Is daylight glare perceived differently by people from different cultures?

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Introduction

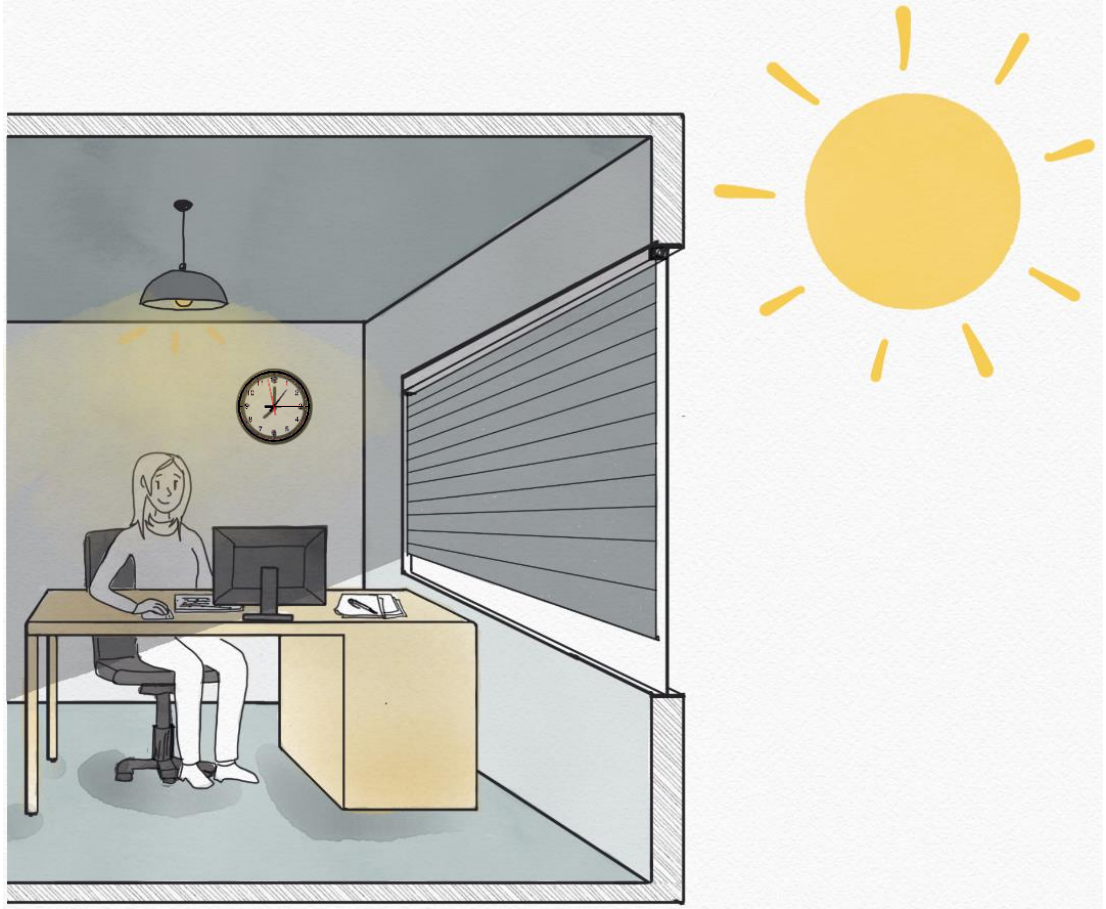
DAYLIGHT

- ENERGY EFFICIENCY
- OCCUPANTS' HEALTH
- OCCUPANTS' COMFORT
- OCCUPANTS' PRODUCTIVITY
- DYNAMIC EXPERIENCE OF ARCHITECTURE
- ETC

Introduction

In case of visual discomfort (discomfort glare)…

blinds are closed and daylight benefits are lost!



