

## **Participant Debrief Form**

(Ethics app no. 16100)

### **Acquisition and control of action sequences**

**Thank you very much for your participation!**

The ability to acquire a countless number of action sequences and retrieve them from memory precisely in the right context is crucial in daily life, such as for speech, tool use, athletic and musical performance. In each of these domains the nervous system needs to form a robust, but flexible memory of the sequences involved. Several conditions affecting the sequencing and precise timing of movement such as dyspraxia, stuttering and task-dependent dystonia can have profound consequences for the individual in daily life.

In the study you participated in we were examining whether

☐ the timing of actions in a sequence can be transferred across different action sequences. This would suggest independent brain resources which are dedicated to remembering and controlling the timing of sequences (finger sequences, speech, tool use, writing etc.). Independent resources for sequence timing in turn mean that the latter can be impaired (e.g. patients) or boosted (e.g. training protocols) independently of each other potentially opening new ways to advance rehabilitation therapies.

☐ a variable training regime (training different combinations of movement timing and movement order in a sequence) during training leads to better performance during the test phase as compared to just repeating the same sequence(s) with the same timing over and over again. This will potentially open new ways to advance rehabilitation therapies and professional training in musicians and athletes.

☐ movement kinematics (e.g. how continuous one movement transitions into the next one) impacts how the brain stores the timing of actions. We aim to test whether only discrete, but not smooth/continuous movement onsets in a sequence lead to a separate encoding of timing in a sequence. This has implications for rehabilitation approaches we take in different action domains

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such as writing (smooth) vs. speaking (discrete) and different levels within a (syllables vs. sentences).

☒ serial actions are prepared in parallel and weighted by their timing in the sequence. By examining your reaction times to action instructions during sequence preparation we will be able to say whether your action ordering prior to sequence initiation was in line with the target sequence and whether this corresponds to your subsequent performance of the sequence. Once this relationship is well established, we can use this measure as a behavioural marker for an impaired action preparation mechanism in different domains such as musical performance, speech production or writing.

Thank you for your help with this study. If you would like any further information please email:

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