Why the outsides of buildings matter to human health: a global evidence review

Executive summary

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Overview

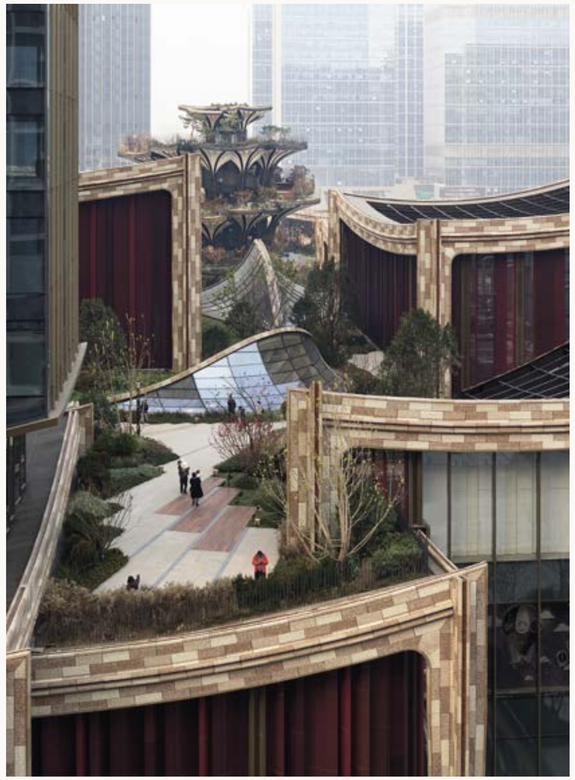
The shape of our cities is shaping us

As more of our world migrates to cities, buildings are shaping far more than the skyline. From the form of façades to the rhythm of streetscapes, a growing body of evidence reveals that the built environment is not just a backdrop to urban life. It is an active force, shaping how people feel, function, and connect.

This executive summary presents findings from a global evidence review: the first of its kind to comprehensively evaluate, integrate and translate findings across a wide range of research on how the external design of buildings affects human health and wellbeing.

Commissioned by Humanise, the global evidence review explores why the outsides of buildings matter inside of us: regulating stress, guiding attention, sparking memory, and influencing mood, physiology, and behaviour in ways we are only beginning to grasp.

Synthesising over 80 recent studies spanning neuroscience, cognitive science, environmental psychology, place-based studies, and urban design, it demonstrates the measurable impact of façades in shaping body, mind and behaviour, with actionable insights to shape the future of our cities.



An evidence base for action

From fragmented findings to thematic insight

Interest in how building exteriors affect human health and wellbeing is growing — but the research remains scattered across disciplines. The global evidence review synthesises the emerging science into a unified thematic framework: identifying areas of promise and building systematically from impacts on the brain and body to emotional and social effects.

Organised by eight themes — physiological stress, visual complexity, nature-based features, spatial orientation, street-level design, place attachment, sensory experience, and enriched environments — it connects research to practice, and creates insight for action.

This Executive Summary summarises key findings from the global evidence review. It then offers practical insights for all those concerned with the health of people and cities: architects and designers, developers, researchers, planners, city leaders, clients, investors, and communities.

Presented at the 5th Seoul Biennale of Architecture and Urbanism, we hope it sparks a global conversation on why radically human buildings matter, and how they might be designed, developed and supported.

The goal is simple but urgent: to rehumanise our buildings and positively shape the cities that are shaping us — not only to support health and wellbeing, but to embed an ethics of care in how we build, now and for future generations.

Read the full global evidence review at: humanise.org

Cover image: Iwan Baan

Xi'an Centre Culture Business District, Xi'An, China (2024) by Heatherwick Studio. Image: Qingyan Zhu

Eight core findings

1. The shape of buildings affects stress levels
2. Visually engaging buildings help us think and feel better
3. Natural features boost mood and reduce mental strain
4. Distinctive buildings help people find their way
5. Street-level design shapes how we feel and connect
6. Buildings with character create a sense of belonging
7. We experience buildings through our whole body
8. Welcoming design supports wellbeing