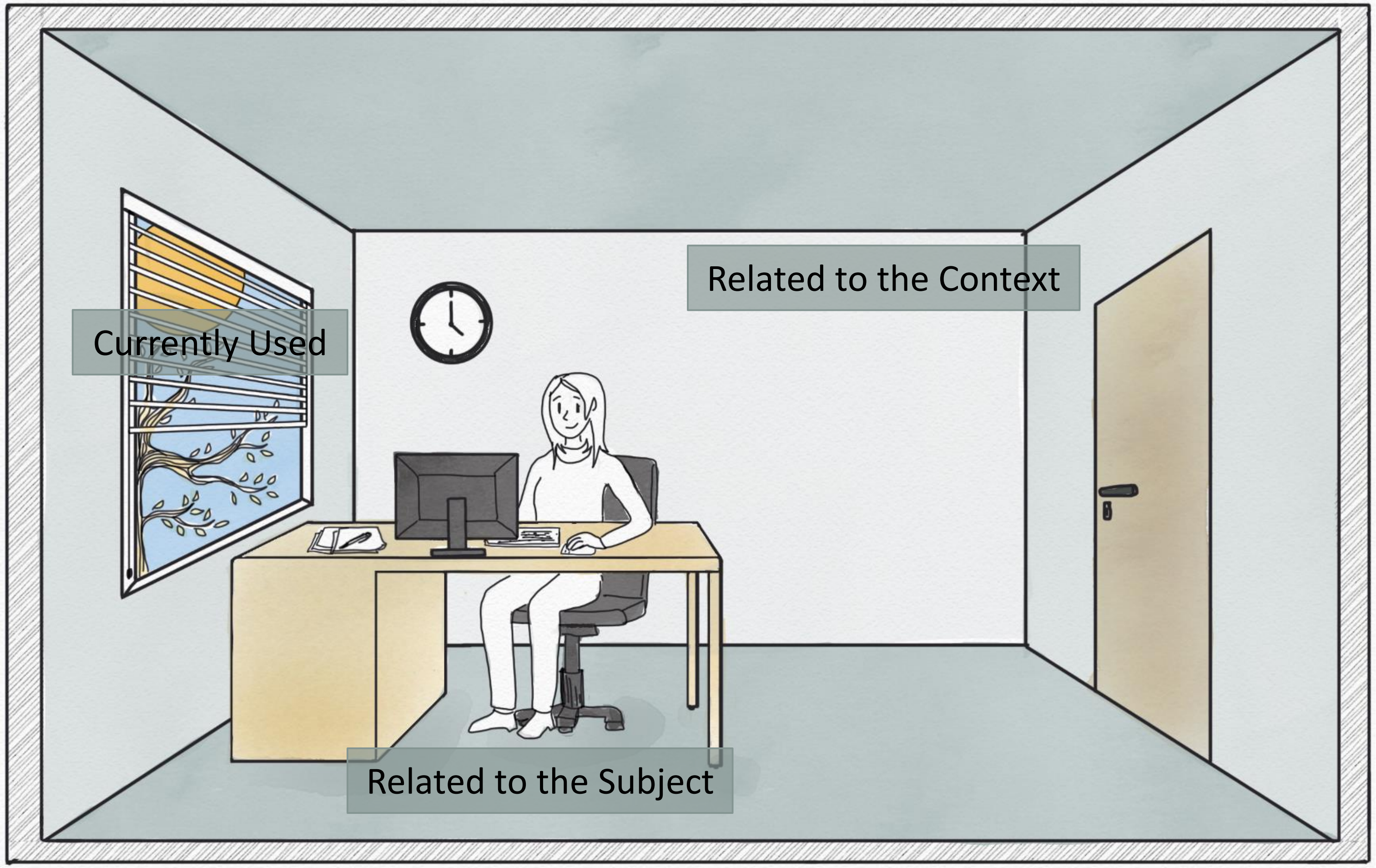
➔ To harvest daylight benefits, need to predict discomfort glare from daylight!

Introduction

20+ daylight discomfort glare metrics → no accurate prediction

31 potentially influencing factors:

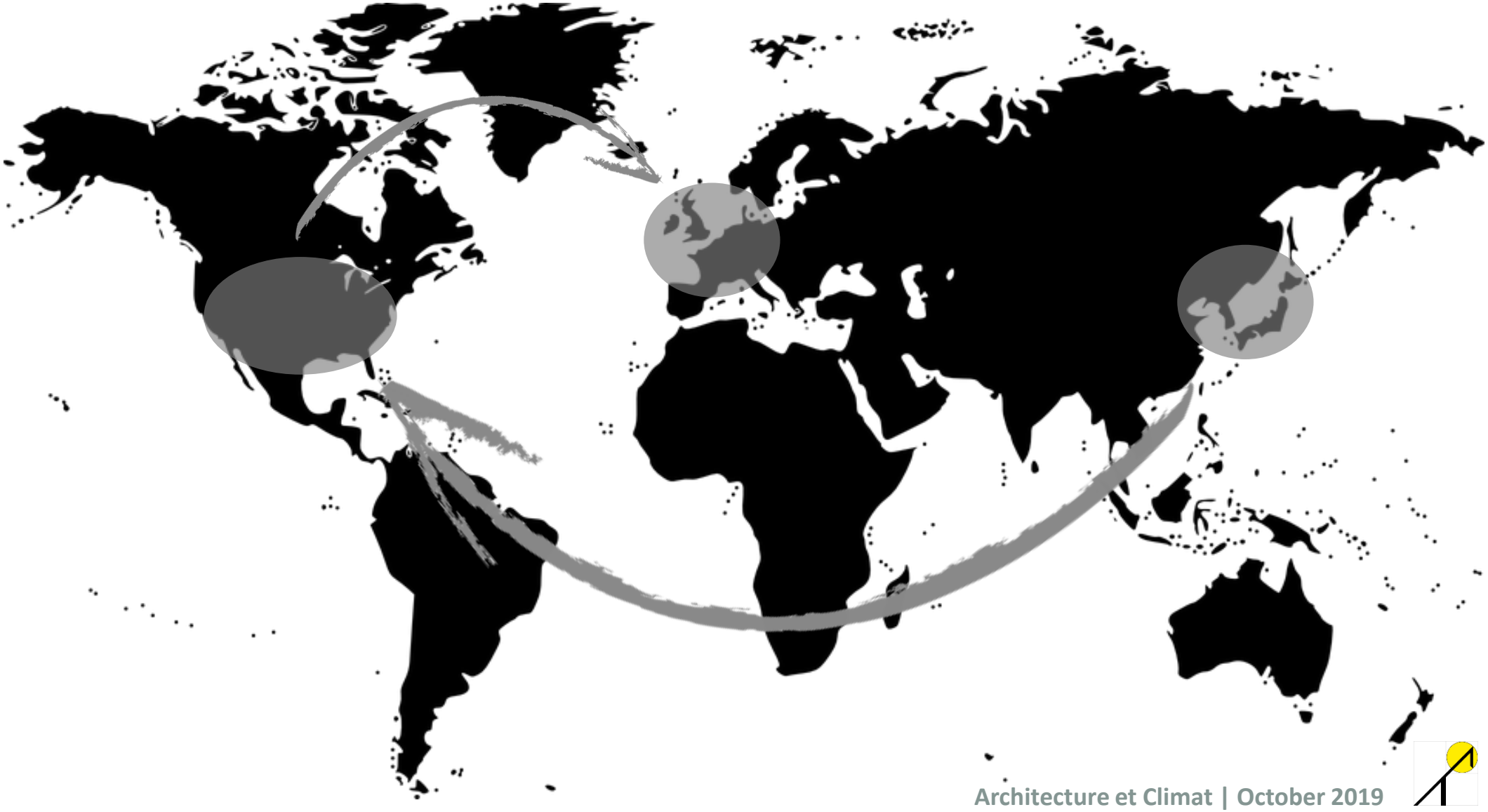
- Spectrum and color temperature / Luminance of the glare source
- View direction and position / Size of the glare source
- Position of the glare source / View through the window
- Adaptation level / Air temperature
- Contrast effect / Noise sensitivity
- Saturation effect / Time of the day
- Season / Contrast sensitivity
- Task difficulty / Iris pigmentation
- Duration of exposure / Macular Pigment Optical Density
- Cortical hyperexcitability
- Previous luminous environment
- Physical state
- Emotional state
- Caffeine ingestion
- Food ingestion
- Fatigue



Pierson, C., Wienold, J., & Bodart, M. (2018). Review of Factors Influencing Discomfort Glare Perception from Daylight. *LEUKOS, 14*(3), 111-148. doi:10.1080/15502724.2018.1428617

