

A Change in Perspective:

The interaction of saccadic and pursuit eye movements in oculomotor control and perception

Due to the close relationship between oculomotor behavior and visual processing, eye movements have been studied in many different areas of research over the last few decades. While these studies have brought interesting insights, specialization within each research area comes at the potential cost of a narrow and isolated view of the oculomotor system. In this review, we want to expand this perspective by looking at the interactions between the two most important types of voluntary eye movements: saccades and pursuit. Recent evidence indicates multiple interactions and shared signals at the behavioral and neurophysiological level for oculomotor control and for visual perception during pursuit and saccades. Oculomotor control seems to be based on shared position- and velocity-related information, which leads to multiple behavioral interactions and synergies. The distinction between position- and velocity-related information seems to be also present at the neurophysiological level. In addition, visual perception seems to be based on shared efferent signals about upcoming eye positions and velocities, which are to some degree independent of the actual oculomotor response. I will suggest an interactive perspective on the oculomotor system, based mainly on different types of sensory input, and less so on separate subsystems for saccadic or pursuit eye movements.