

Spatiotemporal overlap between saccade preparation and attentional orienting

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Recent imaging studies provided ample support that the brain areas involved with attentional orienting and the preparation of saccades largely overlap, which supports the hypothesis that attentional orienting may be equated with the preparation of saccades (i.e. the premotor theory of attention). However, whether the recruitment of these brain areas shows a comparable pattern over time is not yet known. To give an answer, we determined direction-related activity derived from the electroencephalogram in tasks in which central cues indicated the most probable side (left or right) at which a to be detected or discriminated target, or at which a saccade goal would appear. Additionally, we performed spatiotemporal source analyses on the direction-related activity. In all tasks an early directing attention negativity (EDAN), an anterior directing attention negativity (ADAN), and a late directing attention positivity (LDAP) was observed. Analyses of these components revealed some differences among tasks. Source analyses revealed that the location of otherwise comparable temporoparietal dipole pairs was more anterior in the detection task than in the discrimination and saccade preparation task. In addition, the orientation of comparable sources differed between the discrimination and the saccade preparation task. Thus, the brain areas involved with attentional orienting and saccade preparation show a comparable activation pattern over time, but subtle differences among the tasks indicate that attentional orienting depends on the type of task and cannot be fully equated with saccade preparation.

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