Background

Task-set: an effective organisation of cognitive processes towards a specific goal which includes: establishing a task goal; orienting attention towards relevant spatial loci, modality, object, dimension, feature; activating appropriate effectors for output; initiating appropriate input-output translation procedures.

Switch cost: RT is longer on task-switch than on task-repeat trials; this “switch cost” reduces when time is allowed for preparation, indexing task-set preparation. A neurophysiological correlate of preparatory task-set reconfiguration is the late, posterior switch positivity (e.g., Karayanidis et al., 2011; Lavric, Mizon & Monsell, 2008) between cue and stimulus —example below.

Attentional orientation contributes to the switch cost (Longman, Lavric & Monsell, 2012; Mayr, Kuhn & Rieter, in press). Longman et al. (2012): On switch trials there is a delay in anticipatory orientation to the relevant region and more inappropriate fixations on the irrelevant, previously relevant region — attentional inertia. And this predicts RT switch costs: on long RT switch trials where the switch cost is large there is more attentional inertia, and individuals’ delays in orienting attention predict their RT switch cost. The current study combined EEG and eye tracking to probe the temporal relationship between anticipatory orienting of spatial attention and the aspects of task-set reconfiguration captured by the late positivity in the pre-stimulus ERP.

Conclusions

(1) Reconfiguration of ‘Attentional Set’ appears separable from other ‘Task Set’ components captured in the posterior switch positivity: the latency of the positivity and a preceding negativity are modulated by the timing of anticipatory shifts in fixation.

(2) Spatial attentional set is reconfigured before the other components as can be seen in the cue-locked ERPs divided into attention orientation terciles as well as in landing-locked ERPs: regardless of when attention shifts, the negativity is always BEFORE the shift and the positivity always AFTER.

(3) The negativity appears to be an ERP correlate of an anticipatory shift of spatial attention.

References