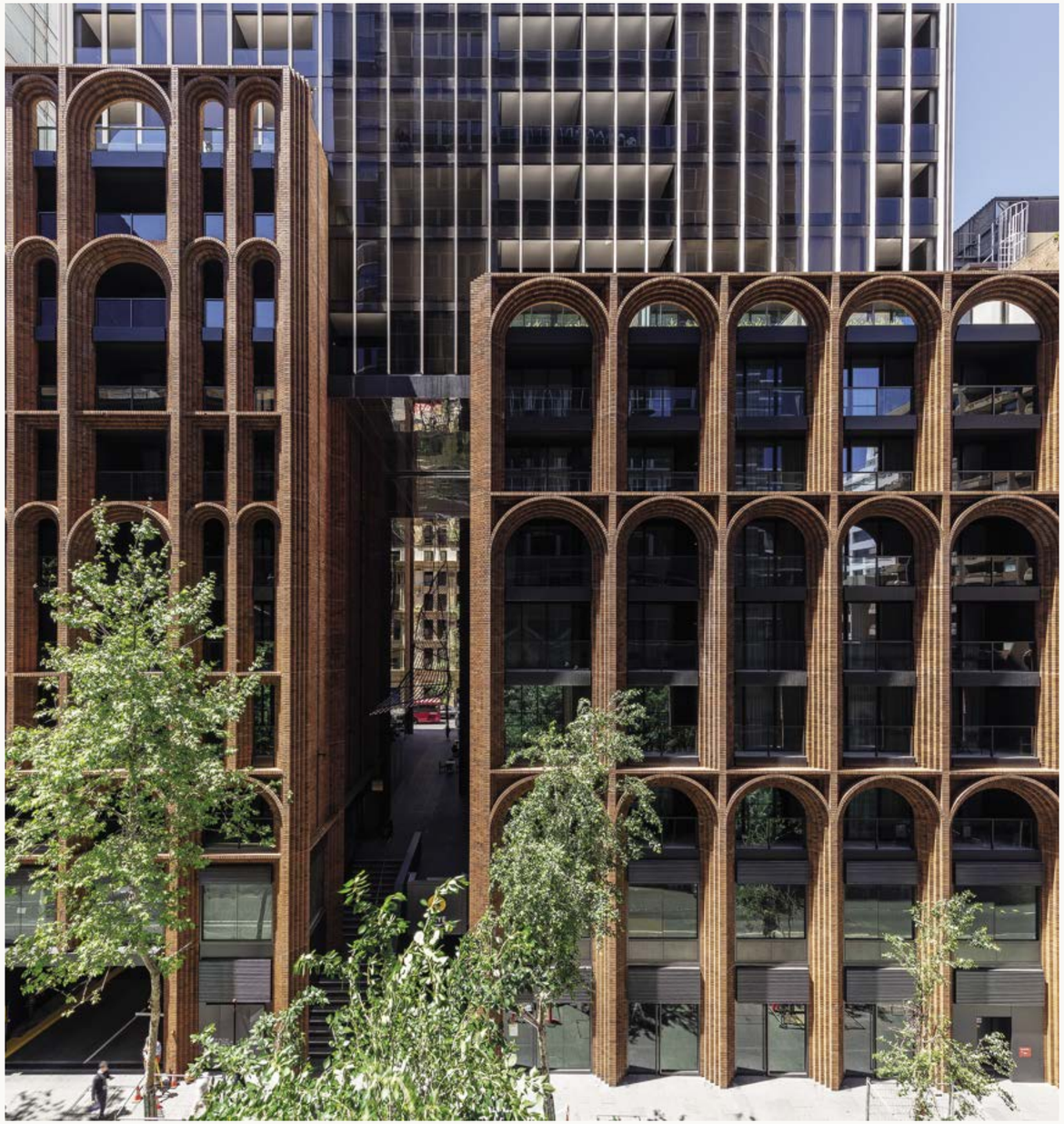
Core findings

1. The shape of buildings affects stress levels

Our bodies respond to buildings — often before we're aware of it. Research shows that long, blank walls or harsh, repetitive façades can trigger stress responses such as elevated heart rate, skin conductance, and visual fatigue. Over time, repeated exposure to monotonous environments may even contribute to chronic stress. In contrast, buildings with variation, rhythm, and human-scale features help us feel calmer and more at ease. Key design factors — like curvature, openness, and proportion — can reduce sensory strain and support wellbeing. These effects are real-time and measurable.