Objective

Influence of the culture on discomfort glare perception



Methodology

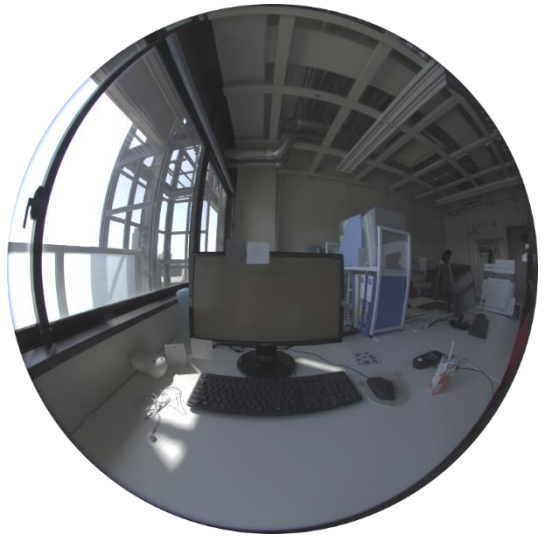
Field study in 4 different cultures

Chile
Antofagasta
23°38’60’’S -70°24’00’’W
Concepción
36°49’12’’S -73°2’40’’W
Punta Arenas
53°9’17’’S - 70°54’41’’W

March 2017

Belgium
Louvain-la-Neuve
50°40’12’’N -4°36’36’’E

July/August 2017



Japan
Tokyo
35°39’10’’N -139°50’22’’E

May 2018

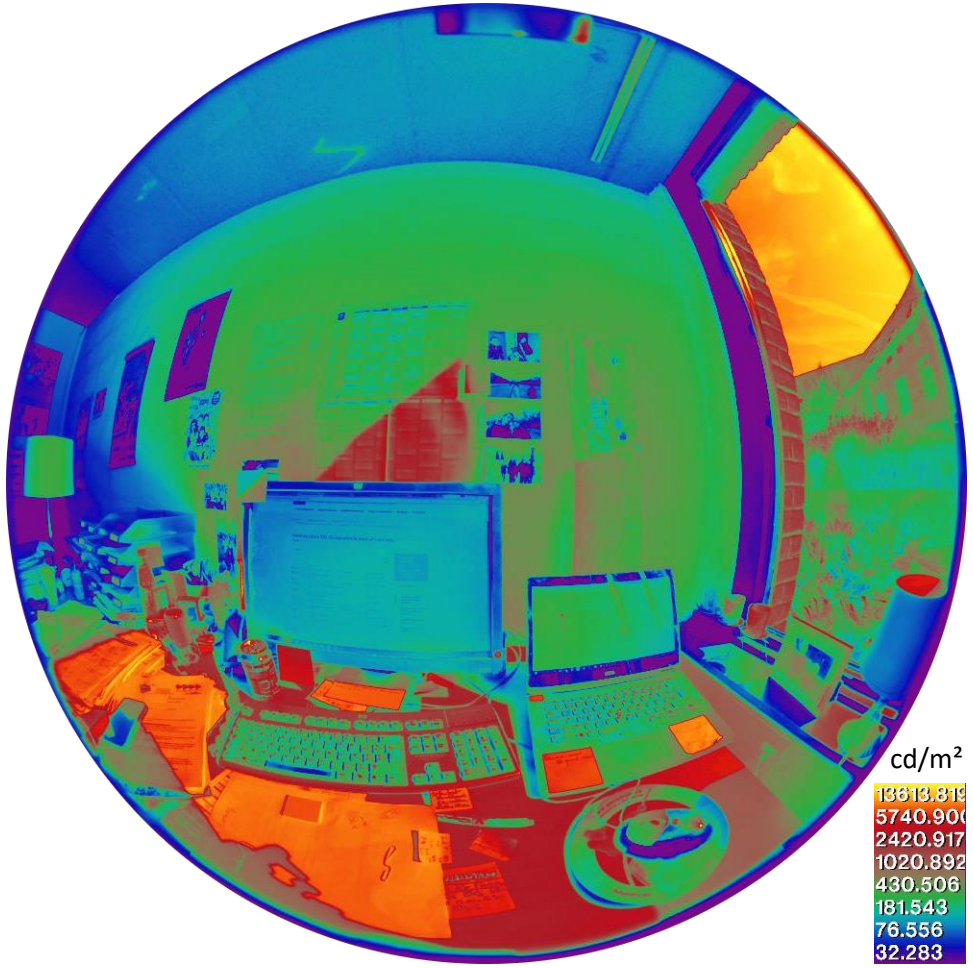
Switzerland
Lausanne
46°31’12’’N -6°38’1’’E

July/August 2018

Methodology

2 main types of measure

Luminance map of the field of view



Subjective assessments of visual discomfort

At the moment, are you satisfied with the lighting conditions in your office?

