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INDIVIDUAL DIFFERENCES IN GABAERGIC INHIBITION PREDICT ACTION CONTROL

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Background: Effective inhibition of actions in the presence of prepotent impulses is crucial for appropriately reacting in a changing environment. Notably, during emotional situations, affective states can significantly impact the ability to control actions. Intriguingly, studies suggest that emotional stimuli can either hinder or enhance action control. Consequently, considerable uncertainty exists in our understanding of the intricate dynamics underlying emotions and action control.

Aims: Here, we aimed to investigate whether task-irrelevant negative emotional stimuli presented as primes can influence action control compared to neutral stimuli. Additionally, using Transcranial Magnetic Stimulation, we tested whether individual differences in intracortical motor excitability may predict subjective action control capabilities.

Method: We asked healthy participants to perform a modified version of the Stop Signal Task (SST) in which fearful or neutral stimuli were presented as primes. The task required participants to discriminate the direction of an arrow (go signal) and to withhold their action when a cue (i.e., crosses) appeared on the screen. Stop signal reaction times (SSRT) were computed as a measure of action control. Moreover, we assessed participants' resting-state corticospinal excitability, short intracortical inhibition (SICI), and intracortical facilitation (ICF).

Preliminary results: Preliminary results suggested better action control capabilities when fearful stimuli were presented (i.e., shorter SSRT) and interindividual SICI seems to predict action inhibition capabilities. Taken together, these results will shed new light on the intricate dynamics between action and motor control, suggesting that intracortical measures can be used as potential biomarkers of reduced motor inhibition in research and clinical settings.

Keywords: Action control, Intracortical projections, Stop signal reaction times, Emotions

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