

Associative Memory and Error Patterns as Markers of Cognitive Impairment: Evidence from the ItFNAT

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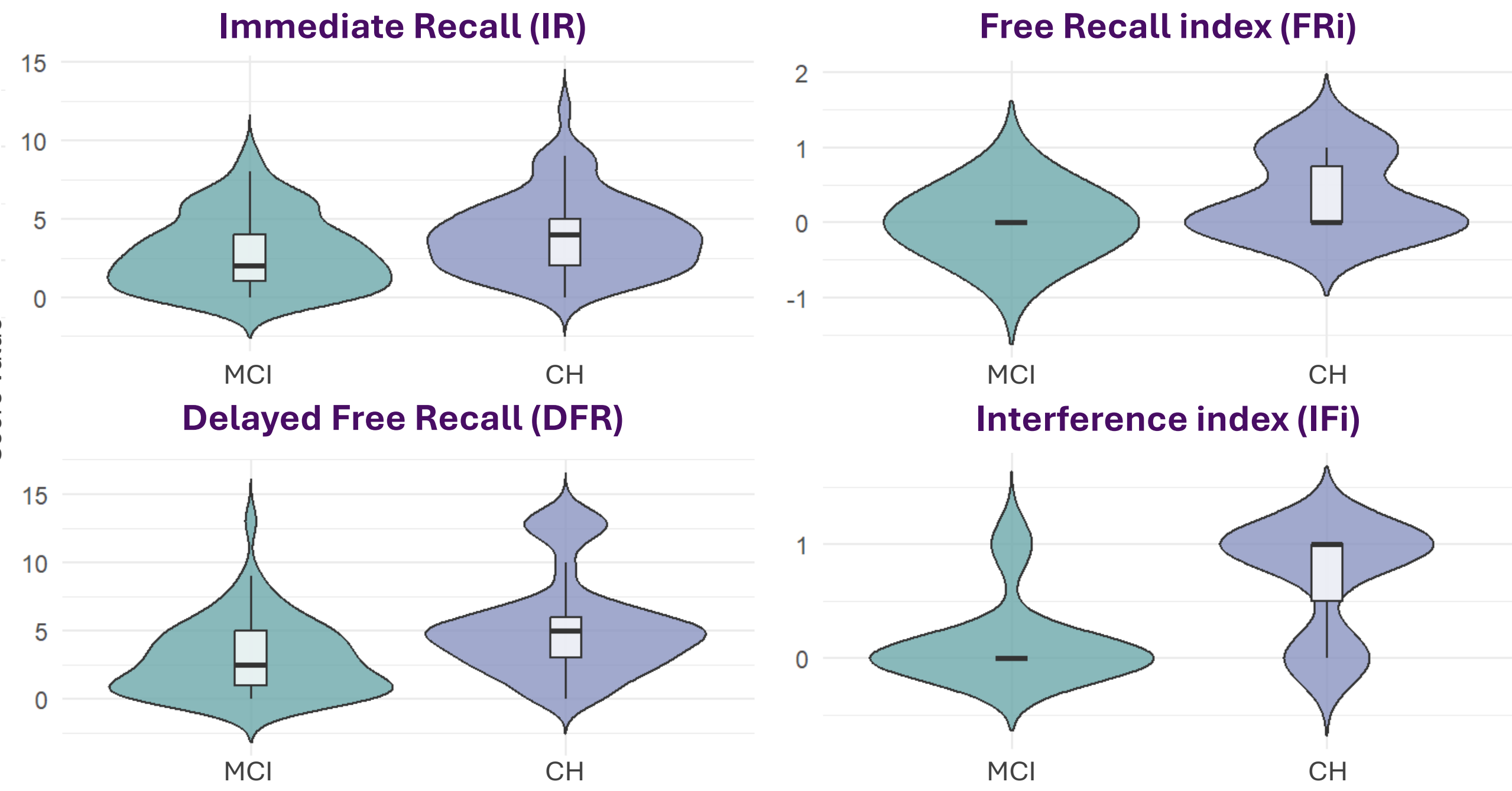
INTRODUCTION

Cross-modal associative memory is among the earliest cognitive processes to deteriorate in neurodegenerative conditions, and is frequently reported as a sentinel marker in the prodromal stages of Alzheimer’s Disease. Despite its clinical relevance, few validated instruments exist in Italian. The recently validated **Italian Face-Name Association Test** (ItFNAT; Manippa et al., 2025) addresses this gap by assessing cross-modal associative learning through three **classic quantitative metrics of memory performance** (i.e., immediate and delayed recall scores) and four quantitative indices of **cue-dependent retrieval** and response error patterns (i.e., **omissions**, **intrusions**, and **interferences**).

