

# Conceptual alignment

Conceptual alignment is a prerequisite for mutual understanding. However, little is known about the neurophysiological brain-to-brain underpinning during conceptual alignment for mutual understanding. Here, we recorded multi-channel electroencephalogram (EEG) simultaneously from two participants in Experiment 1 and adopted the dual-tACS techniques in Experiment 2 to investigate the underlying brain-to-brain EEG coupling during conceptual alignment and the possible enhancement effect. Our results showed that 1) higher phase-locking value (PLV), a sensitive measure for quantifying neural coupling strength between EEG signals, at the gamma frequency band (28-40 Hz), was observed in the left temporoparietal site (left TP) area between successful versus unsuccessful conceptual alignment. The left TP gamma coupling strength correlated with the accuracy of conceptual alignment and differentiated whether subjects belonged to the SUCCESS or FAILURE groups in our study. 2) In-phase gamma-band transcranial alternating current stimulation (tACS) over the left TP area increased the accuracy of subjects in the SUCCESS group but not the FAILURE group. 3) The effect of perspective-taking on the accuracy was mediated by the gamma coupling strength within the left TP area. Our results support the role of gamma-band coupling between brains for interpersonal conceptual alignment. We provide dynamic interpersonal neurophysiological insights into the formation of successful communication <sup>1)</sup>.

<sup>1)</sup>

Chen D, Zhang R, Liu J, Wang P, Bei L, Liu CC, Li X. Gamma-band neural coupling during conceptual alignment. Hum Brain Mapp. 2022 Mar 14. doi: 10.1002/hbm.25831. Epub ahead of print. PMID: 35285571.

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