certain air pollutants with brain health, showing an increased incidence of psychiatric and neurological disorders such as developmental disorders and dementia. However, noise and light pollution also impact our mental health and are of growing environmental concern. Today, 20% of the EU population live in areas where noise levels are considered harmful to health. As our brains are constantly monitoring sounds for signs of danger, even as we sleep, loud and frequent noise from traffic, nightlife, or construction can trigger anxiety, irritability, lack of focus, and increase a person's sensitivity to stress. Excessive light exposure during the nighttime produces an increase in cortisol, the stress hormone, during a time when our bodies are biologically conditioned to sleep. The secretion of cortisol blocks the production of melatonin, the sleep hormone, disrupting our natural circadian rhythm. A deficit in sleep leads to deficits in health and often precipitates or exacerbates affective symptoms in susceptible individuals.

## Deprivation — The concrete jungle

Not only are densely-populated cities inflicting unpleasant experiences onto us, they are also depriving us of certain protective factors against mental illness such as regular access to nature and physical activity. Grey, concrete roads, and



an excessive amount of cars has driven us away from nature, and towards a more sedentary lifestyle. **This limited contact with green space can have long-term health consequences**. A recent study discovered that children who lived in areas with the lowest levels of green space had a 55% greater risk of developing psychiatric disorders as adults.

There is now substantial evidence that physical activity is not only good for your body, but also for your mind, and increasingly so if you are able to get active outdoors. A walk through nature is restorative for the body and mind and has been found to be a potent stress reliever. Research suggests that spending time in green space and bringing nature into everyday life can benefit our mental health, making us feel happier, and even reducing our levels of depression and anxiety. As these benefits seem to increase with the diversity of plants and animals we encounter, we should all be looking for less concrete and more jungle.

## Barriers to Progress — Why can't we move forward?

If evidence for healthy placemaking is so clear, why haven't the changes been prioritised? What are the major barriers preventing the design of mindful urban spaces?

**The Design Council**, an independent charity and the UK Government's advisor on design, led a survey in 2018 that set out to answer some of these questions. The results highlighted a number of obstacles which inhibit environment practitioners across the UK from creating places that reduce cases of preventable illnesses and positively impact people's wellbeing.

Overall, practitioners who completed the survey had a strong understanding of the wider issues impacting health and wellbeing within the built environment. **However, they generally felt that they needed to convince clients and other professionals to invest in creating healthy environments, as there was**  a lack of understanding amongst the general public and politicians regarding the effect of the built environment on health. Although increasing physical activity was often high on the agenda, other important components of healthy spaces such as pedestrian priority or convivial spaces to encourage social interaction were overlooked. A lack of knowledge seems to underpin the lack of support from the policies and processes of urban planning towards creating healthy places.

We know that a wide range of disciplines are involved in developing healthy environments, which is probably why these issues are lagging to be addressed. Practitioners acknowledged that some collaborations do exist, but the overall results revealed that it is not common practice to work as a multi-disciplinary team. Respondents deemed it necessary and wished to see more cross-sector **cooperation**. They also stated that while they are able to use local data to justify certain interventions, access to and usage of this type of data was very limited. Practitioners lack a framework in order to measure the impact of their decisions but recognise the value in local insights from residents admitting that this is rarely part of the process. Imagine the possibilities with abundant data and information, differing points of views and knowledge, and measurement tools to support and help shape decisions on healthy spaces.

Finally, one of the most important barriers mentioned was cost. Economic value is the driver of most current systems, urban development included. Practitioners mentioned having to be conscious of finances as their main priority influencing their work. **Developers tend to focus on commercial priorities and shortterm objectives which can inhibit the development of healthy spaces**.

Similarly, a common hurdle seems to be financial viability. Planners and architects stated that they repeatedly get questioned if something is deemed too costly and is not the most efficient use of resources. Certainly, good urban design may be expensive, but the cost of bad design impacts the wellbeing and health of millions, leading to longterm consequences with its own steep costs attached, and significant knock-on economic effects. The direct and indirect costs of mental ill health can amount to over 4% of global GDP. Reducing the rate of mental illness in urban areas by 20% could save the world \$250 billion yearly.

