

Streets, emotions and the brain:

How neurourbanism can help design better walking environments

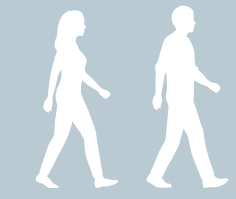
Mobilitet 2025

Lisa Marie Brunner, PhD Candidate, NTNU



Photo: Unsplash, Arvid Malde

Walking & the built environment



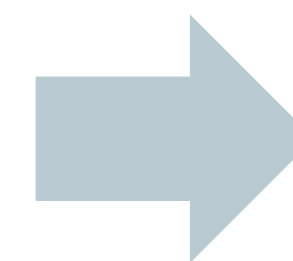
Interactive or passive



Rich in sensory experience or boring



- human scale
- 5km/h architecture
- engaging environments encourage to walk and stay
- variety in facades, mixed-use, transparency, etc.



streets that are designed for people and their perspective

Arkitekturopprøret



Dette er kåret til Norges styggeste nybygg

Årets styggeste og peneste nye bygg er kåret ved Arkitekturopprørets avstemning.



Hvorfor er norske bygg så fargeløse?

Sort, hvitt og grått. Det preger mange bygg i Norge i dag. Hvor ble fargene av? 🎨

Articles: NRK



MUSEET: Museet har et bruttoareal på om lag 55 000 kvadratmeter. Utstillingsarealene utgjør 13 000 kvadratmeter, hvorav museets signatur Lyshallen er på 2400 kvadratmeter, er 133 meter lang og har en høyde på syv meter under taket, ifølge snl.no Foto: Rodrigo Freitas (NTB)



(1) Photo: Iwan Baan, Nasjonalmuseet; (2) Screenshot from Google Street View, Dokkveien, Oslo Nasjonal



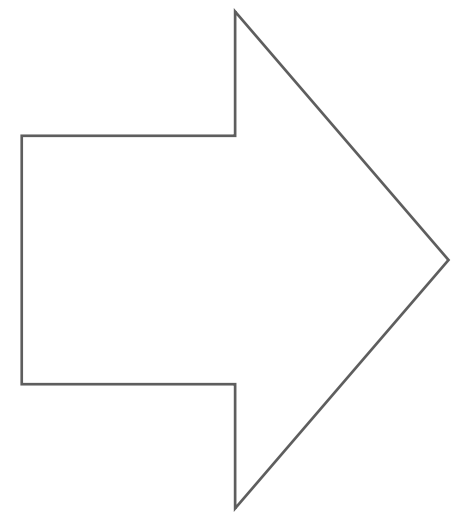
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(1) Photo: Laura Stamer, The Black Diamond Copenhagen; (2) Video from pedestrian perspective



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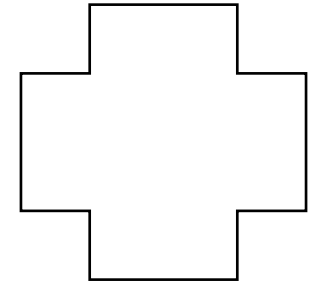


Evidence-based planning

TRANSPORTATION

URBAN DESIGN & PLANNING

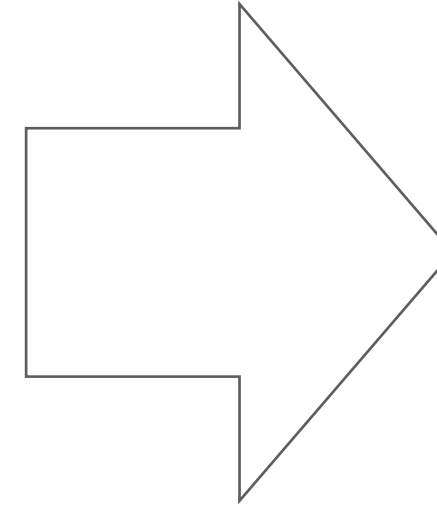
ARCHITECTURE



NEUROSCIENCE

ENVIRONMENTAL PSYCHOLOGY

PHYSIOLOGY



NEUROURBANISM

NEUROARCHITECTURE

NEUROTRANSPORTATION

Researching the built environment:

- experiences and perceptions
- preferences
- emotions
- health and well-being
- behaviour
-