Unsatisfied ○ Rather unsatisfied ○ Rather satisfied ○ Satisfied ○

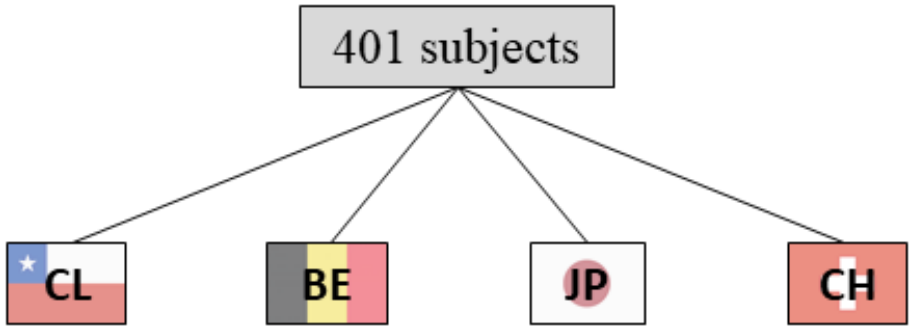
Which element(s) bother(s) you in the current lighting conditions?

At the moment, do you feel discomfort due to glare?

No, no discomfort ○ Yes, a small discomfort ○ Yes, a moderate discomfort ○ Yes, a large discomfort ○

Methodology

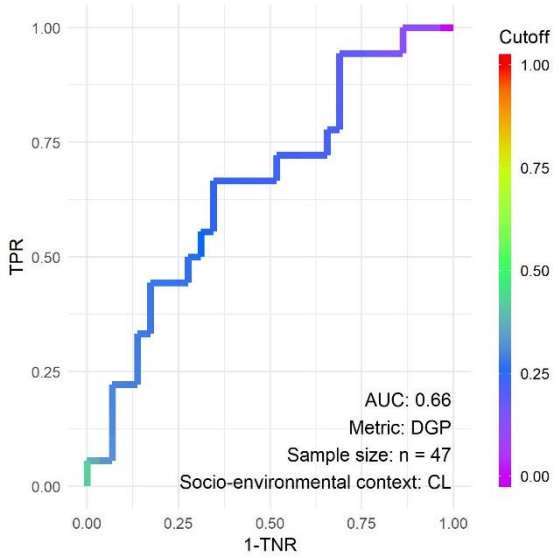
Dataset

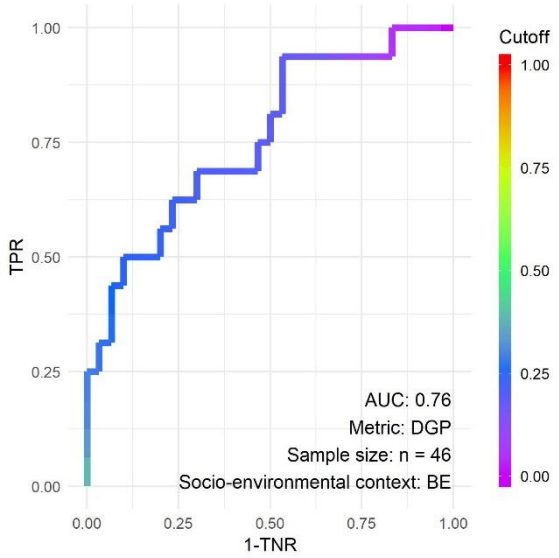


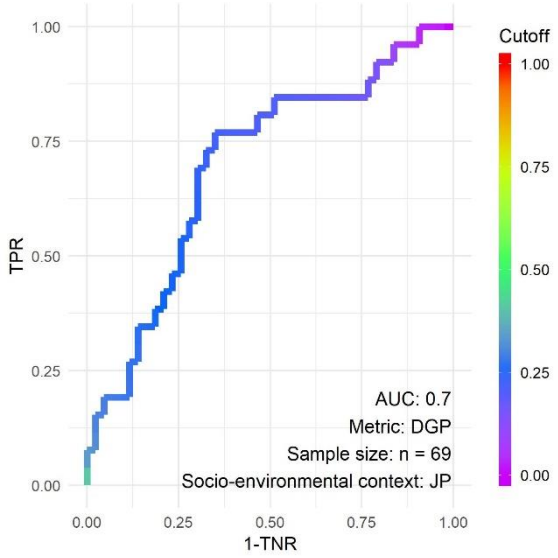
Initial dataset	85	86	119	111
Final dataset	51	48	70	65