Cities are the places where we work, live, and play. They provide us with great opportunities, but our health seems to pay the price. **We've seen how our external world impacts our internal world**, how the very places that are created for us to live in can actually hinder us from leading happy and healthy lives. Although mental health figures are generally worse in cities than in rural areas, they are by no means the problem -- cities are part of the solution, they just need some mindful adjusting.

Can we imagine urban environments that enhance, rather than detract from our wellbeing?

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or centuries, people have been fascinated by imagining what the city of the future could look like. Contrary to what people once thought, **moving sidewalks** or **nuclearproof underground cities** haven't become commonplace yet. The picture they painted was one where technology ruled, where skyscrapers pierced through the heavens

and flying cars made roads redundant. Quite strikingly, nature wasn't invited to the party and inclusive community spaces were nowhere to be found. Wellbeing, it seems, was not as exciting as the technological advancements of our wildest imagination. In light of what we know today, let's ask that question again. What would today's ideal city look like?



# Creating a mindful city means putting wellness at the forefront, offering a soothing atmosphere to regain strong bonds between each other and our environment, which in turn leads to happier and healthier communities.

Mental health is a key asset for long-term sustainable development and nurturing this asset is critical to ensure that people can live creative and productive lives. It is clear that there is a need for urban designers and planners to help create spaces in cities that increase social capital -- the links, shared values, and understandings in society that enable individuals and groups to trust each other and work together. Creating a mindful city means putting wellness at the forefront, offering a soothing atmosphere to regain strong bonds between each other and our environment, which in turn leads to happier and healthier communities.

Our neighbours and our environment can play an important role in improving psychological distress. Doctors are already "social prescribing", encouraging patients to engage with others, often around an activity such as gardening to tackle anxiety, loneliness, and depression. Green and blue prescribing is the use of nature-based activities for improving the physical and mental health of individuals. However, all too often these remedial approaches are treating poor health. Preventative care that supports people to lead healthy lives may not only be more effective and efficient, but could prevent long-term poor health and mental distress. **By designing our surroundings with a heightened awareness towards the users' needs, we can facilitate lifestyle changes and shift the focus from mental illness and treatment to wellbeing and prevention.** 



### Reimagining the conditions for humans to thrive

Picture this: you head out of your home only to be just a few minutes away from a park where a local meet-up group is enjoying an outdoor tai-chi class. Walkers and cyclists are safe from traffic, enjoying wide roads shadowed by trees and flanked by running water in a harmonious meeting between occupants and their natural environment.

Biodiversity is thriving. You wouldn't recognise that you were in the city centre. It feels energetic and vibrant, nurturing your senses rather than overwhelming them. When you look up, you discover natural elements intertwined with the highrises on which they live. Pedestrians are prioritised, having space to wander, and traffic is no longer ubiquitous. Evening arrives and warm-coloured street lights are ephemeral, turning on when someone approaches and off when nobody is around. People feel safe and confident to engage with others and contribute to their communities.

### Green and Blue Spaces — Beyond highways and highrises

We know that exposure to nature, whether it be spending time outside or looking out on natural landscapes, reduces anger and stress while increasing pleasant feelings. The incidence of depression within urban areas has been shown to be lower when people have access to green spaces, and some cities are leading the way. Singapore is already one of the world's greenest cities with one third of its land covered in trees, moreover, as part of the city's Green Plan 2030, every home will be no more than a 10 minute walk from a park and the city is setting aside an additional 10 square kilometres of green space.

As humans, we are genetically programmed to find these settings attractive and biophilic design, an idea already making waves across the globe, seeks to satisfy our inherent need to connect with nature. The concept aims to create architecture as an extension of nature, using natural elements of lighting, ventilation, and landscape into contemporary architecture. Biophilic design can be incorporated everywhere from our workplaces, indoor gyms, buildings, or even entire highways. The Relink project by Urban Scale Interventions, a Belfast-based multidisciplinary design studio, is using biophilic design ideas to reshape the Northern Irish city. By drawing inspiration from interventions such as the Catharijnesingel in Utrecht or the High Line in New York City, the aim is to transform the westlink motorway and bridges currently dividing and polluting the city into a massive linear park stretching North to South. Solutions such as this one where accessible spaces and inviting paths of biodiversity are created will undoubtedly make for a healthier and more prosperous city, while also caring for our planet.

