BROAD SPECTRUM LIGHT AND NIGHT-TIME MENTAL PERFORMANCE: EFFECTS OF INTENSITY AND DURATION

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Tania Baker

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ABSTRACT

The present study examined the effects of light intensity and duration on mental performance at night. A number of investigations have found light levels as low as 500 lux can have a significant impact on cognition, but there have been few, if any, systematic experiments that have investigated the potential trade-off between the intensity of the light and its duration. Light levels of 100 (normal room lighting), 300, 600 and 1,000 lux were paired with one of two different light exposure times: 15 and 60 minutes. Sixteen volunteers completed tests of critical thinking, simple maths, letter cancellation, recall, and recognition between 2300 and 0100 hours once a week for four consecutive weeks. Body temperature and subjective sleepiness levels were also recorded. The results showed that, in general, light intensities, irrespective of duration, of 300 and 600 lux had a positive effect on critical thinking and recognition memory. In contrast to some previous findings, there was little or no effect on sleepiness levels, core body temperature, recall, letter cancellation or the simple maths task. Surprisingly, the 1,000 lux light level had no effect on any of the tasks. It was concluded that changes in the intensity of broad-spectrum light can affect night-time cognitive performance, but that the intensity of the light cannot be traded for duration. However, further investigation of the manner in which light intensity is varied, either by distance from the light or by varying the brightness of the light source, is required before firm conclusions can be drawn.

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