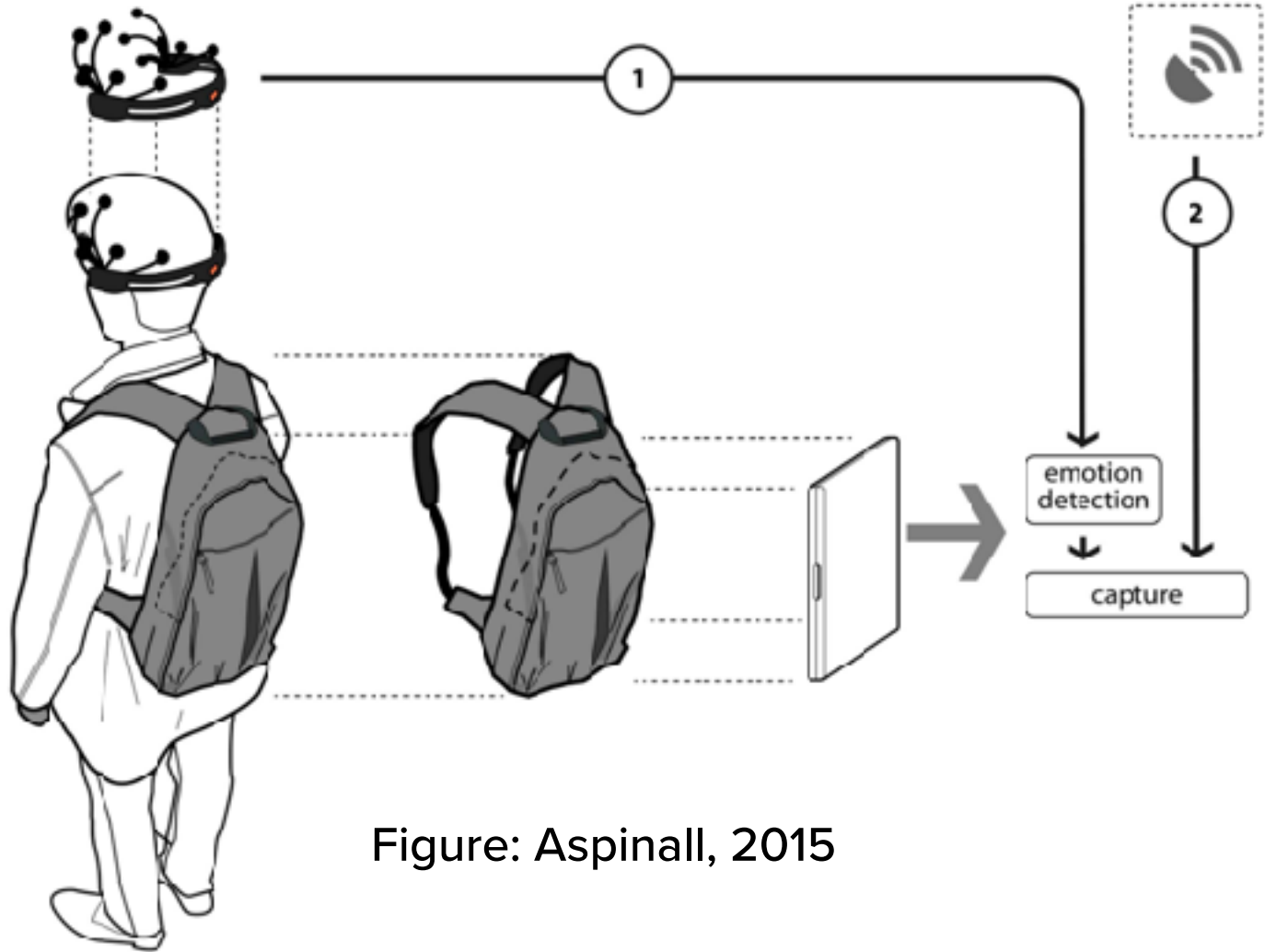
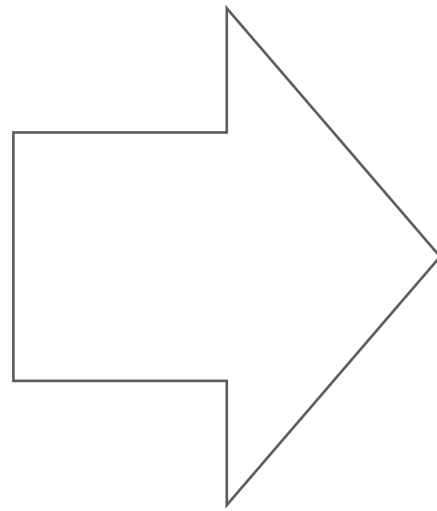