With our environment and lifestyles increasingly removed from nature, we now face the attention-depleting effects of urban living. Studies have confirmed that biophilic design could in fact remedy these drawbacks by reducing stress, enhancing creativity, expediting healing, and improving our wellbeing. If spending time in nature actually replenishes the attentional and cognitive resources that are depleted by urban environments, we can only hope that more of our cities will be moving towards greater green and blue spaces in the near future.

creative public seating, and multi-use open spaces present the opportunity for cooperative community events and socialization. Breeding this sense of belonging through engaging and inclusive spaces makes people feel safe and confident in order to thrive within their community and contribute to society.

Take for example the **Friendship Bench programme** in Zimbabwe. Following a number of atrocities in the country and the lack of healthcare professionals, grandmothers have taken to the park

**(** I cannot say exactly how nature exerts its calming and organizing effects on our brains, but I have seen in my patients the restorative and healing powers of nature and gardens. benches. With no previous experience in counselling, the community volunteers offer a listening ear to anyone struggling with their mental

— Oliver Sacks, Everything In Its Place

### Community — The seedbed for belonging and inclusion

People are the heart of cities. Urban spaces have the capacity to bring people together, and therefore should be striving to create social harmony in everyday life. Social interaction increases our feeling of belonging and helps us cope with life's challenges. **Urban design should** work to reinforce inclusion and foster a greater sense of community between people by facilitating natural and positive interactions. Creating pro-social spaces through walkable neighborhoods, health. Today, grandmothers are being trained in evidence-based talk therapy and have helped over 30,000 people. This unlikely solution to an enormous treatment gap has now been empirically vetted and expanded to other countries. Creating physical spaces that ignite creativity and intimacy can sometimes provide beautiful solutions.

A number of projects, organizations, and think tanks have put wellbeing at the forefront of their urban work. **Jonathan Rose Companies** is a mission-based real estate, urban planning, development, and investment firm with projects that support the wellbeing of communities by balancing opportunity between residents through mixed-income residential units and

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community spaces. Similarly, Denmark's visionary residential project, **The Future Sølund**, is transforming a nursing home into a multi-generation and neurodiverse community. These projects bring together a broad range of ages and backgrounds promoting close contact and learning between groups while immersed in urban gardens and multi-purpose spaces.

At a city-level, Singapore, the world's second-fastest ageing society, has prioritised friendlier public spaces such as community gardens where the elderly can relax and socialize, as a way to combat urban loneliness and the rising rates of suicide among older adults. Since 2017, the city has also freed-up plots of land for

people to farm together, fostering closer social bonds between all age groups. The island's Therapeutic Horticulture Programmes uses gardens filled with fragrant and edible plants to engage the senses. Suitable for people with dementia, therapeutic gardening has been shown to stimulate memory, encourage positive social interactions and connection with nature, as well as have a calming effect, lift moods, and instill hope in visitors. The horticulture intervention has proved successful in promoting psychological wellbeing of the elderly of Singapore, and not surprisingly, the success of the intervention was attributed to the positive relations that it fosters.



