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NON-VISUAL RESPONSE TO (DAY)LIGHT IN OFFICE BUILDINGS

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OBJECTIVES

To test whether the non-visual system may constitute a dominant driver for determining the quality of lighting conditions in an office building, and how it seems to interact with visual factors. Ultimately, to develop a rational scientific basis to assess good human-centric lighting, and to provide an adequate balance between visual and non-visual response in office buildings.

OVERVIEW

Few models are currently available to embed non-visual lighting in a design decision-making process beyond the ability to compare how effective different sources are expected to be generating non-visual effects. One model has been proposed that goes beyond this approach and attempts to address non-visual lighting in a design context, called the non-visual Direct Response model (**nvRD**) (Amundadottir, 2016), developed alongside another novel model for visual interest of daylight composition, named modified Spatial Contrast model (**mSC**) (Rockcastle, 2017).

HUMAN-CENTRIC LIGHTING

→ working and learning environments

COMPONENTS

VISUAL ASPECTS

visual comfort
visual performance
visual interest

NON-VISUAL ASPECTS

direct effects

EVALUATION

objective

glare avoidance (DGP)
illuminance on task (Etask)
perceptual performance (mSC)
alertness (nvR_D)

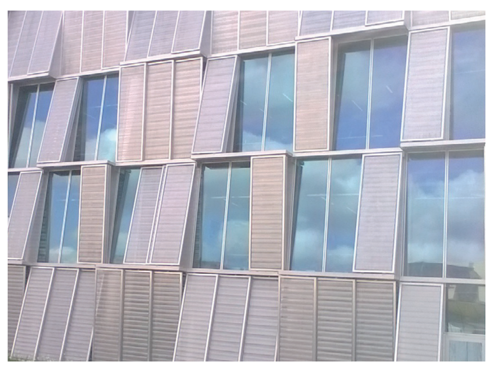
subjective

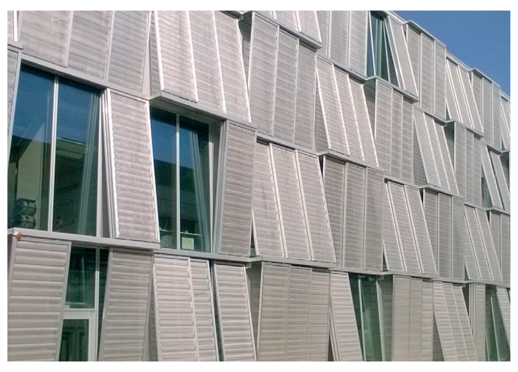
point in time surveys

context

MED BUILDING, EPFL (CH)

9-days monitoring
from 9AM to 5PM
different sky conditions
two orientations (East and West)



1. TEMPORAL VARIATIONS ON LIGHTING PERFORMANCE

Daylight patterns were monitored simultaneously in two reference rooms. Data is computed according to existing models for visual (DGP, Etask and mSC) and non-visual (nvRD) lighting. Temporal variations in objective performance are evaluated.

2. RELATIONSHIP BETWEEN LIGHTING MODELS

Uncovered possible synergies between these four individual lighting models are revealed.

3. VISUAL VS. NON-VISUAL COMPONENTS

Multivariate regression analyses are conducted to determine the relative weight of each (instantaneous) visual component compared to the (cumulated) non-visual one, according to recorded lighting conditions.

4. ASSOCIATION BETWEEN OBJECTIVE AND SUBJECTIVE DATA

Correlational analyses are conducted to estimate the association between objective and subjective data collected in the study.

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