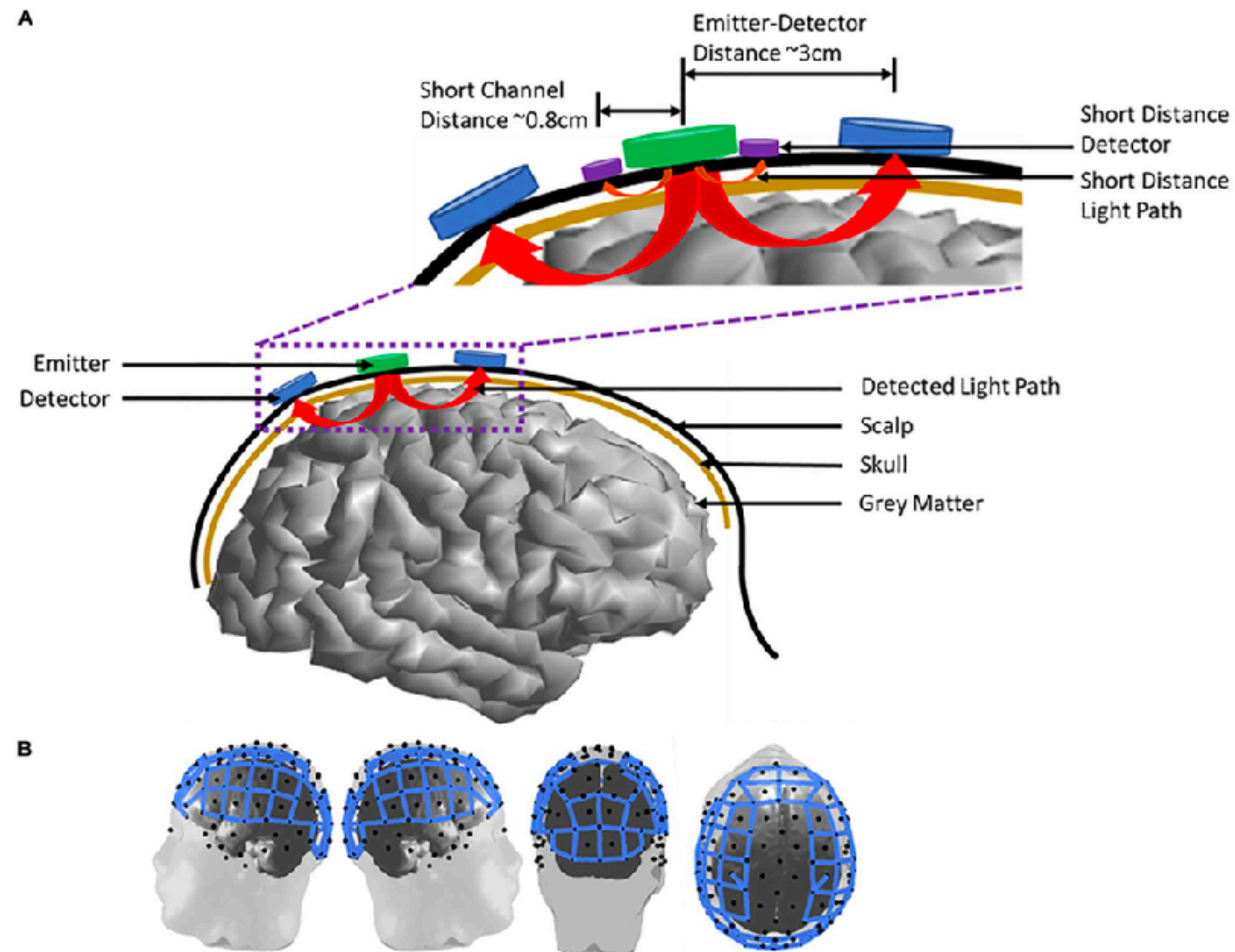


