Online adaptation and over-trial learning in macaque visuomotor control.

By elsc_admin  
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By elsc_admin September 22, 2011


Abstract:

When faced with unpredictable environments, the human motor system has been shown to develop optimized adaptation strategies that allow for online adaptation during the control process. Such online adaptation is to be contrasted to slower over-trial learning that corresponds to a trial-by-trial update of the movement plan. Here we investigate the interplay of both processes, i.e., online adaptation and over-trial learning, in a visuomotor experiment performed by macaques. We show that simple non-adaptive control schemes fail to perform in this task, but that a previously suggested adaptive optimal feedback control model can explain the observed behavior. We also show that over-trial learning as seen in learning and aftereffect curves can be explained by learning in a radial basis function network. Our results suggest that both the process of over-trial learning and the process of online adaptation are crucial to understand visuomotor learning.

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