### Physical Activity — More cycling routes, less mega gyms

It is unquestionable that regular physical activity has been proven to help prevent and treat a variety of noncommunicable diseases both physical and mental. But in a world where gyms and fitness apps

have become commonplace, we seem to have, paradoxically, almost entirely removed physical effort from our day-today lives. Whether it be walking, cycling, sports or active forms of recreation, our spaces should be promoting the pursuit of everyday physical activity, and fortunately there are limitless possibilities for designing cities that do so. Encouraging active transport has already been prioritised in many cities as an opportunity to integrate movement into the setting in which people live, work, and play. Any visitor to Copenhagen or Utrecht will agree that well-connected sidewalks and safe cycling lanes are often more attractive modes of transport than driving. Copenhagen aims to be the world's best city for cyclists by 2025 by creating cycling routes separate from car traffic, connecting the entire city from the waterfront to the city centre with routes accessible and comfortable for all. In Utrecht, bikes now outnumber people and there are measurable benefits from their incentive; though the city spends a (whopping) 55 million dollars annually to build and improve bike facilities, the savings from reduced air pollution-related healthcare costs are estimated at 300 million dollars a year.

#### Studies have shown that the more greenspace available, the more physically active the people. Moreso, using the natural environment for physical activity weekly halves your risk of poor mental health. From China to Denmark, outdoor gyms have been springing up and providing opportunities for people of all ages, abilities, and incomes to

exercise. There are more than 600,000 pieces of outdoor equipment in China, and Copenhagen, a city with 600,00 inhabitants, has over 60 places equipped for outdoor training. Far from the fetishization of autonomous vehicles and flying cars, the ideal city would invest in smarter (and likely less-costly) solutions to our transportation challenges, integrating those with our need for physical exercise and social inclusion where possible. Things as simple as walking loops in parks, sports fields and running routes in low-income and minority neighbourhoods, and expanded cyclepaths go a long way when it comes to wellbeing.

### The Environment — Seeing the stars through the forest again

When was the last time you got a proper night's sleep? Not interrupted by wailing ambulances, honking cars or glaring street lights. Although we have somewhat unconsciously grown accustomed to eroded sleep patterns, the long-term damage it causes is significant. Sleep is an extremely important protective factor for good mental health and the quality of sleep experienced by being near the soothing sound of crashing waves or in the silence of the mountains, differs drastically from the man-made noise pollution characteristic of the city. What if sound sleep wasn't just limited to weekend getaways? Thankfully, there are plenty of solutions for making our urban centres more friendly to sleep and rest. Noise pollution can be kept out through improved building insulation as well as the use of plants and trees to dampen and filter out sound. Imagine a city that not only replaces old roads with smoother asphalt, but improves the soundscape quality of our spaces by using pleasant noises like running water to mask the sound of traffic.

In the same way that forests can shelter our minds, the night sky has long been a source of human wonder and exploration. We shouldn't forget the wonderful cosmic landscape just above us, and our cities should do more to protect it for the health and wellbeing of all living beings. Prioritising downward-facing street lamps and using warmer colour lighting versus blue-rich white lights would avoid poorly targeted and unnecessary glare. While **some cities** are already attempting to

> bring darker skies back, more tangible steps are needed towards protecting this vital, yet overlooked, natural resource.

As climate change has been a growing threat to our planet, it has also been a threat to our mental health. Feelings of anxiety, depression, and grief can arise from confronting the fact that the world is running out of time to limit the irreversible damage we are causing. We imagine a city that could address eco-anxiety through urban design choices -- creating energyefficient buildings, reusing and recycling waste energy and materials, and obtaining energy from cleaner sources. We should be living in



a city that is not only taking action to create change, but is also providing the opportunity for its inhabitants to do their part by supporting lifestyle changes compatible with their values.

#### As part of Singapore's Green Plan,

the island is planting 1 million trees to cut pollution, new diesel cars will be banned and the recycling infrastructure will be improved. In line with this vision, Singapore is creating its first smart and sustainable town, **Tengah**, known as a new eco-development of over 40,000 homes. At surface level, its centre is entirely car-free allowing more space for cycle routes, parks, and community farms. The energy efficient town will have smart lights switching off when no one is around and house a 100-metre-wide eco-corridor for wildlife to safely pass through. Human Nature is also envisioning the sustainable city of the future. As a development company and campaigning business, they aim to build and inspire a new generation of healthy and sustainable neighborhoods where people can live life within the planet's limits. Using investment and urban design, they are crafting places that stand the test of time while fostering diverse communities and resilient economies. These projects embody the concept of living amidst nature, as well as amongst each other, in harmony with our environment.

