Perceptual load modulates ERP-manifestations of endogenous attentional shifts

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When a central cue directs visual attention to a hemifield, a sequence of event-related brain potentials can be recorded at posterior scalp locations contralateral to the attended field, (Harter et al., 1989, J of Cogn Neurosc, 1, 223-37). Typically, a negativity (200-400 ms: EDAN) precedes a positive deflection (500-700 ms: LDAP). Later studies indicated that LDAP is not sensitive to moderate vs. high perceptual load of the target (Hopf & Mangun, 2000, Clin Neurophysiol, 111, 1241-57), but a ceiling effect of load could not be excluded. In turn, the EDAN disappeared when the target was not visual but tactile (Van Velsen, Forster, & Eimer, 2002, Psychophysiol, 39, 874-8). This prompted the question whether these components are sensitive to manipulations of perceptual load at relatively low levels. We studied the effects of cues directing attention to a hemifield where targets could appear that required simple detection (low load) vs. discrimination based on their spatial frequency (moderate load). The results indicated that EDAN, but not LDAP was sensitive to perceptual load. Since the attentional costs and benefits in performance did not depend on perceptual load, we propose that EDAN reflects an aspect of attention that is not mandatory for its expression in performance. Still, EDAN's sensitivity to perceptual load appears to be in conflict with the notion that it merely reflects the selection of task relevant aspects of cue stimuli (Van Velzen and Eimer, 2003, Psychophysiol, 40, 827-31).

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