This study provides a systematic analysis of the psychometric properties and diagnostic accuracy of the ItFNAT in an aging population, benchmarking its clinical utility against the MoCA.

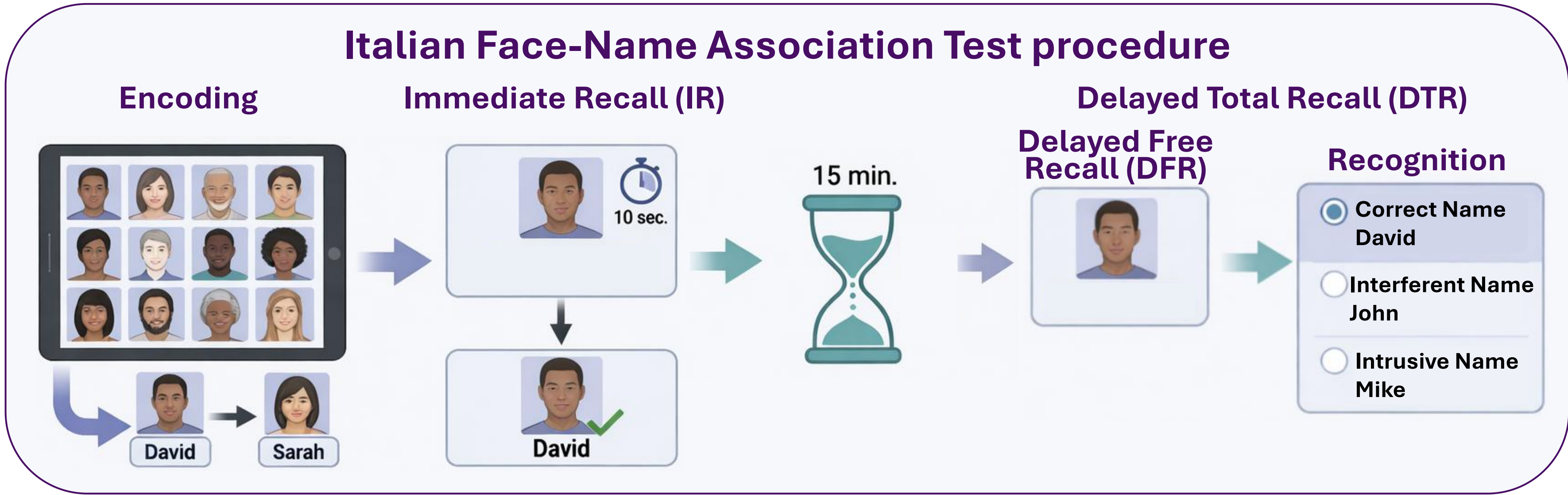
GROUP DIFFERENCES

The MCI group performed significantly worse on **Immediate Recall** ($p = .035$) and **Delayed Free Recall** ($p = .002$). Among the indices, both the **Interference Index** (IFI; $p = .010$) and the **Free Recall Index** (FRI; $p = .002$) discriminated reliably between groups, pointing to heightened susceptibility to intra-list interference and a specific deficit in free retrieval as core features of MCI-related memory dysfunction.