### Beyond visual peaks and through smellscapes

We know that cities can be taxing on our attention and can lead to cognitive overload due to constant stimulation. How could we use sensory inputs to nurture perception rather than swamp it with overload? Certain cities have cleared their streets of advertising in order to promote the health of their people and the environment. Sao Paulo was one of the first cities to ban urban billboards, digital signs, and advertising on buses, and several US states as well as the city of Chennai and Grenoble followed suit.

Although planners and urban designers mostly focus on how a place looks, sight is not the only sense through which we experience spaces. Conscious environments engage and evoke occupants at deeper levels and harmonize us with our surroundings. Through the design and placement of objects, urban form, and environmental characteristics, we can create areas of sensory stimulation that combine all our senses and impact our perception, emotion, and overall experience of wellbeing. They say smell is the garden of memory, and our memory is deeply intertwined with our emotions. Beyond the predominance of audio-vision determining practices of urban design, using smellscape to improve the sensory experience of our cities can create warm and pleasant feelings for its inhabitants. Our daily sensory encounters impact our wellbeing, and designing cities with senses in mind can enrich us in a purposeful way.

### Accessibility - Building a city that works for all

Nurturing cities would not just consider the needs of the young and dynamic - assuring their transportation and productivity, but would also consider the needs of its older adults, and particularly those with cognitive decline. As we age, we begin to exhibit substantial difficulty in our navigation abilities and memory, this is especially true for adults suffering from dementia. Alzheimer's disease causes a degeneration of the hippocampus, the region of the brain associated with spatial and episodic memories, causing people to experience disorientation. We must strive to understand which aspects of our urban spaces are most important for successful

We should promote urban design that reduces decision-making, reduces the need for wasted circulation, and makes streets comfortable and energetic, without being overwhelming. Advocating for roads with more right-of-way to pedestrians and features that make walking safer and more pleasant can address the needs of our aging population.

Recent studies have shown that **the neurodiverse population also differs in their navigation strategies**, adding to the already challenging experience of excessive crowds, lights, and noise found in cities. One project chose to create an inclusive and supportive space for convening, play, and healing to better service those with differing needs. **Restorative Ground** by WIP Collaborative was born from the COVID-19-related social

orientation and how these can be best positioned in order to create a more friendly environment for all. For example, by providing wayfinding guides that point to civic destinations and activities of daily living, and preserving traditional architecture and landmarks that have defined a place for generations.



isolation and the need for public spaces for both recreation and reconciliation. An installation in Manhattan's Hudson Square neighborhood, the project consists of a multifaceted landscape of exploration with a range of experiences and interactions between residents and the broader public. It fosters collective engagement using research about inclusive play spaces for people of all ages, backgrounds, and spectrums of neurodiversity. Using a range of colours, shapes, materials, and textures in order to distinguish between the focused, active, and calm experiential zones, it offers both high and low stimulation. This project responded to its community's needs and we can only hope our cities will do the same.

### The memory of place

We tend to project emotions, thoughts, and memories onto people and places, influencing how they make us feel. Like humans, **cities can bear wounds from traumatic events generating negative associations and impacting our mental map of those places**. Consider sites of suffering and loss such as the Berlin Wall and the World Trade Center Site in Lower Manhattan. Although the physical scars attributes of a place are important in understanding people's psychological response to their setting. A physically damaged environment has an emotional impact on its inhabitants and can instil feelings of insecurity, distress, horror, and vulnerability. A place that was once safe can now feel threatening.

Urban planning must strive to reconcile the city and their communities. The ideal city would consider areas where a traumatic event occurred and explore how urban design can contribute to reducing individual and public distress caused by that place. Designing with recovering features can transform a place of trauma into a place of healing. When individuals return to places with a history of pain and suffering, but which are now being cared for, the safe space can condition a new response, catalysing new memories and emotional attachments for its community. Such a designed environment provides stability and peace, finds reconciliation with the past and embraces the future, preserves sensitive memories and opens up the possibility for a new and nurturing spatial narrative to emerge. Both the Berlin Wall and Ground Zero were transformed into a memorial. These memorials are a powerful reminder that

## **(** Recovery can only take place within the context of relationships; it cannot occur in isolation.

we all, individually and as a group, have the potential to recover and rebuild.

