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Visuoconstruction is not a single ability: sTCFT performance emerges from the combined contribution of education, ventral and dorsal visual pathways, and motor function.

BACKGROUND

Visuoconstructive abilities depend on the integration of visuo-perceptual, visuospatial, motor, and executive processes and are influenced by factors such as education, motor abilities, and executive functioning. Deficits in these abilities are common in dementia and other neurodegenerative disorders, yet most assessment tools provide only global scores, limiting the understanding of underlying cognitive mechanisms. This study examined the relative contributions of visuo-perceptual, visuospatial, motor, and executive functions to performance on the Simplified Taylor Complex Figure Task (sTCFT) in older adults.

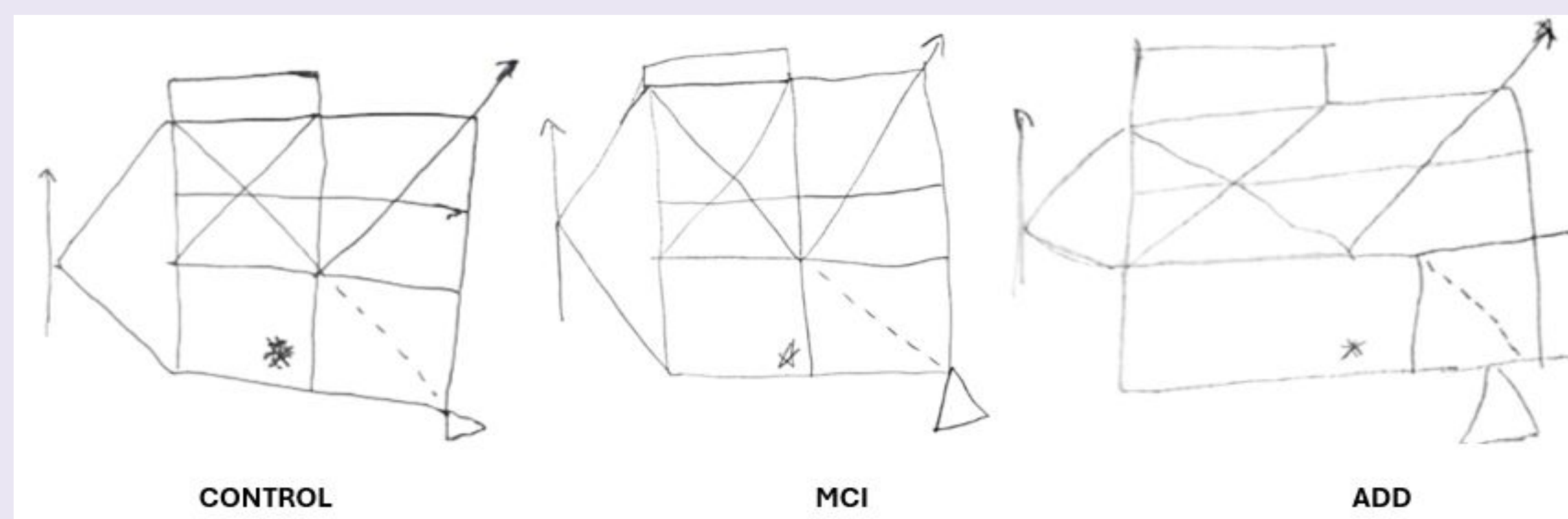


Figure 1 - Representative Visuoconstructive Figure Copy Performance Across Clinical Groups

METHODS

A cross-sectional study was conducted with 292 Brazilian older adults (63.0% women; mean age = 75.7 ± 7.4 years; mean education = 4.6 ± 4.3 years), including cognitively healthy controls, individuals with amnesic mild cognitive impairment (aMCI), multiple-domain amnesic MCI (mdaMCI), and mild Alzheimer's disease. Visuoconstructive ability was assessed using the sTCFT copy total score. Predictors included age, sex, education, naming ability (TN-LIN; ventral stream), visuospatial working memory (Backward Corsi; dorsal stream), planning (Tower of London), and motor function (FAB motor sequence). Forced-entry linear regression analyses were performed to identify independent predictors of sTCFT performance.



