Poster

User-based Research Approach for Assessment of Non Visual Lighting Effects

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Introduction

The need for understanding users' desires and the way they live and work in architectural spaces generated the need to also understand the human physiology to design. Biological rhythms such as rest-activity rhythm, social rhythm, body temperature rhythm and hormonal levels (melatonin and cortisol) can be easily measured and they are related to lighting. The role of lighting, especially artificial lighting, and its relationship with biological processes, is fundamental to define new project guidelines and assess the consequences of the specifications of different lighting environments.

Methodology

The general goal of the study was to evaluate how lighting conditions interfere in the health and well-being of employees from shopping malls and hospital building. The sample consisted of 50 woman aged between 18 - 65 years old. They were divided in five groups of ten subjects: with presence of day light and daytime work (one group in mall (A) and other in hospital (E)) and without presence of day light, and daytime working hours (one group in mall (B) and other in hospital (D)), and a group without presence of day light, and afternoon and evening working hours (2 p.m. to 10 p.m.) in shopping mall retail spaces (group C).

Visual, biological and emotional aspects were correlated with the lighting system variables. The methodology used instruments from psychological and medical areas. The procedures included evaluation of lighting conditions and illuminance and the subject`s light pattern (using a luxmeter in the wrist called actigraph).

Results and discussion

Having visual contact with the outside throughout windows was an important factor for groups A and D to present better well being indicators in the assessment. Results indicate direct and indirect correlations between this factor and higher depression and anxiety scores in groups without natural light (B, C and E). The subjects of group B and D showed the worst conditions in the assessment of anxiety and stress (cortisol levels) among the five groups, probably because they had no contact with natural light. In group C, where average general illuminances were up to 700 lux, physiological alterations where found in melatonin production and the worse condition in the assessment of depression. Results showed that the circadian rhythms are important indicators and new methodologies could include then as an innovative design tool for lighting designers.

This knowledge might be used to develop ways of intervening in the health-disease process, composing a set of guidelines that can be included in rules and regulations for the production of architectural spaces.

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