Other locations may

not have been physically hurt by an event but could represent a space of distress, such as bridges or overpasses that

#### — Judith Lewis Herman

of these places are barely visible today, the history of the trauma lives on and can remain present for its visitors. Symbolic

have frequently been chosen to attempt suicide. Our Future Foyle, Urban Scale Intervention's first public health project, understands that the **spaces we use** everyday affect how we feel and think, impacting our health and our perception of a place. The Foyle Reeds project in Derry, Northern Ireland will transform the river Foyle and its bridge lining it with digital "reeds" that move in the wind and change colour. The sculptural installation will not only act as an innovative physical prevention barrier, but as a dynamic and colourful art installation changing the perception of the bridge for its community. Japan has some of the highest rates of suicide in the world, and while the subject still remains relatively taboo, the country has recently focused on suicide prevention through urban design. Installing physical platform barriers to prevent access to the train line has been shown to deter suicide attempts or draw attention to them, enabling others to press public panic buttons before the train approaches. A Japanese study suggested that installing soothing blue lights in train stations was associated with a reduction of suicides. Today, you can find blue light installations at a train crossing in Scotland, and at Gatwick airport train station.

The cities of the future need to be healthier, adapting and responding to human needs. We have considered how to develop better person-environment interactions through urban design in order to reduce urban stress, and improve our wellbeing. Interconnected land uses, biophilic design, non-motorized modes of transportations, and plenty of public and common open spaces foster and improve social capital. Providing restorative spaces for people to cross paths, play, learn, and cooperate with each other develops a sense of community and conviviality -- important ingredients for individuals to generate positive relations, feel a sense of autonomy, and reach their unique potential.

Designing such spaces presents an opportunity to improve our lives and it is imperative that we take action to do so. We have looked at the conditions in urban spaces needed for humans to thrive, and we have surveyed some of the most inventive approaches already taken to create planet- and people-friendly places. How can we implement these solutions and enable real change in order to ensure the wellbeing of future generations? How can we form better cities, so that they in turn, form better minds?

## Chapter III Harnessing the power of tech for healthier cities

e are deeply and intimately linked to our environment. We don't simply interact with our cities through work, transport and daily life -- we have a constant emotional experience in them. **The way cities are built has a powerful influence on mood and behaviour**. Simply put, the systems and forms of our cities influence how we feel. Our roads, buildings, neighborhoods, and parks are emotional infrastructure, and understanding the effect on the people who encounter them is key to finding ways to enhance urban health.

While we aspire to build resilient neighborhoods, well-connected places, and cooperative communities, have we truly understood what is required to create such spaces? Could it be that we must first capture the emotional experience in order to build the cities we dream of? And if so, how?

We believe in taking a bottom-up approach to uncover the causes and cures of bad design from the very people inhabiting those places. By using innovative technology in the form of wristbands and headsets, we can now objectively measure our emotions. Often used as a complement to psychotherapy or to learn meditation, we are imagining other applications for these devices. Measuring changes in emotional states as people move from one urban setting to another could provide insight into how people experience cities in real time.

Academic research already does fascinating work in this realm, yet it almost never reaches the people who plan and build public spaces, buildings, neighbourhoods, and cities. A major obstacle is the lack of collaboration between specialists. We hope to create longer-lasting relationships between startups and urban planners in order to inspire mindful design decisions and drive impactful change. We believe in creating a space for partnerships to emerge at the intersection of neuroscience, health, and urban design by sharing knowledge, increasing cross-sector collaboration, and motivating action.

Significant investments have already been made to design healthcare facilities in ways that improve health and help recovery. These refined treatment spaces contribute to healing and broaden the therapeutic benefit of the facility. Collaboration between designers and healthcare professionals in treatment spaces may seem evident, but how about extrapolating this approach to the wider built environment in order to understand people's lived experience and create solutions accordingly?



