

# Managing Workplace Fatigue- Environmental Bright Light

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Environmental assessments are essential to the practice of occupational therapy. Occupational therapy models acknowledge the complex interplay of an individual engaging in occupations within their environment. Every task is context dependent, and a comprehensive environmental assessment ensures occupational therapists create a complete picture of how an individual is functioning. As outlined in this summary and the accompanying video engagement in occupations can be directing influenced by a person's physical environment. **Lighting within the workplace** is an element of an individual's physical environment that may impact their level of workplace fatigue.

Although older studies yielded mixed results about the effect of On functional performance (Veitch & McColl, 2001), more recent, and methodologically rigorous studies have been employed to explore the impact of bright lighting on daytime function. Smolders & de Kort (2014) found that participants who were exposed to ambient bright lights **subjectively reported feeling less sleepy, more vital and happier**. This was especially true of individuals experiencing mental fatigue; participants who felt fatigued and were then exposed to bright lighting reported subjective feelings of sleepiness and vitality close to those of their rested counterparts. This study however, did not find bright lights to improve task performance.

Ferlazzo et al. (2014) compared the cognitive function of participants while exposed to either halogen or blue spectrum light. Results indicate that **exposure to blue spectrum light enhanced participant's abilities to perform multiple tasks simultaneously and decreased the number of errors participants made**. These tasks were performed after being exposed to blue spectrum light (or halogen) for just 20minutes; the authors state that the duration of this enhanced cognitive function was not measured.

Neuroimaging studies have explored how light exposure modulates the responses of different areas of the brain (Vanderwalle et al, 2009). Across studies, blue light exposure resulted in the **activation of areas in the brain involved in alertness** such as the brainstem, hypothalamus and thalamus; areas of the limbic system such as the amygdala and hippocampus; and areas of the cortex involved in executive functioning and visual-spatial abilities (Vanderwalle et al, 2009).

The results of these studies may have implications for occupational therapists' who need to prevent and or manage their own workplace fatigue. These early studies indicate that bright lights, particularly light within the blue spectrum, modulate alertness, feelings of sleepiness and happiness, and cognitive function. All of which may contribute to the experience of workplace fatigue. Viola et al.(2008) found that office workers exposed to blue-enriched white light reported increases in their perceived levels of alertness and performance, as well as reported improvement in sleep quality at night.

Occupational therapists, their managers and Occupational Health and Safety Committees should include lighting in their environmental assessments when developing and carrying out fatigue risk management programs. Lighting has implications for many of the setting (such as offices, clinics, hospitals, schools, and long term care facilities) in which occupational therapists work. Fatigue Risk Management programs should include education about the use of bright light to reduce workplace fatigue. Occupational therapists who receive this education can then also apply the principles in their homes and out-of work activities. Therapists should consider however, that research is still building and there is, as yet, no evidence indicating optimal dose or duration of light exposure. Occupational therapists should continue to monitor the research in this area because of its useful application to their own well-being and that of their clients.

**IMPORTANT NOTE:** While blue spectrum light is an important tool to promote daytime alertness it is **contraindicated for use in the evenings** because it suppresses production of the hormone melatonin which is needed for sleep.

## Resources

- Canadian Centre for Occupational Health and Safety- Office Lighting Guidelines (2013) [http://www.ccohs.ca/oshanswers/ergonomics/lighting\\_general.html](http://www.ccohs.ca/oshanswers/ergonomics/lighting_general.html)
- Introduction to light therapy and products (Phillips Canada) <http://www.philips.ca/c-m-li/light-therapy>
- Guide to Health Risk Assessment – Lighting in Offices (UK Dept of Labour) <http://www.labour.gov.hk/eng/public/oh/OHB50.pdf>
- Lighting at Work: Guidelines (Industrial Accident Prevention Association- Ontario) <http://www.iapa.ca/pdf/lightin.pdf>
- Understanding light and sleep (L LaBerge and B Johnson, MScOT UofAlberta) <https://www.youtube.com/watch?v=OHnGbTk9qOM>
- The Nature of Things with David Suzuki- 'Lights Out'. A 60 minute documentary exploring the serious health effect of artificial light exposure <http://www.cbc.ca/natureofthings/episodes/lights-out>

## References

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- Smolders, K. C. & de Kort, Y. A. (2014). Bright light and mental fatigue: Effects on alertness, vitality, performance and physiological arousal. *Journal of Environmental Psychology*, 39, 77-9.
- Viola, A. U. et al. (2008) Blue-enriched white light in the workplace improves self-reported alertness, performance and sleep quality. *Scandinavian Journal of Work, Environment and Health*, 34, 297–306.
- Veitch, J. A. & McColl, S. L. (2001). A critical examination of perceptual and cognitive effects attributed to full-spectrum fluorescent lighting. *Ergonomics*, 44, 255-779.