Research sources include:
Le, A.T.D., Payne, J., Clarke, C., Murphy, K.A., Prudenziati, F., Armsby, E., Penacchio, O. & Wilkins, A.J., 2017. Discomfort from urban scenes: Metabolic consequences. Valentine, A., Munoz, A. & Serrano, F., 2025. Architecturally Mediated Allostasis and Neurosustainability: A Proposed Theoretical Framework for the Impact of the Built Environment on Neurocognitive Health. Brain Sciences, 15(2), 201; Srikantharajah, J. and Ellard, C., 2025. The physiological and psychological impact of boring buildings: Field studies of the effects of architectural façade complexity. PsyArXiv. Landscape and Urban Planning, 160, pp.61–68.

Amsterdam, Netherlands. Image: Pexels



Core findings

2. Visually engaging buildings help us think and feel better

Our brains are wired to respond to certain patterns — symmetry, rhythm, texture, and variation — especially those found in nature. When buildings reflect these patterns, they're easier to process and more emotionally engaging. Eye-tracking studies show we're naturally drawn to façades with depth, detail, and human-scale features. These designs reduce visual strain, support orientation, and create a sense of ease. Too much monotony or chaos, by contrast, makes buildings harder to interpret. Visually rich, coherent façades don't just look better — they help us think more clearly, feel more grounded, and move through the world with less mental effort.

Research sources include:
Coburn, A., Vartanian, O. & Chatterjee, A., 2020. Buildings, beauty, and the brain: A neuroscience of architectural experience. Journal of Cognitive Neuroscience, 32(4), pp. 581–591; Rosas, H.J., Sussman, A., Sekely, A.C. & Lavdas, A.A., 2023. Using eye tracking to reveal responses to the built environment and its constituents. Applied Sciences, 13(21), p.12071; McAdams, P., Svobodova, S., Newman, T.-J., Terry, K., Mather, G., Skelton, A.E., et al. (2025). The edge orientation entropy of natural scenes is associated with infant visual preferences and adult aesthetic judgements. PLoS ONE, 20(2), e0316555.

ARC, Sydney, Australia, by Koichi Takada Architects (2018). Image: Martin Siegner

Core findings

3. Natural features boost mood and reduce mental strain

Even subtle traces of nature on building façades — leaf-like patterns, curved forms, green walls, or organic textures — can reduce stress and improve mood. Research shows that these “biophilic” elements support mental restoration and emotional balance, especially in dense, built-up areas. Such features appear to engage the brain’s attention systems effortlessly, helping to calm the body and ease mental fatigue. From visual complexity to fractal geometry, nature-inspired design reduces cognitive strain and fosters wellbeing. These effects are both psychological and physiological — benefiting mood, focus, and stress regulation.

Research sources include:
Brielmann, A.A., Seresinhe, C.I., Reber, R. & Leder, H., 2022. Fractal aesthetics: Physiological and attentional responses to nature-inspired geometry. Psychological Aesthetics, Creativity, and the Arts, 16(2), pp.245–258; Lavdas, A., 2024. Emotional and visual engagement with biophilic architecture: A wearable eye-tracking study. Journal of Environmental Psychology, 88, p.102062; Valtchanov, D. & Ellard, C., 2015. Cognitive and physiological responses to natural and urban environments. Journal of Environmental Psychology, 43, pp.10–17.

ParkRoyal Hotel, Singapore by WOHA (2013). Image: Pexels

Core findings

4. Distinctive buildings help people find their way

Distinctive façades do more than stand out — they help us navigate. Visual features like contrasting materials, textured surfaces, and recognisable entrances make buildings easier to spot, remember, and mentally map. In complex or unfamiliar areas, well-designed exteriors act as visual anchors, improving orientation and reducing disorientation. Studies show that such landmarks engage brain systems involved in memory and spatial awareness. When façades are too repetitive or indistinct, wayfinding becomes harder — especially in dense developments. Clear, characterful architecture supports not only personal navigation, but a shared sense of place, helping people feel more grounded, confident, and connected as they move through cities.

Research sources include:
Gregorians, M., Kim, J. & Frith, C., 2025. Spatial encoding in the urban brain: Neuroimaging responses to façade complexity. Cognitive Urban Studies, 3(1), pp.23–40; Maestre, R., Lee, S. & Bratman, G.N., 2025. Imageability and wellbeing: A systematic review of spatial legibility in urban design. Journal of Environmental Psychology, 90, p.102145; Rounds, J.D., Biel, A. & Chatterjee, A., 2020. Brain dynamics of architectural navigation: Theta-band responses to façade distinctiveness. Neuropsychologia, 148, p.107633.