## Measuring wellbeing

Human beings are emotional creatures. Our emotions motivate and activate us. Emotions are key drivers of many of our decisions, especially those involved in our behaviours and experiences around wellbeing and health. They signal to us what we like or dislike, both consciously and unconsciously. Adding an emotional dimension to urban analysis using psychological data provides a new opportunity for urban research.

So much of our behaviour is already being studied. Our private information is being collected and used, sometimes unknowingly, in order to distract us, misinform us, and even manipulate us. At our worst, we have used it for predatory marketing purposes, to push political agendas, and to target and discriminate against groups. A huge case is to be made for diverting the end goal and using data for good.

### How we experience urban life: subjective experience

While we accept that our overall wellbeing is affected by our built environment, there are currently few studies that focus on the momentary subjective wellbeing in relation to urban space. Subjective wellbeing, commonly known as emotional states, refers to how people experience and evaluate their lives, which varies over time and place. Places are interconnected with our emotions, and every experience of a location can evoke them.

Subjective measures such as questionnaires, diary entries, and smartphone prompts allow us to collect self-reports of behaviour, cognition, or emotions in near real-time in the daily lives of participants. Reporting feelings as they occur in a natural environment minimizes certain biases as well as the incidence of coinciding with social norms. The World Happiness Report relies on city dwellers' self-evaluation of the quality of their lives and how happy they perceive themselves to be. This kind of bottom-up approach gives the population a voice on the factors they believe matter most to them. Smartphones can be a rich source of self-reported data about urban space, and a number of projects have been involved more specifically in collecting and using this information to improve mental health in their cities. Over the years, large amounts of data regarding transport in cities have been collected and analyzed. More recent studies looked at pedestrians and attempted to measure their wellbeing in relation to their surrounding environment.

The **LondonMood Project** was designed to look at the relationship between mood and the physical environment of different neighbourhoods in London. This appbased project collected data by prompting its users to answer certain questions about their current subjective experience and their current surroundings. Similarly, the Urban Mind app measured participants' experiences in both urban and rural environments in order to determine how these spaces are affecting mental wellbeing as people go about their daily lives. Requesting momentary assessments of the participants' environment -- "Can you see trees?", "Can you hear birds singing?"

### How we experience urban life: objective measures

Today, objective measures of emotion are also available. Technology such as wristbands, eye tracking devices, or EEG headbands are making it possible to capture biomarkers such as heart rate variability, gaze patterns, skin temperature, tone of voice, and breathing patterns outside of the lab. In order to complement subjective self-report measures, which are known to be prone to bias, these indicators provide insight into our physiological arousal and wellbeing -simply by wearing a digital device.

In one study, the **Urban Brain Lab** was interested in the connection between social and neurological lives of urban citizens, with a focus on mental health. The researchers used a mobile EEG to record and analyse the emotional experience of people walking in different urban environments. **The Urban Realities Laboratory** used both subjective and objective measures, as well as immersive virtual reality to study how our bodies and minds respond to different environments. In order to track the way we think and feel about them, participants were asked questions while they moved through virtual spaces. Measures of their skin conductance were taken, reflecting **bodily signals associated with stress and arousal**.

Not only did the results of these studies consistently demonstrate the restorative effects of green-spaces and the high stress levels due to overstimulation of cities, but the data also provides evidence that could inform future investments and policies. While these were informative but momentary studies, we wonder, how can we continue to operationalise new technologies emerging from startups to inform urban design and planning? How can we drive transformative change?

### Mindful cities harness the power of innovation and collaborative action

The barriers to building healthy places are known. However, few studies have paid attention to the solutions conceived by planners to overcome these obstacles and integrate healthy principles into the built environment. The Royal Town Planning Institute responded to the call for evidence and conducted a large research study to fill that gap. A few of their key findings reflect what we believe is needed to bring change and take action: harnessing the benefits of digital innovation, engaging the communities, and supporting cross-sector collaboration.

