

CHARACTERIZING SOCIAL COGNITION ACROSS MIGRAINE FREQUENCY USING THE STORY-BASED EMPATHY TASK AND THE READING THE MIND IN THE EYES TEST

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Background. Social cognition impairments have been increasingly reported in migraine, particularly in Chronic Migraine (CM), although their profile remains poorly characterized. The Story-Based Empathy Task (SET) has never been investigated in migraine. This validated non-verbal measure assesses cognitive and affective Theory of Mind (ToM) including a Causal Inference control condition. Our study investigated social cognition across migraine frequency groups combining the SET with the Reading the Mind in the Eyes Test (RMET) to explore distinct dimensions of Theory of Mind and their relationship with migraine burden.

Methods. participants were classified according to monthly migraine days (MMD), into Low-Frequency Episodic Migraine (LFEM; 0-7 days, n=26), High-Frequency Episodic Migraine (HFEM; 8–14 days, n=12), and Chronic Migraine (CM; ≥15 days, n=22). Group comparisons were performed using non-parametric tests, associations with MMD were explored using Spearman's correlations, and multivariable regression models adjusted for age and education were fitted. Performances were also compared with published normative data.

Results. SET data were available for 53 patients and RMET data for 44 patients. Among the SET domains, Intention Attribution showed the strongest association with migraine severity, correlating negatively with MMD ($\rho = -0.338$, $p = 0.015$), and remaining independently associated with MMD after adjustment for age, education, and HIT-6 score ($\beta = -0.059$, $p = 0.042$). Emotion Attribution was not associated with MMD, whereas Causal Inference scores were lower than published normative values in HFEM and CM. RMET performance was lower in CM than in HFEM (20.9 ± 3.8 vs 23.7 ± 3.7, $p = 0.045$). Compared with normative data, Intention Attribution showed a progressive decline from LFEM to HFEM and CM, whereas Emotion Attribution remained comparable with normative values. Overall, both continuous and categorical analyses consistently suggested poorer cognitive Theory of Mind performance with increasing migraine burden.

Conclusions. Preliminary findings suggest a differential Theory of Mind profile across migraine frequency groups. Although previous studies have mainly emphasized affective ToM alterations, Intention Attribution emerged as the component most closely associated with migraine frequency, possibly reflecting the greater executive demands of cognitive ToM. Larger studies are needed to confirm our findings and better define the social cognition profile across the migraine spectrum.