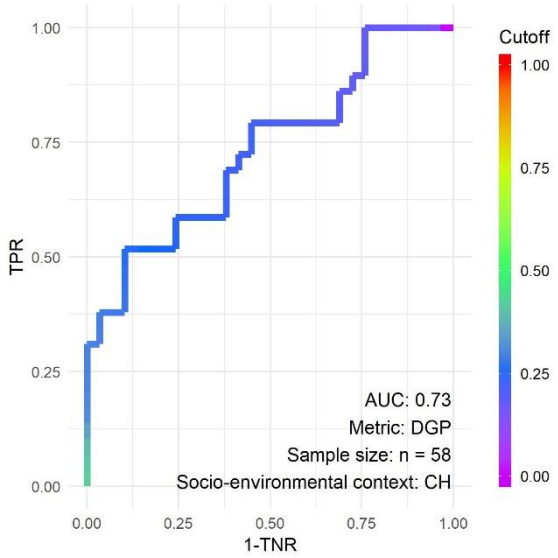
Results

Can the DGP predict subjects' glare reports?





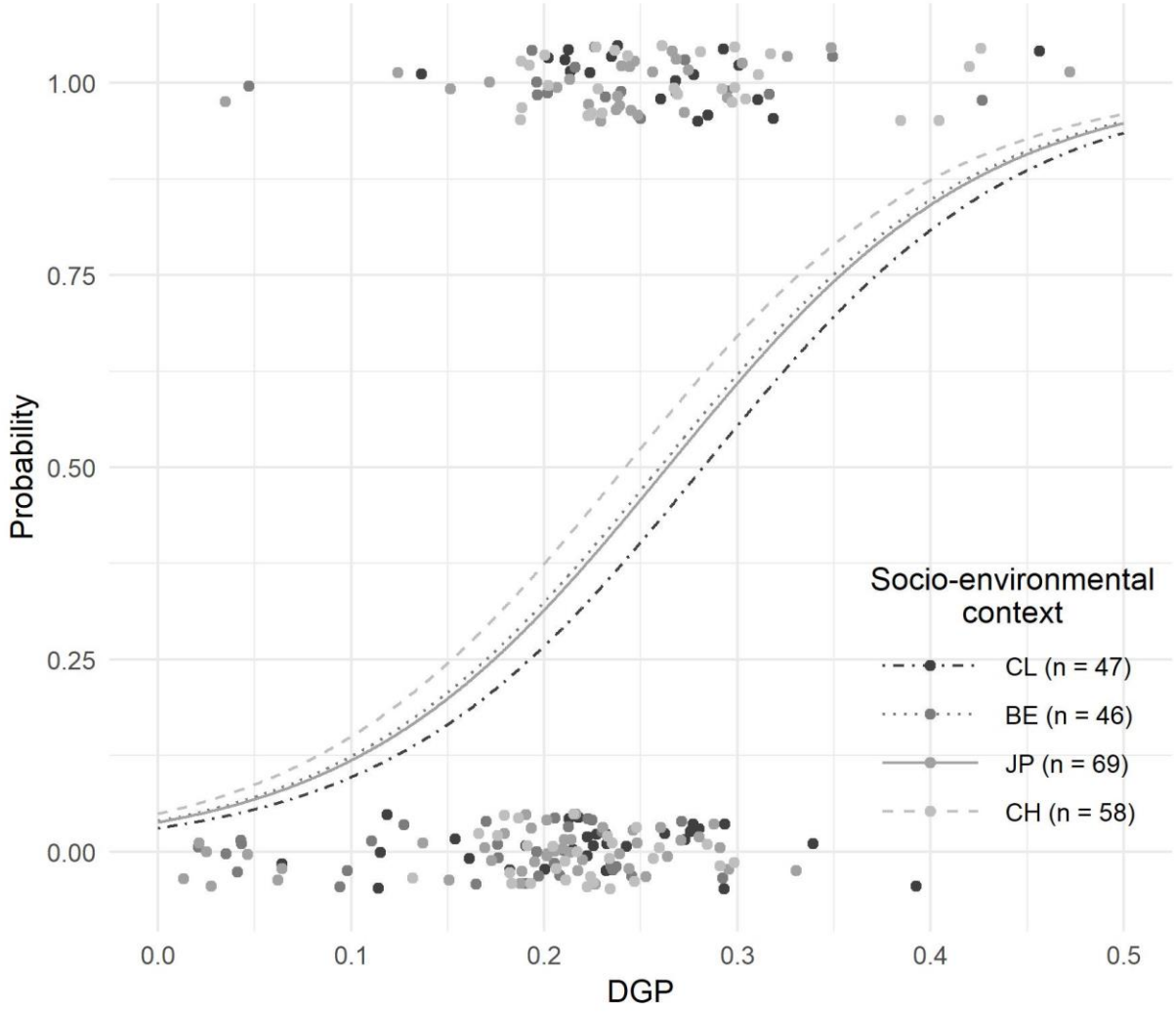




Results

Is there an influence of the culture?

