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Year 2023	Summary of Thesis	
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(Title) Effect of Workation on Creativity and Human Responses		
<p>Many studies have suggested that humans can fully utilize their inherent self-healing abilities and creativity by connecting with nature. For example, Ulrich (1984) reported on patients admitted to rooms with a view of deciduous trees had requiring shorter hospital stays ^[1], and Palanica (2022) reported that viewing nature scenery enhances creativity ^[2]. Therefore, the Japanese government is advocating for a new style of work called “workation”, in which work is conducted in nature-rich areas while engaging in non-routine experiences. In 2019, Workation Alliance Japan was established, and workation garnered attention from 113 municipalities by 2020. However, according to a survey conducted by the Japan Tourism Agency (2020), only 5.3% of companies have implemented workation. This is presumed to be because of limited scientific evidence regarding its effectiveness.</p> <p>Furthermore, recent advancements in virtual reality (VR) technology have led to expectations for advancements in VR content that enables the workation experience. However, owing to limited scientific evidence regarding the effects of workation in virtual spaces, empirical experiments based on quantitative evaluations are necessary. To this end, this study used psychophysiological indices to examine the effects of workation on creativity and human responses in both real and virtual spaces.</p> <p>First, we constructed a rating scale for the semantic differential (SD) method to evaluate images of workation environments (WEs) in real and virtual spaces. Subsequently, 9 participants evaluated the image of the workation and office environments (OEs) in real space, and 20 participants evaluated them in virtual space. In the OE condition, significantly lower relaxation and exhilaration levels were exhibited than in the WE condition, regardless of type of space. In addition, we observed no significant difference in the evaluations between the real and virtual spaces, suggesting the validity of using the proposed rating scale in evaluating the image of WEs in both real and virtual spaces.</p>		

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Second, 11 participants experienced a two-day workation in a guesthouse facility (nature condition: NC), and we measured their creativity and psychophysiological state. We conducted control experiments in a university conference room (office condition: OC). The results suggested that significantly lower creativity scores were found in the OC than in the NC, exhibiting increased subjective fatigue and stress responses. Furthermore, a suggestion of heightened activation of the sympathetic nervous system and/or inhibition of parasympathetic nervous system activity were exhibited in the OC compared with in the NC, indicating a potential increase in psychological stress. This suggests that humans placed in stressful environments, such as offices, may experience a decrease in their inherent natural healing abilities and other capacities. Conversely, workation environments may help humans fully realize these abilities. In addition, recreational experiences such as soaking in hot springs, dining out, and engaging in physical exercise conducted in the NC may positively impact creativity and human responses.

Finally, we examined the effects of workation in virtual spaces on creativity and human responses. In particular, 12 participants used a VR office that enabled them to experience workation under both the aforementioned conditions, and we measured their creativity and psychophysiological states. Consequently, we obtained findings similar to those of the real-space experiments. Participants expressed opinions such as, ‘In the office condition of the real space, there was a discrepancy without natural elements between visual and spatial information, causing discomfort’ and ‘The office condition lacked refreshing elements, leaving a sense of fatigue’. Therefore, we speculate that experiencing a VR office in an OE lacks sensory stimulation, such as touch and hearing, and therefore, cannot yield the same benefits as workation.

In summary, humans in natural environments may experience an increase in their inherent natural healing abilities and other capacities, and workation enhances creativity and reduces psychological stress and subjective fatigue compared with in-office work. Furthermore, to achieve effects equivalent to those of workation when experiencing VR content that stimulates workation in an OE, we determined that stimuli that affect various senses, such as visual information and auditory and tactile sensations, in addition to simple recreational experiences such as footbaths, are necessary.

[1] Ulrich, R.S.: View through a window may influence recovery from surgery. *Science* 224, pp.420-421, 1984.

[2] Palanica, A., Fossat, Y.: Effects of nature virtual backgrounds on creativity during videoconferencing. *Think. Skills Create.* 43, 2022.

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