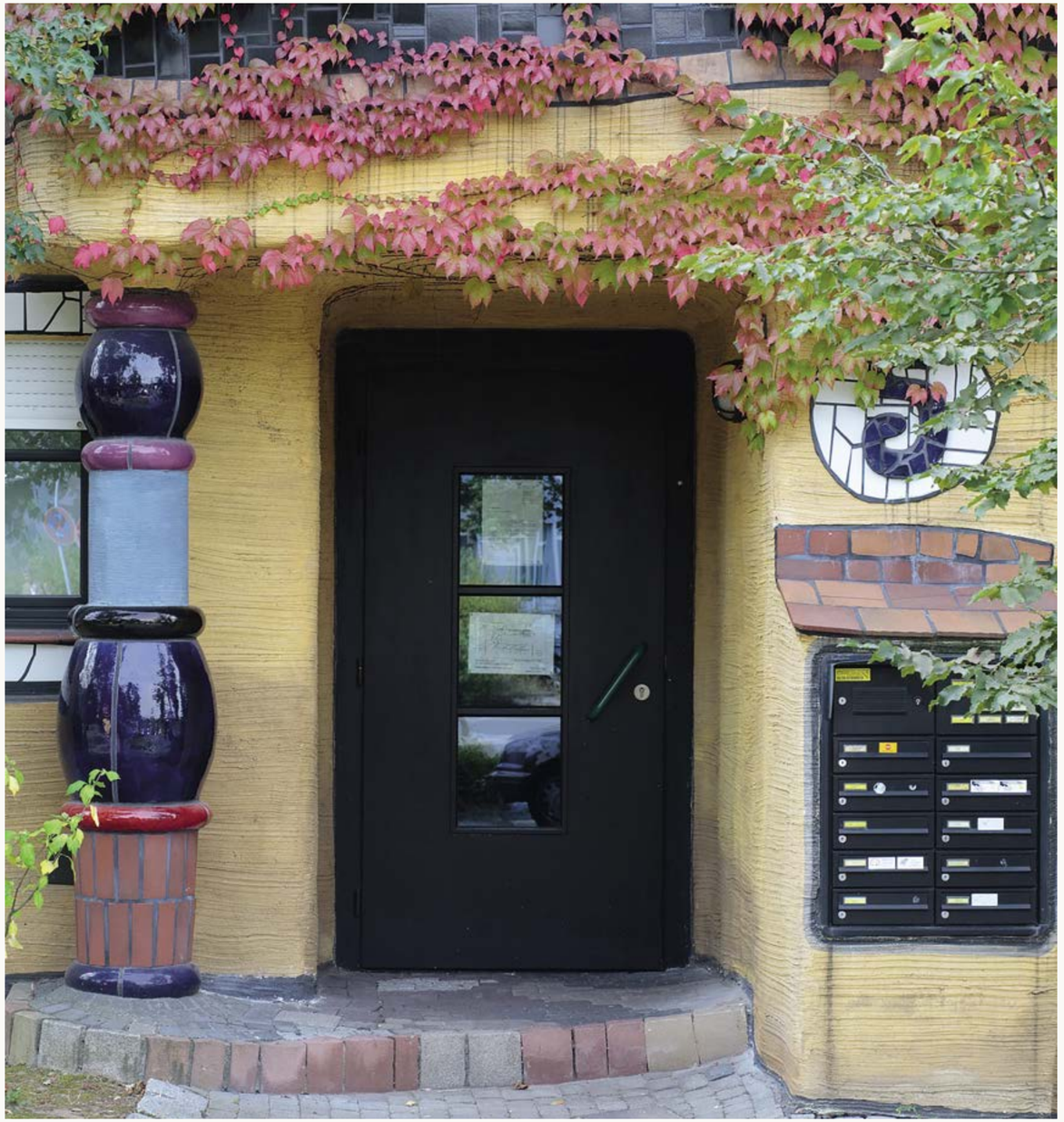
The Exchange, Sydney, Australia, by Kengo Kuma and Associates (2016). Image: Martin Mischkulnig

Core findings

5. Street-level design shapes how we feel and connect

How a building meets the street has a powerful impact on how we experience public space. Textured materials, transparent glazing, greenery, and signs of life at eye level make streets feel more welcoming, safe, and socially engaging. These human-scale details encourage people to pause, interact, and feel at ease — especially in dense urban areas. Studies show that well-designed façades can reduce stress, support emotional regulation, and promote prosocial behaviour. By contrast, visually monotonous or blank ground-level façades are often associated with feelings of discomfort, indifference, or disconnection. Street-level architecture doesn't just shape footpaths — it shapes how people relate to one another in public life.