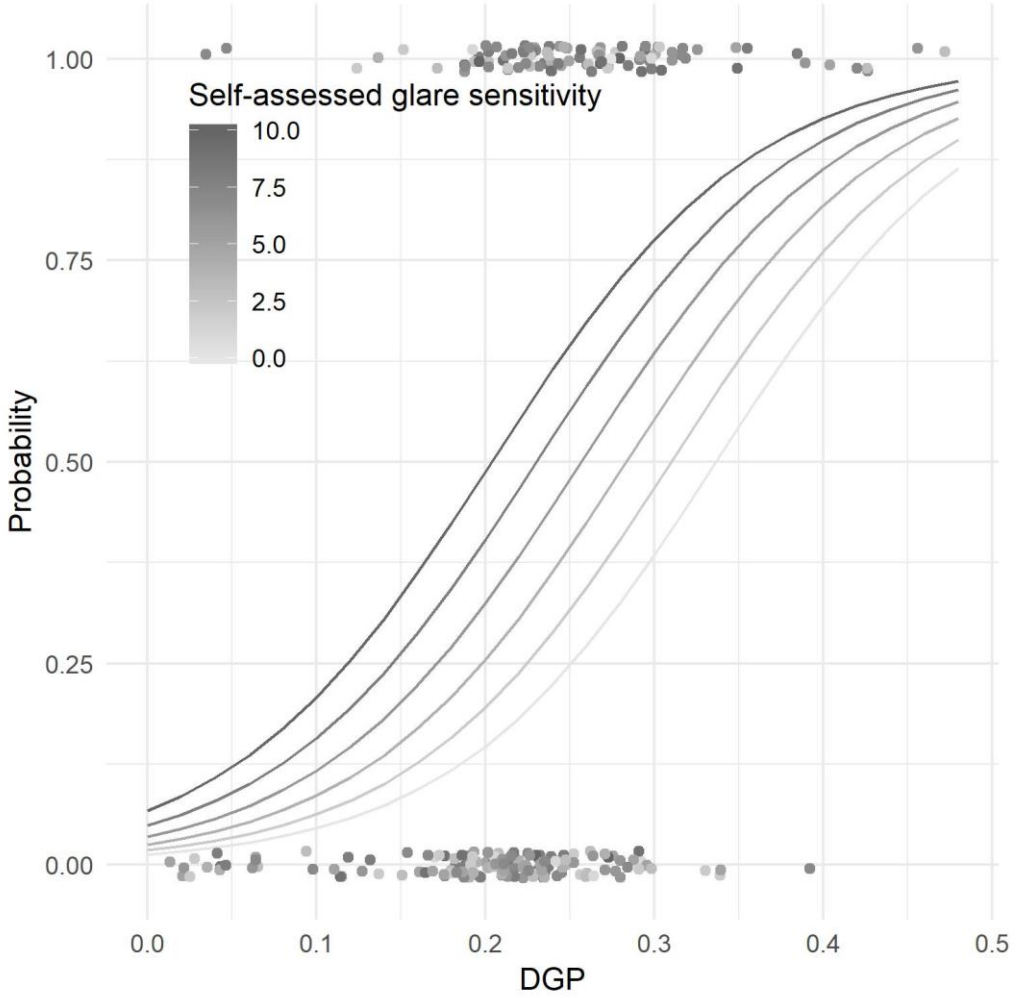
$$Subject's\ Glare\ Report \sim DGP^{***} + Culture$$



