

Theme: Cognitive Neuroscience

Development and validation of a ToM task with biological motion of two-agent interactions for assessing social-cognitive dysfunction in psychotic disorders

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Abstract:

Psychotic disorders are characterized by abnormalities in perception and emotional responsiveness. Social cognition (SC) relies heavily on the information retrieved from the physical traits of those we interact with, including face expression, voice tone and biological motion (BM) patterns. The temporoparietal junction, a core set of key regions for BM perception and for SC, presents structural and functional changes in these disorders.

Here, we designed and validated a theory of mind (ToM) task with BM based on a pre-existing paradigm, to study behavioral differences regarding BM perception and its effect on SC.

We used MATLAB R2021b, BiomotionToolbox and Blender for manipulating real motion capture data from two open access online databases, PLAViMoP Database and SoPID, and Psychophysics Toolbox (version 3) to present it. This resulted in four interactions to fulfill previously established categories of animations: affiliative (a friendly social interaction), antagonistic (a hostile social interaction), indifferent (no interaction between the two agents), and linear (non-social movements).

This task was tested and validated by 2 female healthy participants (mean age of 30.5 ± 0.7 years). Participants completed 2 runs of 8 trials, each of which comprising a period of baseline, followed by the animation movie, and a question block for identifying the preceding animation category. After the experiment, participants were interviewed on their experience and asked to identify each presented situation. Participants correctly identified and classified each animation, with a 100% rate of correct classifications.

Introducing BM in ToM tasks enables the evaluation of performance in situations closer to real-world scenarios. This paradigm can be a powerful tool to study biological motion in psychotic disorders - which, to our knowledge, has yet to be studied - and a valuable step for understanding psychotic disorders, minimizing SC handicaps faced by patients in daily life.

Keywords: social cognition, theory of mind (ToM), biological motion, psychotic disorders