

Brain activities related to target- versus trajectory-based strategies in visually-guided movement control: A functional MRI study

Je-Kwang Ryu

Seoul National University

Hee Sun Eum

Seoul National University

Kyoung-Min Lee

Seoul National University

Abstract: Previous studies on movement control modulated target size or distance in order to investigate the mechanism underlying control strategies. While these elucidated the contribution of targets in the control, how trajectory itself influences movement strategy has received little attention. Here, using event-related fMRI, we examined neural processes of trajectory-based movement control as well as those of target-based control; we manipulated the focus of movement control by varying the size of a target (target-based control) or the window through which the movement had to pass (trajectory-based control). The brain activation maps showed that the increase in task difficulty with target-based control was associated with greater activation at right parietal and ventrolateral occipital regions, while that with trajectory-based control was correlated with more extensive activation at medial frontal and ventromedial occipital regions. These differential brain activities indicate that the neural mechanisms for target selection and trajectory control are distinct during visually-guided movements.