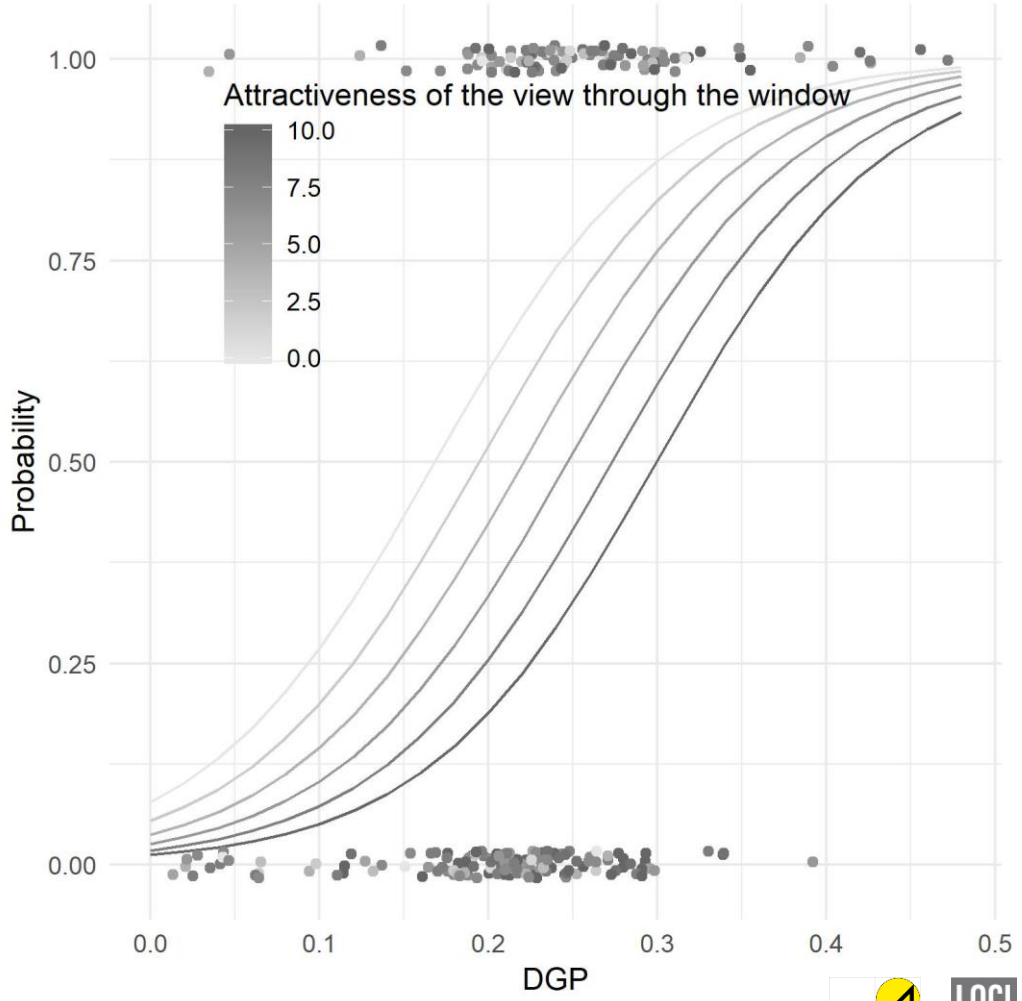
Results

Is there an influence of other factors?

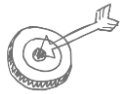
$$Subject's\ Glare\ Report\ \sim\ DGP^{***}+\ Glare\ Sensitivity^{**}$$



$$Subject's\ Glare\ Report\ \sim\ DGP^{***}+\ Window\ View^{**}$$



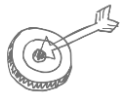
Conclusion



No evidence of an influence of the **culture** on discomfort glare perception from daylight

Why differences observed in the literature?

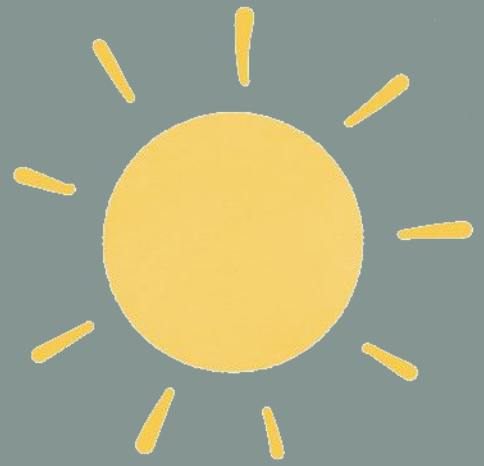
Further research + Experimental biases



Preliminary evidence of an influence of **glare sensitivity** and the **view through the window** on discomfort glare perception from daylight

Is there really an influence?

Further research



Thank you!

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