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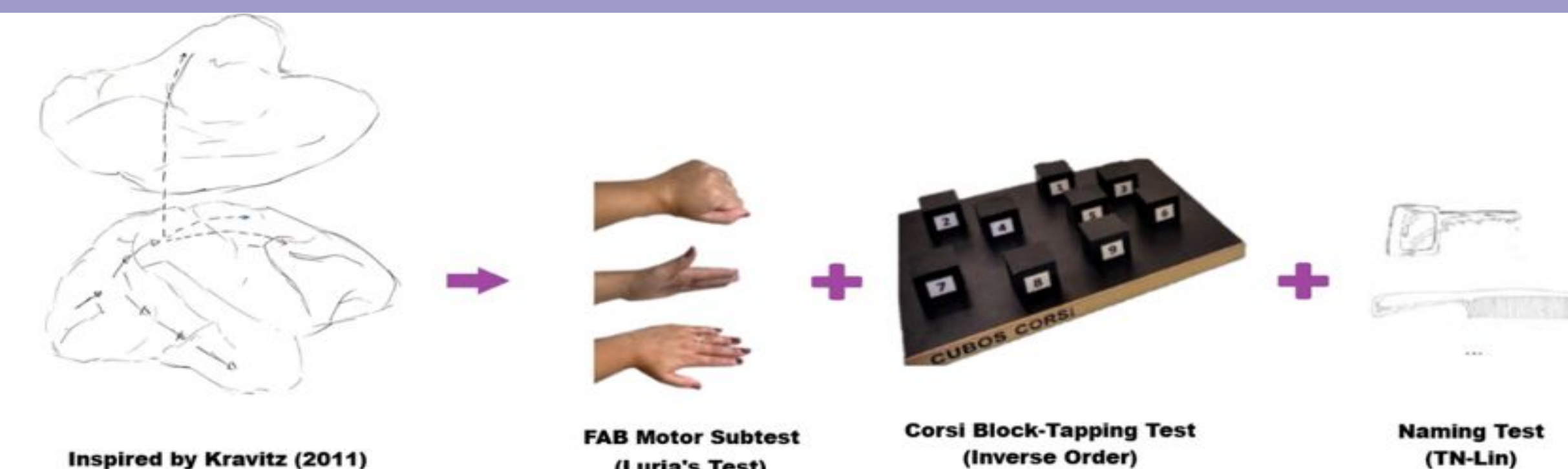


Figure 2 - Neural Pathways and Neurocognitive Domains Representing Ventral, Dorsal and Motor Contributions to Figure Copy Performance

RESULTS

The regression model explained 37.2% of the variance in sTCFT-Copy performance ($R^2 = .372$, adjusted $R^2 = .356$, $p < .001$). Education was the strongest predictor ($\beta = .283$, $p < .001$). Ventral (TN-LIN; $\beta = .245$, $p < .001$) and dorsal (Backward Corsi; $\beta = .239$, $p < .001$) streams measures showed significant contributions. Motor function also predicted performance, with a smaller effect size (FAB motor; $\beta = .126$, $p = .012$). Age, sex, and planning were not significant predictors. These findings support the multifactorial nature of visuoconstructive performance, highlighting the roles of education, visual processing, and motor abilities.