Research sources include:
Suurenbroek, F. and Spanjar, G., 2023. Neuroarchitecture: Designing High-rise Cities at Eye Level. Rotterdam: nai010 Publishers; Zumelzu, A., Ortega, P. & Reyes, M., 2024. Colour, material, and emotion in urban streetscapes: A field study in southern Chile. Environment and Behavior, 56(2), pp.156–175; Ellard, C., 2020. Neuroscience, wellbeing, and urban design: Our universal attraction to vitality. Psychological Research on Urban Society, 3(1), Article 9.



Waldspirale, Darmstadt, Germany by Heinz Springmann (1990s). Image: Norbert Nagel

Core findings

6. Buildings with character create a sense of belonging

When building exteriors reflect care, craft, or cultural identity, they help people feel emotionally connected to place. Eye-level features — like texture, transparency, greenery, and visible signs of life — can foster comfort, pride, and community connection. These façades support not just individual wellbeing, but social interaction and a sense of welcome. In contrast, blank walls or closed-off buildings are linked to discomfort and stress. Research shows that thoughtful, human-scale design encourages people to linger, engage, and feel at home — especially in dense cities. Buildings with character don't just shape streets — they help shape the emotional bonds that hold communities together.

Research sources include:
Madgin, R. & Lesh, J. (eds.), 2021. People Centred Methodologies for Heritage Conservation: Exploring Emotional Attachments to Historic Urban Places. Routledge; Weinberger, A.B., Christensen, A.P., Coburn, A. and Chatterjee, A., 2021. Psychological responses to buildings and natural landscapes. Journal of Environmental Psychology, 77, p.101676; Ariannia, N., Naseri, N. and Yeganeh, M., 2024. Cognitive-emotional feasibility of the effect of visual quality of building form on promoting the sense of place attachment Frontiers of Architectural Research, 13(1), pp.37–56.

Casa Milà, Barcelona, Spain by Antoni Gaudí (1912). Image: Thomas Ledl

Core findings

7. We experience buildings through our whole body

We don’t just see buildings — we sense them. As we move past a façade, the play of light, texture, rhythm, and material detail can spark memory, emotion, and atmosphere. Research shows that features like porches, balconies, decorative thresholds, and cultural motifs help foster a sense of familiarity and belonging. These sensory cues can be especially meaningful for children, older adults, and others closely tied to their local environment. When façades show care, continuity, or character, they become more than surfaces — they become emotional anchors. Architecture lives in the body as much as in the eye, shaping how we feel, moment by moment.

Research sources include:
Djebbara, Z., Fich, L. B., Petrini, L., & Gramann, K., 2019. Sensorimotor brain dynamics reflect architectural affordances. Proceedings of the National Academy of Sciences of the United States of America, 116(29), 14769–14778; Heft, H., 2024. The ecological approach to perceiving and the dynamics of environmental esthetics: A research agenda. Ecological Psychology, 36(3), pp.183–209; Ruzzon, D., 2022. Tuning Architecture with Humans: Neuroscience Applied to Architectural Design. Milan: Mimesis International.

The Richard Gilder Center for Science, Education, and Innovation, New York, US by Studio Gang (2023). Image: Zeete

Core findings

8. Welcoming design supports wellbeing

Buildings that invite curiosity, comfort, and connection — through texture, detail, and form — do more than please the eye. They support emotional wellbeing. Research shows that environments with sensory richness, spatial variation, and human-scale design can reduce anxiety, boost mood, and support cognitive health. These façades offer what some researchers call “architectural generosity”: they engage our senses and create space for delight, dignity, and ease. This isn’t about decoration — it’s about care. When buildings are designed with empathy and meaning, they help people feel safer, more resilient, and more alive in the spaces they move through every day.

