

## Poster

# The Impact of Different Lighting Conditions on Extreme Chronotypes: Effects on Physical Comfort and Alertness

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### Introduction

There is increasing knowledge of non-image forming aspects of light which proves the importance of proper lighting on our wellbeing. Early studies investigating user preferences indicated similar results for the majority of subjects, but differences for subjects with extreme sleep-wake rhythms, known as early birds/late owls<sup>1</sup>. We used these extreme chronotypes<sup>2</sup> as a 'natural model' to investigate circadian and acute effects of different lighting conditions on well-being, alertness, skin temperature and hormonal secretion.

### Objectives

We aimed at testing visual and non-visual effects of three different lighting conditions in extreme chronotypes. We hypothesized that differences in timing, quality and intensity of lighting conditions might differently impact objective and subjective variables of physiology, well-being and alertness.

### Subjects and Methods

Healthy young morning types (MT) and evening types (ET) were selected. All underwent three sessions with different lighting conditions: dim light (DIM; <5 lx); constant bright light (BL;  $\approx$  1000 lx in a vertical direction at the corneal level), and self-selected light (SSL). Each session lasted for 16 hours and began one hour after habitual wake time. Questionnaires, cognitive performance tests, hormonal analyses and skin temperature measurements were used. So far, 18 subjects (11 MT and 7 ET) completed the study.

### Results

Preliminary results from questionnaires suggest that subjects felt significantly more alert under the BL and SSL condition, when compared to DIM (2-way rANOVA; main effect of 'condition';  $p < 0.05$ ). During the BL condition, MT felt significantly more alert during the first half of the study session than the second half ( $p < 0.05$ ; Wilcoxon matched pairs test).

Subjective wellbeing decreased over time for both chronotypes ( $p < 0.05$ ; main effect of time) such that MT felt less well in the second half of the SSL condition, whereas ET felt less well in the second half of the BL condition ( $p < 0.05$ ; Wilcoxon matched pairs test).

Subjective thermal assessments revealed that subjects felt significantly colder throughout the DIM condition, when compared to BL and SSL ( $p < 0.05$ ; main effect of 'condition').

### Conclusions

A better knowledge of inter-individual acute and circadian light effects could contribute to develop high quality indoor lighting environments which also consider physiological and behavioral needs.

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### References

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