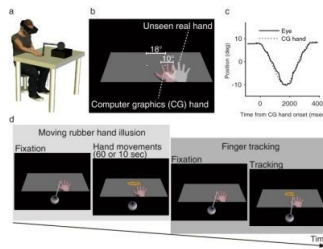


VR for Better Motor Control



A new virtual reality-based method reassesses the approach to agency and body ownership in motor control and looks promising for rehabilitation purposes, especially in elderly patients.

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The accuracy of motor control depends on the awareness of one's own body. This awareness comprises two elements: sense of body ownership (one experiences body parts as their own) and sense of agency (one is able to voluntarily act with that visible body part). Professor Kazumichi Matsumiya from the Graduate School of Information Sciences at Tohoku University in Japan looked into the interaction between the two aspects and tried to separate them. He found that the sense of agency, rather than body ownership, improves motor control (Matsumiya 2021).

In a series of experiments Prof Matsumiya used a virtual reality (VR)-based environment to manipulate the senses of agency and body ownership, and the finger-tracking paradigm to quantify motor control (coordination of eye with hand movements). The participants wore a head-mounted display and were shown a computer-generated model of a hand whose movements related to the movements of their own hand (either active or passive, i.e. assisted by a device). He tested the eye-hand coordination, which requires awareness of the hand to track the hand with the eye, in various combinations of synchronous/asynchronous active/passive movement arrangements.

The results of the study suggest eye-hand coordination improvement depends more on a sense of agency over a tracked artificial hand than a sense of body ownership, and the relationship is more prominent in for initiation than maintenance of eye-hand coordination. The author draws a conclusion that "sense of agency is only linked to predicting initiation of one's own action" and that its prospective experience improves motor control.

These findings suggest that artificial manipulation of one's sense of agency may be a useful technique in rehabilitation, especially in elderly people who experience motor dysfunctions.

Source: Tohoku University

Image credit: Matsumiya 2021

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