Research sources include:
Farrow, T., 2021. Constructing Health: How the Built Environment Enhances Your Mind’s Health. Toronto: Farrow Partners; Magsamen, S. & Ross, I.E., 2023. Your Brain on Art: How the Arts Transform Us. New York: Random House; Ruggles, D.H., 2018. Beauty, Neuroscience & Architecture: Timeless Patterns and Their Impact on Our Well-Being. Layton, UT: Gibbs Smith.

Azabudai Hills, Tokyo, Japan, by Heatherwick Studio (2023). Image: Raquel Diniz.

Conclusion

The global evidence review points to a simple but powerful insight: how buildings look and feel on the outside affects how people feel on the inside.

Materials, scale, rhythm, and detail don't just shape appearance — they shape experience. Research shows that façades influence stress, mood, attention, wayfinding, and social connection. Buildings that lack variation, distinctiveness, or human-scale features can quietly contribute to discomfort and disorientation. By contrast, façades with rhythm, texture, openness, and nature-inspired patterns foster feelings of safety, clarity, and delight — responses grounded in how our brains and bodies are wired to interpret the world around us.

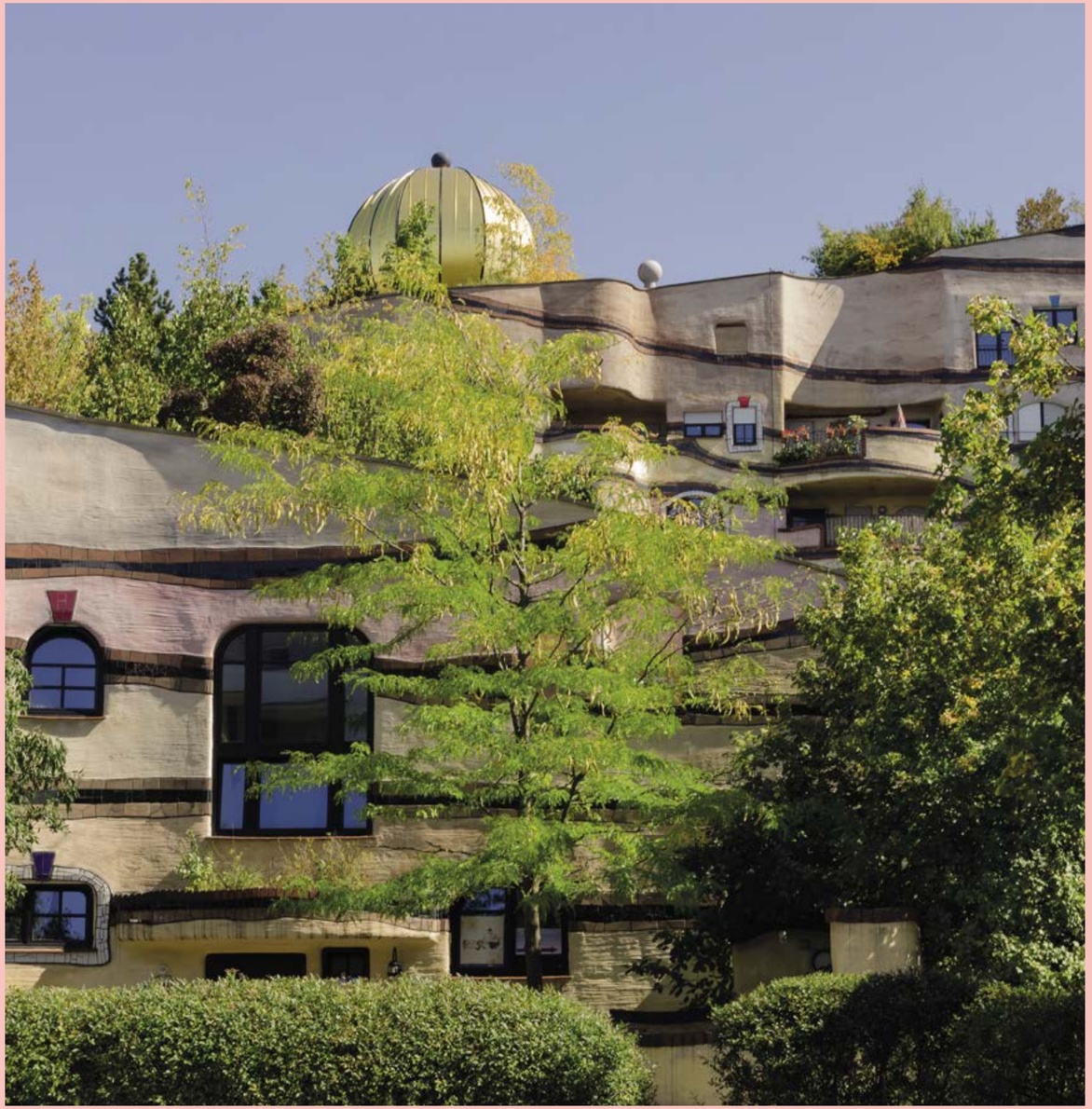
These findings make a compelling case for treating façade design not as an afterthought, but as a public health opportunity — a tool for supporting emotional wellbeing, cognitive clarity, and community connection.

