

Kinesthetic visual capture induced by apparent motion

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Abstract

"Visual Capture" describes a class of phenomena in which visual perception strongly influences a somatosensory percept. In prior studies, it has been reported that viewing one's own hand through a displacing prism can shift the sense of hand position and cause large reaching errors. Here, we report a kinesthetic form of visual capture. Subjects held their hand 6-12 inches in front of their eyes. At this distance, the two eyes receive disparate views of the hand with different occlusions. By winking or with the aid of stereo goggles, subjects alternated (1-2 Hz) between left and right eye views of their stationary hand. At this speed and distance, visual apparent motion was induced within a few cycles. In addition, subjects reported a kinesthetic sensation that their own hand was being moved. The kinesthetic sensation typically required several cycles in order to approach full strength. The sensation typically grew with repeated cycling and with additional trials. Subjects reported the sensation as a non-painful "tingling" which was largely localized to the joint or joints required to produce the motion observed visually. Four different canonical hand positions were employed which produced kinesthetic sensations referred to the wrist, elbow, or one of two knuckle joints. When the hand was positioned so that "anatomically impossible" motion was perceived visually, the kinesthetic percept persisted. Subjects reported feeling mildly disturbed but amused by impossible motion. Consistent with Shimojo's work on visual capture, we observed that shifting the focus of attention influenced both the visual and capture percepts. We also observed that the kinesthetic percept depended strongly on identifying the viewed hand as your own, suggesting that visual capture is driven by the visual recognition (or "What") pathway as well as by the visual spatial location (or "Where/How") pathway.

History

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