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Shifting the Body Midline: The Impact of Visuomotor Illusions in Virtual Reality on Peripheral Autonomic Activity

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A coherent sense of body ownership relies on the integration of top-down and bottom-up sensory signals. Disrupting the coherence of these signals through experimental manipulations (e.g., the rubber hand illusion or mirror box illusion) has been shown to affect body representation and peripheral physiological activity, such as body temperature. However, recent studies have debated these findings.To further investigate the relationship between coherent body representation and physiological state, we developed an innovative paradigm designed to alter body-centered representation during a visuomotor task in virtual reality. Participants (n = 24) engaged in a 15-minute visuomotor task in which they used their right hand to manipulate a virtual cube with a stick. In the congruent condition, the virtual hand matched the actual right hand. In the incongruent condition, the right hand was visually replaced with a virtual left hand, inducing a shift in the perceived body midline. We measured the temperature of the unused left hand before (baseline) and during the task. Additionally, in the middle of the task, we recorded skin conductance responses to supra-threshold electro-cutaneous stimulations. Our results revealed a significant reduction in left-hand temperature in the incongruent condition compared to the congruent one. Moreover, SCR amplitude was positively correlated with temperature changes—greater cooling was associated with diminished responses, while higher temperatures predicted stronger SCRs.. Overall, our findings demonstrate that body illusions disrupting the coherent body reference frame can induce changes in the physiological state, strengthening the link between body representation and peripheral body signals

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No

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