

M. Yamagishi, K. Yamaba, C. Kubo, K. Nokura, M. Nagata. *Effects of LED lighting characteristics on visual performance of elderly people. Gerontechnology 2008; 7(2):243.* Light-Emitting Diodes (LEDs) have been anticipated for use in home lighting. This study examines the effects of preferred LED lighting specifications on visual performance of elderly people. Because of aging, visual functions such as visual acuity decline. Results of a previous study show that white LED lighting provides higher legibility and that it is preferred by younger and elderly subjects over that of fluorescent lamps and incandescent lamps<sup>1</sup>. The present study assesses psychological and physiological aspects of white LED lighting operated with Correlated Color Temperature (CCT) because CCT influences mood, arousal and pleasantness<sup>2</sup>. Davis & Garza<sup>3</sup> describe effects of illuminance and CCT on visual performance for elderly people. They concluded that the performance of older people is affected more by illuminance than CCT. This study is intended to examine the effects of CCT on visual performance of elderly people using mood measurements under white LED lighting. **Methods** *Subjects*: 20 younger people (20s) and 10 elderly people (over 65). *Lighting conditions*: Using white LED units (Toyoda Gosei Co. Ltd.) as experimental lighting, three CCT conditions are set: 2500 K, 5000 K, and 8200 K. *Tasks*: Three tasks are performed in this experiment: (i) Visual acuity test, (ii) Color appearance test using Macbeth Color Checker, and (iii) Numerical verification (NV) task<sup>3</sup>. Task (iii) investigates performance under each CCT condition. *Mood measurements*: In this experiment, mood means arousal and pleasantness. Therefore, two measurement methods are used: (i) the Two-Dimensional Mood Scale<sup>4</sup> as a psychological index and (ii) electrocardiogram as a physiological index. *Ratings for LED lighting*: Each lighting condition is evaluated using a subjective rating composed of seven bipolar adjectives and discriminating color of light. *Procedure*: First, this experiment was explained to subjects and the electrocardiogram was prepared. Then, one of the experimental lighting conditions was applied. Subjects were instructed to rest for 5 min. Then, they were provided the tasks in sequence. After completing the tasks, they were asked to rest again. Finally, they were given the lighting rated questionnaire. **Results and discussion** Comparing younger and elderly subjects, the results of visual performance and mood under experimental CCT conditions are discussed. These results suggest that 5000 K LED lighting is suitable lighting for the visual performance of younger subjects. In addition, LED lighting can present preferred LED characteristics as a visual environment for elderly people.

## References

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