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# TMS reveals the time course of the cerebellum and cerebellum-social brain causal connectivity during emotion discrimination

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Introduction
The posterior cerebellum has emerged as a pivotal component of the social brain, contributing to various socio-affective processes. Despite accumulating evidence of its involvement in social cognition, the temporal dynamics and causal interactions with cortical regions, such as the posterior superior temporal sulcus (pSTS), remain underexplored.
Methods
In a series of different experiments involving more than 100 different participants, we employed chronometric transcranial magnetic stimulation (TMS) to explore the time course of the involvement of different cerebellar sectors (left and right cerebellar hemispheres and vermis) in tasks tapping on facial emotion discrimination. Moreover, we employed a condition-and-perturb TMS paradigm to assess the causal functional connectivity between the left posterior cerebellum and the right pSTS.
Results
We revealed that when perceiving emotional faces, the medial posterior cerebellum is recruited in the initial stages of emotional processing, while the posterolateral cerebellum is recruited at a later stage. Furthermore, we found that the involvement of the posterolateral cerebellum in emotional processing is asymmetric: only the left (but not the right) posterolateral cerebellum is causally recruited in this socioemotional task.
Discussion
Our findings provide the first causal evidence of the posterior cerebellum's early involvement in emotional processing and its functional interplay with the pSTS. These results underscore the cerebellum's integral role within the social brain network, extending beyond traditional motor functions. Understanding this cerebellar-cortical interaction offers new insights into the neural mechanisms underpinning social cognition and has potential implications for interventions targeting social cognitive deficits.

## If you're submitting a symposium talk, what's the symposium title?

Dissecting the Social Brain with Neurostimulation: Mapping Connectivity, Plasticity, and Individual Differences

## If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

No

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