

Investigating the temporality of gesture/speech integration with Transcranial Magnetic Stimulation: building of a study

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The mechanisms of gesture/speech integration (GSI) have been increasingly studied over the past few years. Co-speech iconic gestures are of particular interest, given their semantical proximity with the speech they accompany. Numerous studies, with different methodologies, have observed facilitated processing of information when that of gesture matched that contained in the co-occurring speech. One relevant aspect of GSI relates to their temporal relationship. McNeill (1992) suggested that temporal synchrony was essential for a successful integration of the gestural and verbal information. Obermeier and Gunter (2014) showed that a specific time window for GSI (between -120ms and +200ms) allowed and was required to form a more precise concept. While these studies have shed light on the importance of temporal synchrony in GSI, they do not allow for a precise determination of the temporality of the cerebral neural processes in the latter. The aim of our study is therefore to determine, among healthy adults (aged between 18 and 38), GSI temporality in brain regions that have been shown to be implicated in this integration. More precisely, using transcranial magnetic stimulation (TMS), we plan to apply single online pulses to the left posterior superior temporal sulcus (Callan et al., 2003 ; Dick et al., 2014 ; Holle et al., 2008), the inferior left parietal lobule (Holle et al., 2008) and left anterior inferior frontal gyrus (Dick et al., 2009) at specific moments in time (i.e., -200, -120, 0, +120, +200) while participants take part in a gender classification task (Kandana Arachchige, et al., 2019 ; Zhao et al., 2018), that has been successfully used to implicitly assess GSI. We hereby hope to gain more knowledge on the timing of neural processes while they take place, by observing the variation of performances on the task according to the timing of TMS pulse.