

Dose Effect To Adherence In Supera Cognitive Stimulation Study In Older Adults: A Randomized Controlled Clinical Trial

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Background: The relationship between dose exposure (number of sessions) and clinical benefit in long-term cognitive stimulation interventions is not uniform, suggesting treatment heterogeneity. The objective of this study was to apply the Conditional Average Treatment Effect (CATE) methodology to identify adherence sensitivity profiles (mean attendance rate) and determine whether the classification based on the interaction model at T1 (6 months) predicts different trajectories of global cognitive and executive performance over time.

Method: An analysis arm of a randomized clinical trial involving 65 cognitively unimpaired older adults was conducted. Individual sensitivity at T1 was estimated using linear regression with interaction between adherence and sociodemographic variables (model m1). The sample was stratified into sensitivity bands ("More Sensitive" vs. "Less Sensitive"). Longitudinal validation was performed using the comparison models (m2) at timepoints T0 (baseline), T1 (6 months), T2 (12 months), T3 (18 months), and T4 (24 months).

Result: Band validation revealed that estimated sensitivity at T1 robustly predicted cognitive gains. For global cognition (ACE-R), the "More Sensitive" group had significantly better performance at T1 ($p=0.036$), T2 ($p=0.045$) and T3 ($p=0.012$), losing significance only at T4 ($p=0.097$) follow-up.

On the executive functions domain (FAS), the higher sensitivity band consistently outperformed the lower sensitivity band at T0 ($p=0.002$), T1 ($p=0.031$), T3 ($p=0.045$) and T4 ($p=0.008$). The MMSE showed a significant effect only at T2 ($p=0.030$), not remaining significant at the other timepoints (T1: $p=0.669$; T3: $p=0.981$).

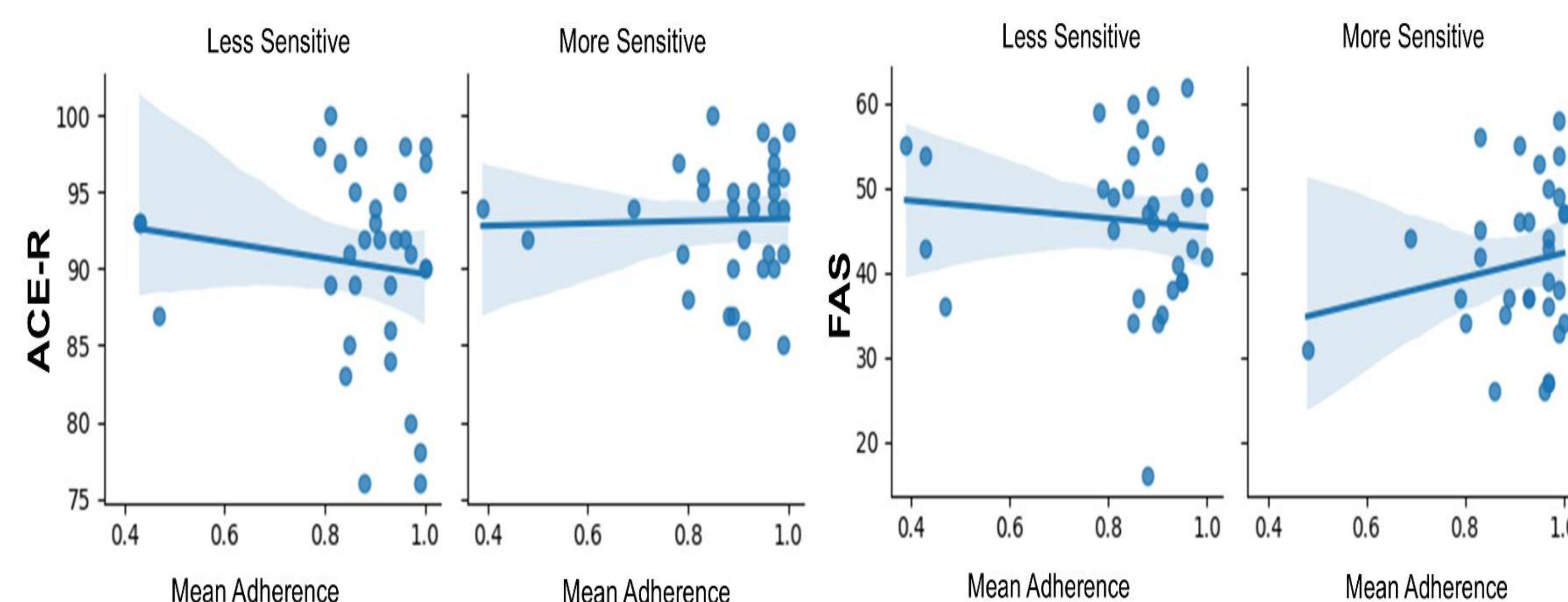


Figure 1. Performance in Global Cognition (ACE-R) and Executive Functions Domain (FAS).

Conclusion: Adherence to the SUPERA cognitive stimulation program promoted heterogeneous gains. The CATE model accurately identified a subgroup in which high adherence supported global and executive performance for up to 18 months (T3), confirming that adherence is a determining factor for consolidating and maintaining cognitive gains in responsive older adults.

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