Psychophysiological and attention restoration in a wooden office: A pilot study

Dean Lipovac1\*, Michael D. Burnard2

1,2 InnoRenew CoE, Livade 6, 6310 Izola, Slovenia & Andrej Marušič Institute, University of Primorska, Muzejski trg 2, 6000 Koper, Slovenia

1 [dean.lipovac@innorenew.eu](mailto:dean.lipovac@innorenew.eu)

2 [mike.burnard@innorenew.eu](mailto:mike.burnard@innorenew.eu)  
\*Corresponding author

It has been shown that certain indicators of human stress can improve in interior spaces with visible wood (e.g., Burnard and Kutnar, 2019). Due to the scarcity of studies, additional research is needed to confirm and clarify current findings. Ideally, human stress responses in indoor environments should be captured by combining measures of physiological arousal, affective states, and cognitive performance (Parsons and Tassinary, 2002). However, it is challenging to reliably elicit a stress response in humans and select appropriate measures and timing of their administration. Additionally, because small effect sizes are expected, appropriate experimental design and sample sizes are required.

The primary aim of this pilot study was to examine if a mental arithmetic task performed before an evaluative audience can lead to a stress response and recovery that is reflected in the selected measures of affective states (i.e., pleasure and arousal single-item scales), cognitive performance (Attention Network Test; Weaver, Bédard, and McAuliffe, 2013), and electrodermal and cardiovascular activity.

A convenience sample of 20 participants completed the study. After stress was induced in subjects (5 minutes), half of them relocated to a desk made of light wood and the other half moved to a desk covered with a plain white cloth, where they rested for 10 minutes before completing the cognitive task (5 minutes). The physiological activity of the subjects was measured continuously throughout the entire study protocol, while the affective states were assessed twice, immediately after the stress-inducing activity and directly before completing the cognitive task. The analysis of the results examines the suitability of the study protocol together with the selected stress-inducing activity and measures capturing physiological, affective, and cognitive performance outcomes. Recommendations for future studies are discussed based on the findings.

**Keywords:** wood, restoration, cognitive performance, physiological arousal, affective states

**Acknowledgements:** The authors gratefully acknowledge the European Commission for funding the InnoRenew CoE project (Grant Agreement 739574) under the Horizon2020 Widespread-Teaming program, the Republic of Slovenia (Investment funding of the Republic of Slovenia and the European Union of the European Regional Development Fund).

REFERENCES

Burnard, M.D., Kutnar, A., 2019. Human stress responses in office-like environments with wood furniture. Build. Res. Inf. https://doi.org/10.1080/09613218.2019.1660609

Parsons, R., Tassinary, L.G., 2002. Environmental psychophysiology, in: Handbook of Environmental Psychology. John Wiley & Sons, Hoboken, pp. 172–190.

Weaver, B., Bédard, M., McAuliffe, J., 2013. Evaluation of a 10-minute version of the attention network test. Clin. Neuropsychol. 27, 1281–1299. https://doi.org/10.1080/13854046.2013.851741