This shift also calls for shared responsibility — an ethics of care in how we design. Researchers, designers, developers, investors, city leaders, and communities all have a role to play in creating environments that are not only functional, but emotionally supportive and psychologically attuned.

Just as building codes protect physical safety, emerging science makes the case for safeguarding mental and emotional wellbeing as well.

Finally, the findings of this global evidence review reflect a core value and aim of Humanise: that architecture should lift us up. It should be joyful, meaningful, and radically human. **We now have the evidence to create buildings that help people feel good, connect more easily, and thrive in everyday life.**

Human beings need human buildings.



Waldspirale, Darmstadt, Germany by Heinz Springmann (1990s). Image: Norbert Nagel

Recommendations

For architects, designers, developers, investors, and planners

1. Recognise the health impact of building exteriors

Understand the impact of façades and streetscapes on stress, emotional wellbeing, and social behaviour, and embed these insights into design, policy, and planning frameworks.

2. Design for visual richness, human scale, and openness

Encourage building exteriors that feel welcoming and alive — through varied materials, open entrances, and detail at eye-level — because these elements can be shown to support trust, comfort, and public life.

3. Address design inequality as a public health issue

Character and detail should not be a privilege. Poor or monotonous design in underserved communities must be recognised and addressed as a matter of equity and wellbeing.

4. Use emerging tools to predict impact before you build

Leverage technologies like vr, mobile eye-tracking, and biometric simulations to understand how buildings will feel in use — reducing risk and improving outcomes from the start.

5. Reclaim design aesthetics as a public value

The sensory and visual quality of buildings is not decorative — it's integral to their function. Design that supports emotional wellbeing and social connection delivers lasting value to people and places.

For researchers and funders

1. Prioritise real-world, multisensory research

Support studies that go beyond lab settings. Mobile EEG, VR, and field-based methods offer new ways to capture how people actually experience buildings in motion and in context.

2. Link physiology with personal experience

Combine biometric data like EEG and heart-rate variability with self-reports and behavioural insights to understand how façades influence attention, memory, and emotion, both consciously and unconsciously.

3. Build a shared framework across disciplines

Support the development of common language and theory that bridges neuroscience, design, and psychology so that insights can be applied more effectively in real-world practice.

4. Use predictive tech to revisit core design features

Harness AI, machine learning, and image-based tools to evaluate how elements like symmetry, rhythm, and proportion affect wellbeing and can guide design from the start.

5. Standardise how impact is measured

Develop consistent protocols for measuring and reporting design effects to strengthen the evidence base and make findings easier to compare, replicate, and scale.

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The author, Dr Anna Kim, Senior Research Lead at Humanise, is solely responsible for its content.

This executive summary is being presented at Emotional City, a global conference at City Hall in Seoul on the 27th-28th September 2025 for the 5th Seoul Biennale of Architecture and Urbanism.

Read the full global evidence review at:
humanise.org

About Humanise

The Humanise campaign is sparking a global movement calling for more joyful, engaging and human buildings and cities. Inspired by Thomas Heatherwick's book *Humanise: a maker's guide to building our world*, the campaign shines a light on how dull, soulless buildings are bad for our brains, our economy, and the planet – and how what surrounds us can shape us, connect us, and bring us joy. Because human beings need human buildings.

Find out more and join the movement at:
humanise.org

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