



Behavioural determinants of Social Cognition in Amyotrophic Lateral Sclerosis: a cross-sectional study.



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Background

In recent decades, impairment in Social Cognition (SC) and behaviour have been increasingly reported in patients with Amyotrophic Lateral Sclerosis (ALS), including non-demented patients. However, only a limited number of studies have examined the relationship between these two domains in this population. The present study aimed to investigate the prevalence of SC and behavioural impairments in ALS patients and to assess their relationship.

Methods We included 259 consecutive patients attending the Turin ALS Center between 2019 and 2025. Demographic and clinical data were collected, including age, sex, education, site of onset and ALSFRS-R score. All patients underwent a comprehensive neuropsychological battery assessing the five core cognitive domains. Neurobehavioral dysfunction was evaluated through direct clinical observation by a neuropsychologist, as well as the Frontal Systems Behavioural Scale (FrSBe), the Frontal Behavioural Inventory (FBI) and the Beaumont Behavioural Inventory (BBI). SC was assessed using the Ekman 60 Faces test (EK-60), the Reading the Mind in the Eyes test (RMET-36), and the Story-Based Empathy Task (SET) Intention and Emotion Attribution subtests.

Results

A deficit in Theory of Mind (ToM) was observed in 22.3% of patients, in Facial Emotion Recognition (FER) in 31.6%, and in both ToM and FER in 11.2% of cases. A significant correlation was found between the BBI total score since the onset, and the SET-Emotion Attribution score ((**p 0.006**, OR 1.11, CI (1.03-1.19)). Specifically, the BBI items most strongly associated with SET-EA were *perseverative-stereotyped* behaviour (**p < 0.001**) and *dysexecutive behaviour* (distractibility, difficulties in self-monitoring and planning) (**p < 0.001**). Overall, Cohen's kappa coefficient among the three tests was highest for **dysexecutive syndrome** (0.35-0.49) followed by **apathy** (0.29-0.38), and **disinhibition** (0.21-0.49) (**Fig. 1**). The figure on the left shows the comparison of SET-EA scores between patients with and without behavioural changes on the BBI. Moreover, as shown in **Fig. 2**, patients with a deficit in the BBI total score since disease onset had significantly lower Set-EA scores (**p < 0.001**) (**Fig. 2**).

Fig. 1- Concordance between FRsBE-FBI-BBI in detecting Apathy, Disinhibition and Dysexecutive Syndrome in ALS patients

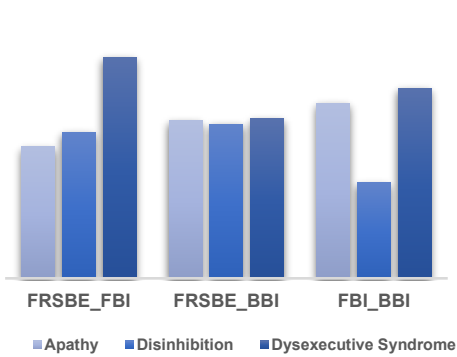
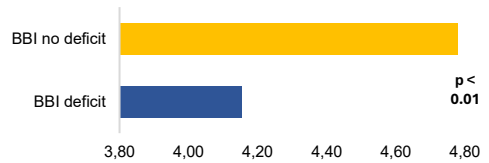


Fig. 2- Comparison of SET-EA scores in patients with and without behavioural changes (according to BBI)



The figure above shows the comparison of SET-EA scores between patients with and without behavioural changes on the BBI. As shown, patients presenting a deficit in the BBI total score since disease onset displayed significantly lower SET-EA scores (**p < 0.001**).

Conclusions

Behavioural impairment in ALS patients, as evaluated through the BBI, showed a correlation with SC abilities, particularly those related to Theory of Mind and Emotion Attribution. Behavioural alterations significantly associated with SC impairments were mainly FTD-like features, specifically *perseverative-stereotyped* behaviour and *dysexecutive behaviour*. Our findings highlight possible behavioural correlates of SC deficits. This result underscores the usefulness of SC assessment considering its potential impact on behavioural manifestations. From this perspective, among the behavioural measures used, the BBI proved to be the most sensitive in detecting such impairments.

References

Radakovic 2024; Abrahams 2023
Consonni 2021; Pender 2020
Crockford 2018; Bora 2017

