COGNITIVE RESERVE AS A PREDICTOR OF COGNITIVE DECLINE IN AMYOTROPHIC LATERAL SCLEROSIS (ALS): A LONGITUDINAL STUDY

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RATIONALE

Cognitive decline and/or behavioural impairment occur in almost 50% of patients with Amyotrophic Lateral Sclerosis (ALS). Few previous studies have hypothesised that a higher cognitive reserve (CR) may significantly predict better cognitive performance at baseline, but is a less reliable predictor of the overall rate of cognitive decline. Similarly, the role of social cognition (SC) in ALS cognitive decline is debated.

AIM AND METHOD

This study investigated the relationship between CR, SC and longitudinal cognitive changes in an Italian cohort of ALS patients. Over a 24-month period, 37 patients underwent longitudinal neuropsychological assessment using the Edinburgh Cognitive and Behavioural ALS Screen (ECAS) along with an additional set of neuropsychological tests. CR was assessed with the short Cognitive Reserve Index Questionnaire (s-CRIq): total score and partial scores in the sub-indexes (CRI-Education, CRI-WorkingActivity, and CRI-LeisureTime) were considered for the analysis. Social cognition was assessed with the Reading the Mind in the Eyes Test (RMET).

RESULTS

The analysis revealed significant correlations between CR and specific cognitive functions. Memory and total CRIq (*Fig. A*) showed a moderate positive correlation (R = 0.32, p = 0.03), suggesting that a higher overall cognitive reserve is associated with better memory performance at baseline. Similarly, logical reasoning and CRIq-Education *(Fig. B)* demonstrated a stronger positive correlation (R = 0.44, p = 0.017), highlighting the role of education in reasoning abilities. In longitudinal analysis, SC and language at T2 (Fig. C) exhibited a weak but significant correlation (R = 0.476, p = 0.013), indicating a potential link between SC and language abilities over time. Lastly, using a linear regression model that included education, total and sub-indexes CR scores, and SC, only education emerged as a significant protective factor against cognitive decline progression (β = 0.86, p = 0.01), while CR and SC showed no significant association.

DISCUSSION AND CONCLUSION

These results support the idea that CR behaves like a global predictor of cognitive performance with statistically significant results in domains not ALS-specific. However, CR does not appear to be a strong prognostic factor for cognitive decline. More research and a larger sample size are needed to investigate if CR and SC may influence the progression of cognitive decline.

Characteristic	N = 37
Sex	
Male	25 (68%)
Female	12 (32%)
Age	58 (48, 66)
Unknown	2
Education (years)	11 (8, 13)
RMET	17 (14, 22)
Unknown	3
CRI-TOT	103 (94, 110)
CRI-Education	99 (89, 110)
CRI-Working Activity	105 (90, 114)
CRI-Leisure Time	103 (93, 108)

[1] n (%); Median (Q1, Q3)

Table 1 *- Demographic characteristics, including sex, education, age at onset, s-CRIq total and partial scores, RMET scores*

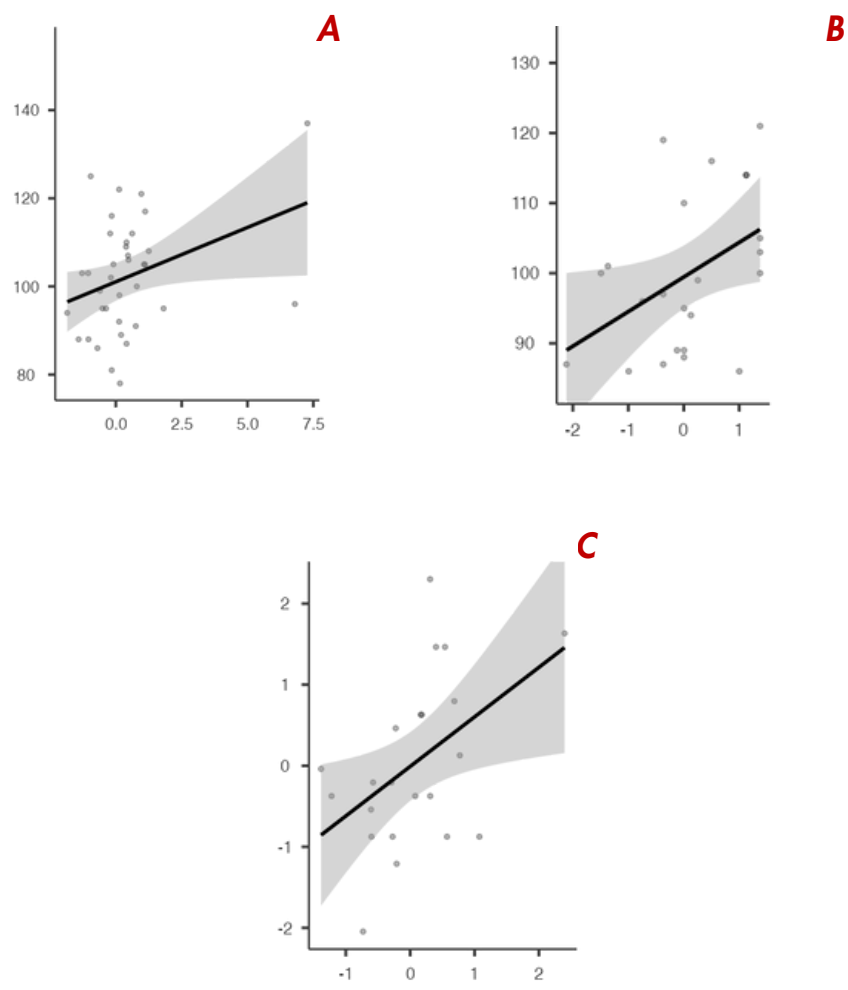

Fig. A: *Memory1xCRIq-tot (R = 0.32, p = 0.03);* ***Fig. B:*** *Logical reasoning1xCRIq-Ed (R = 0.44, p = 0.017);* ***Fig. C:*** *Language2xSC (R = 0.476, p = 0.013)*

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