

# IS BRAIN ACTIVITY DURING A STROOP INHIBITORY TASK MODULATED BY THE KIND OF COGNITIVE CONTROL REQUIRED?

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Keywords: inhibition, cognitive control, fMRI

Performance on the Stroop task is associated to a large antero-posterior cerebral network involving notably the anterior cingulate and dorsolateral prefrontal cortex. In this study, we used a mixed-BOLD-fMRI design (N=25) to determine the neural substrates of inhibitory functioning in a Stroop task according to contextual information. Consequently, two task-contexts were created: (1) *congruent* context with a majority of facilitator items, (2) *non-congruent* context with mainly interfering items. Based on the dual cognitive control model, we postulated that the *non-congruent* blocks will involve proactive control, which is anticipatory, sustained, and involved when a large number of interfering items are successively presented. On the contrary, *congruent* blocks were assumed to involve reactive control, which occurs when few interfering items are presented, and just after the presentation of these items only. On this basis, we hypothesized that the kind of cognitive control modulates cerebral activity associated to inhibitory functioning.

For behavioral data, we obtained faster response times for interfering items in the *non-congruent* vs. *congruent* condition, indicating proactive control specific to the *congruent* condition only. Functional neuro-imaging data showed an increased transient activity for interfering vs neutral items in a fronto-parietal network more important in the *congruent* than in the *neutral* condition. A similar contrast in the non-congruent condition showed no significant brain activity at the statistical threshold used. These data indicate the existence of a modulation of the cerebral areas associated to inhibitory functioning according to the kind of cognitive control necessary to perform the task.