The use of activity trackers worn during exercising, such as the Apple Watch and the Fitbit, is ubiquitous. The wearable device trend is now making its way into the mental health market with Al-driven startups looking to help people track and monitor their emotions and behaviours. InteraXon created a wearable EEG headband, Muse, that senses your brain activity and translates it into signals that help people learn to meditate. Somatix developed a real-time gesture detection technology that monitors your behaviours, identifies irregularities, and offers incentives to support desired changes. The Feel wristband coupled with a smartphone app, developed by Sentio Solutions identifies your emotions by measuring skin electricity conductance, heart rate, and temperature, which are translated into notifications to help you regulate your internal states.

Several of these startups have partnered with employers, hospitals, and healthcare plans. Some wearable tech has even been used in public spaces to analyse people's emotional reactions to advertisements on large billboards. If the experience of urban life can now be measured within our bodies and minds, could this not provide an opportunity to contribute to psychologically sustainable cities?

We believe that to best adapt our spaces to people's needs, the planning

process should accommodate residents' experiences and opinions using a quantitative approach to measure wellbeing. The data collected by these wearable devices could allow us to understand the way people feel while they navigate their cities, including which features of the urban surroundings are positively or negatively impacting our brains. Through partnerships with urban planners and policymakers, we could design with a better understanding of the human experience in mind and continuously improve the exchange between the environment and its occupants.

Not only could this information influence urban planning, but it could also be used to measure the success and impact of interventions. As was revealed in the **Design Council Healthy Placemaking Report**, there is a need to focus on evaluation, review, and learning based on what has worked in the past. Two EU-led urban planning projects, euPOLIS and HEART, both incorporate nature-based solutions into city landscapes with the aim of creating sustainable and healthy environments to improve public health and wellbeing. Through a partnership with Feel, the emotion sensor wristband will be used to assess the impact of the interventions of these projects by monitoring participants' emotional state through bio-signals. Based on the data collected, policy makers will identify the most effective interventions to be implemented in cities. The city interventions could be included into Feel's intervention roadmap, too. When the

wristband identifies real-time changes in the user's body, the notifications could not only suggest a breathing exercise, but could now include a visit to your nearest park, or a walk in a certain restorative area of the city. These examples of crosssectoral projects involving government bodies, tech companies, and academic institutions are demonstrating the potential of multidisciplinary collaboration.

Even closer to our vision lies the EUfunded **eMOTIONAL Cities project**. The international and multidisciplinary consortium includes 12 partners working on a four-year, and nearly €5 million project. With the knowledge that urban spaces generate emotions, the project focuses on providing scientific evidence on how the built environment shapes the neural system underlying the way we think and feel. Leveraging neuroscience and technology with both subjective (smartphone surveys) and objective (fMRI, EEG) measures, this research will create a spatial analysis toolbox for urban health, hoping to shed light on how to design spaces that trigger positive emotional responses. These are undoubtedly steps in the right direction.

## In conclusion

We have seen how our current built environment and infrastructures across cities are no longer fit for today's needs. This lack of congruence is urging us to develop closer contact and exchanges between urban planners, architects, psychologists, and neuroscientists. By combining forces, we can not only further our understanding of people-place interactions, we can adopt a systems approach to drive interventions that would better our urban spaces. We can keep up with the rapid rate of urbanization and the proliferation of technologies and we can turn evidence into policy, and policy into action.

As urban loneliness rises and our cities become more densely populated, building for communities that support humans' basic needs and wellbeing must become the new minimum standard. The way we design our built environment has a strong effect on how we treat other people. Natural exchanges and experiences of conviviality among strangers trigger feelings and actions that are more altruistic and cooperative. This is just the kind of frame of mind we need to deal with the pressing issues of today's urban life -- poverty, inequity, climate change, to name but a few. These challenges demand cooperation, how can we expect to solve them feeling isolated and disconnected?

We must demand our planners, architects, and developers to build differently. To build mindfully. To build placing physical and mental health above traditional measures of efficiency. To build leveraging science and innovation. For happier and healthier citizens.

