



Presentation Abstract

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Presentation Title: The cognitive and neural foundations of discrete motor sequencing skill:
A TMS study

Location: Halls B-H

Presentation time: Wednesday, Nov 13, 2013, 4:00 PM - 5:00 PM

Topic: ++F.01.c. Human learning: Motor and sequence learning

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Abstract: The *dual processor model* (Verwey, 2001) is a cognitive model that postulates that the production of discrete movement sequences is regulated by a cognitive processor and a motor processor. It assumes that the relative contribution of each of these processors depends on the mode in which sequences are being executed. The present study tested the core assumptions of this model at the behavioral level, and the data supported these assumptions. In a next step, we explored the neural substrate that underlies the various functions of the cognitive processor. Specifically, we targeted the pre-supplementary motor area (pre-SMA) by applying 20 min 1 Hz repetitive transcranial magnetic stimulation before performance in a test phase. We predicted its involvement specifically in the selection and initiation of motor chunks, and explored its involvement in other functions of the cognitive processor. Results demonstrated that rTMS stimulation of the pre-SMA slowed key presses reflecting chunk initiation, indicating that the pre-SMA is involved in the activation of internal sequence representations from long term memory. Pre-SMA was also found to be involved in managing sequence complexity across all key-presses. Overall, then, we provided coherent support for the dual processor model, and for the involvement of pre-SMA in various functions of the cognitive processor.

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