
Prepare for the expected: the effect of predictions on proactive attentional control in conflict and task-switching experiments

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Abstract

In a series of studies, we aimed at investigating how predictions steer attentional control. In a first task-switching experiment, participants were asked to predict the upcoming task in one of three conditions varying in the amount of task repetitions (25%, 50% and 75%). In line with previous studies (Monsell & Mizon, 2006), the switch cost was attenuated as the switch probability rate increased. Our data suggest that this is caused by a diminished expectancy for the task to repeat, as participants' task repetition prediction rate dropped from 71% over 61% to 49% with increasing switch probability in the three conditions. As the switch cost was strongly reduced when participants expected a task alternation, the reduced switch cost in conditions with decreased task repetitions can thus be explained in terms of decreased repetition expectancy. In a similar vein, a second study explored how expectations about the next trial influenced the congruency effect by asking participants to predict the upcoming congruency level in a Stroop task. Even though congruency level repetition probability was set at 50%, participants displayed a congruency level repetition bias (68%). Moreover, behavioural adjustments (i.e., a Gratton effect) were only found when participants predicted a congruency level repetition. A currently ongoing EEG study was set up to elucidate the neural mechanisms underlying these prediction-driven adjustments in cognitive control. Taken together, these studies point out that repetition expectancy is a variable that should be given more attention in current theorizing and modelling of cognitive control.

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