Figure: Aspinall, 2015

NEW BRAIN MEASURING METHODS... SUCH AS FUNCTIONAL NEAR-INFRARED SPECTROSCOPY (FNIRS)



- non-invasive technique that uses near-infrared light to measure variations in oxygen levels (hemodynamic response)
- Enables research of, for example, sensory processes, emotional responses, cognitive load, and perception
- Mobile application possible, robust against motion artifacts
- More affordable than other brain imaging techniques
- Possible to combine with other sensors, eye-tracking etc

Figure: Chen et al. 2020



On-going research: walking environments and their effect on emotions & brain



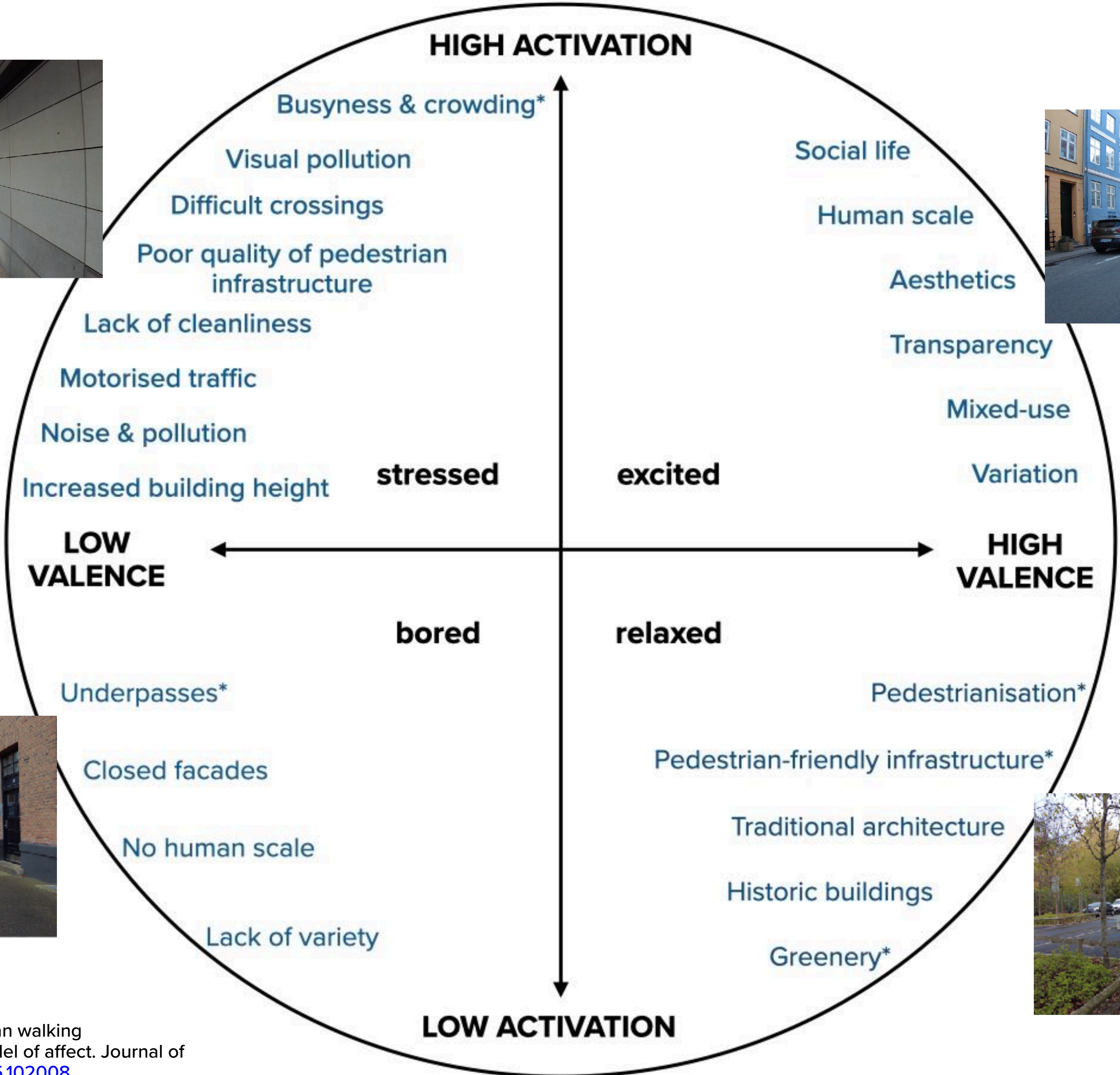
moving traffic and proximity to busy street, monotonous, closed facades, little variation in the environment, underpass



high transparency and variation in surroundings and facades, mixed use, cafes, and little traffic

On-going research: complexity of facades and their effects on the brain





Brunner et al., 2025: Emotional experiences of urban walking environments: an application of the circumplex model of affect. Journal of Transport & Health, <https://doi.org/10.1016/j.jth.2025.102008>

THANK YOU!

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