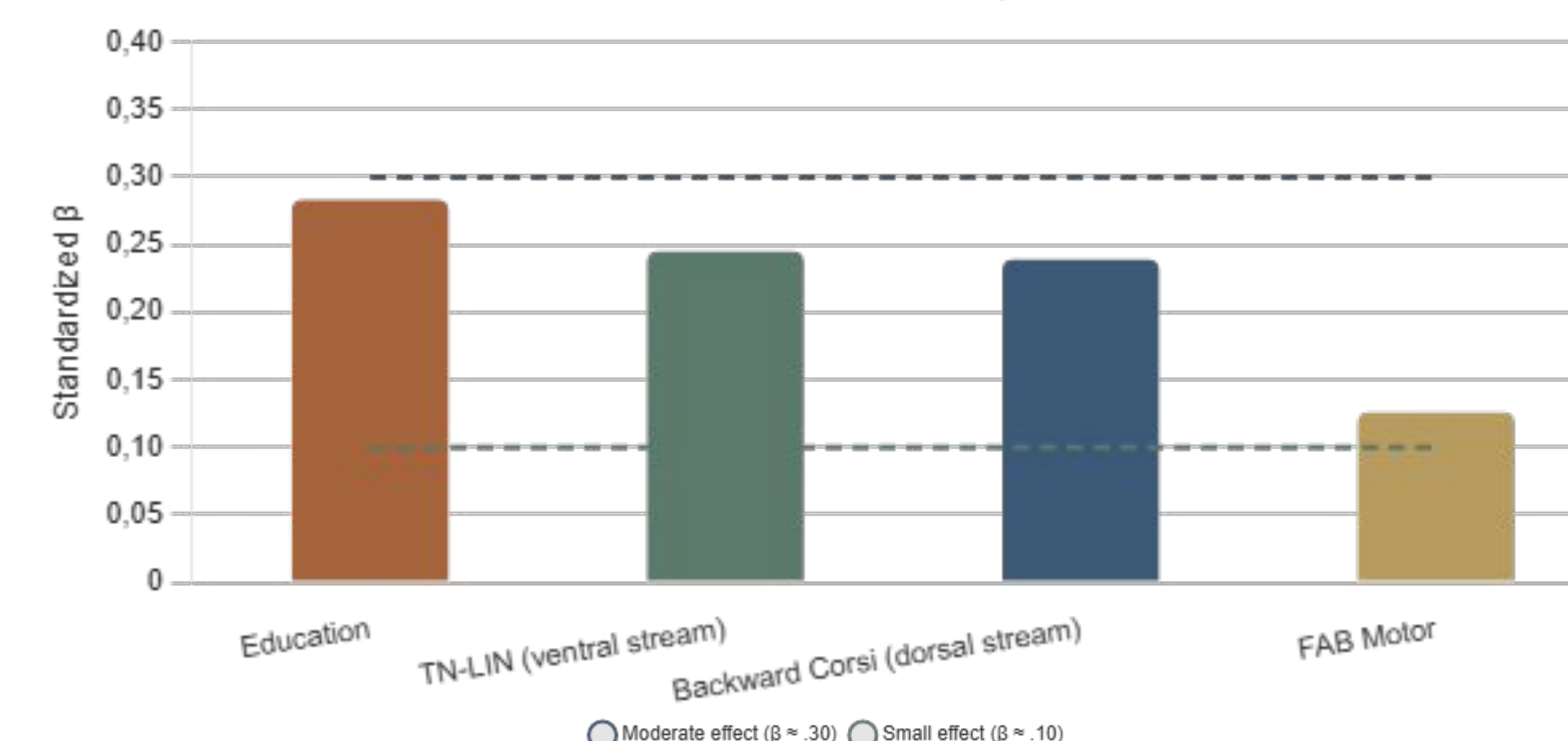


Figure 3 - Predictors of Copy Performance: Standardized Regression Coefficients

CONCLUSIONS

Visuoconstructive performance on the sTCFT is influenced by educational level and by cognitive processes associated with ventral and dorsal visual streams, which contribute with comparable effect sizes. Motor function plays a secondary role, while age, sex, and planning abilities do not independently predict performance. These findings support the development of scoring approaches that differentiate ventral and dorsal stream, potentially improving clinical and methodological utility of the sTCFT in aging and dementia research.

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