

## Action perception: top-down effects

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The cerebral cortex of primates is endowed with neurons specifically tuned for biological actions. These neurons are located in a network of areas comprising the visual areas of the region of the superior temporal sulcus (STS) and the visuomotor areas of the inferior parietal lobule and premotor cortex. It is generally assumed that action understanding depends on a *serial* recruitment of these areas. The observed actions, following an initial processing in striate and extrastriate visual areas, are encoded in STS. Subsequently, they are transformed into a motor format in the parietal and premotor areas. This transformation is done via the mirror mechanism. Here we present evidence for a fundamental role in action perception of backward projections to the occipital lobe. Using high-density EEG, we showed that, during hand-action observation, following an early activation of occipital, parietal and premotor areas, late activation occur in the occipital lobe. We conclude that backward projections from motor cortex 'bind' the understanding of the goal of an action with the pictorial descriptions of the same action. This binding allows the *full* perception of the observed actions as a joint function of visual and motor areas and overcomes the traditional functional separation between the two systems.