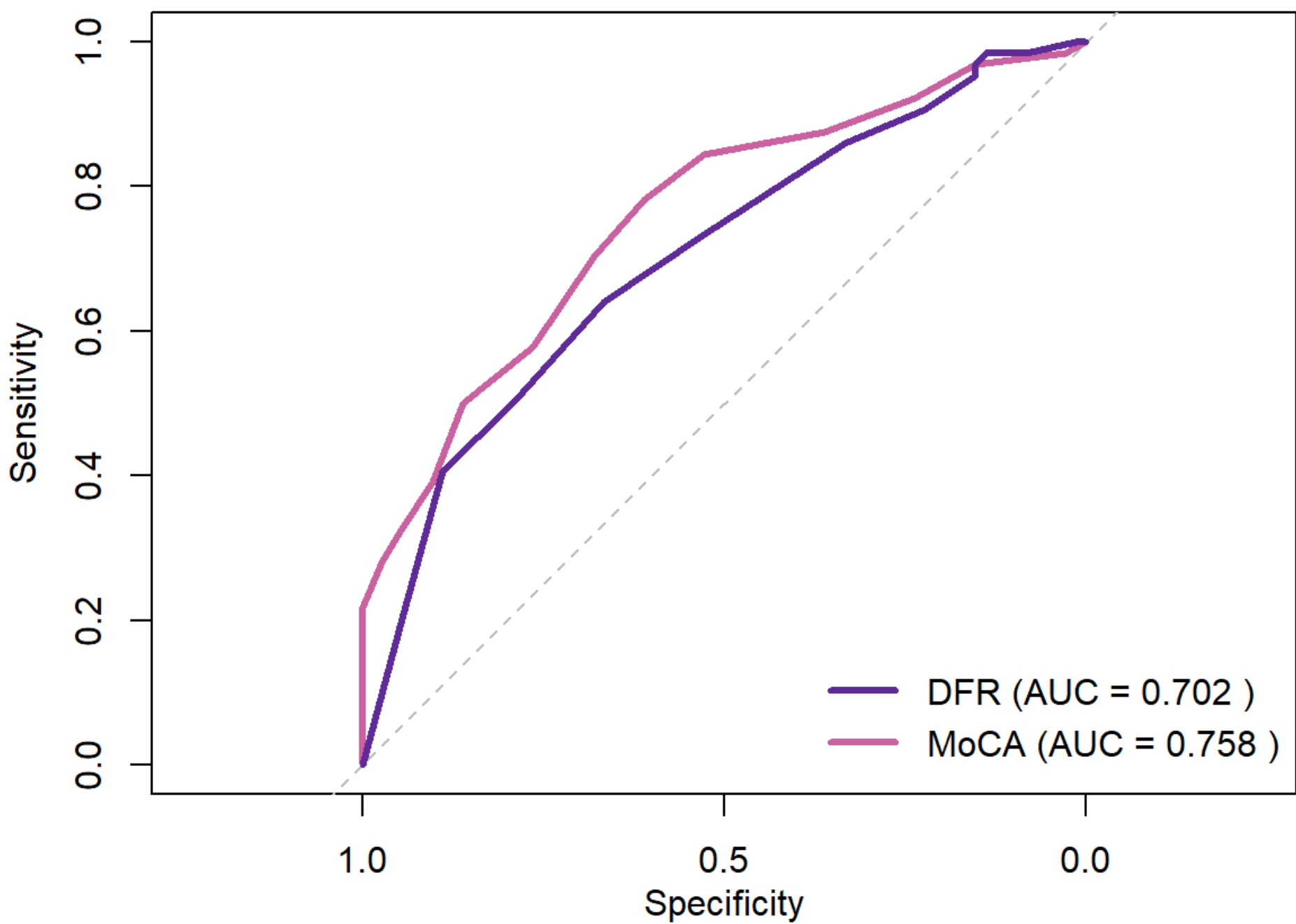
METHODS

A sample of **136 older adults** ($F = 77$; $M_{age} = 63.37$, $SD_{age} = 9.71$) underwent extensive neuropsychological evaluation and were classified, based on the DSM-5 criteria for Mild Neurocognitive Disorder and Petersen's criteria for MCI (APA, 2013; Petersen et al., 1998), as **cognitively healthy (CH = 72)** and **Mild Cognitive Impairment (MCI = 64)**.



CLASSIFICATION PERFORMANCE

Binary logistic regression ($\Delta\chi^2 = 22.113$, $p < .001$; $R^2 = .118 \sim .200$) identified the **DFR score as the strongest independent predictor of impairment** ($B = -0.206$, Wald = 8.369, $p = .004$), with an accuracy of 65.44%. ROC curve analysis established an **optimal raw DFR cut-off of 3.5**. Comparison with the MoCA revealed a complementary diagnostic profile: the **DFR threshold offered superior specificity (66.67% vs. 61.11%)**, while the **MoCA retained higher sensitivity (78.12%)**.



CLINICAL IMPLICATIONS

The ItFNAT demonstrates **high sensitivity to early cognitive decline**, with **delayed free recall** and **interference susceptibility** as its most diagnostically informative features.

Healthy older adults tend to misattribute learned associations, reflecting interference-prone but intact learning, whereas **MCI patients predominantly show omissions and intrusions**, indicating a failure to consolidate stable associative traces. Furthermore, the **DFR** is the only ItFNAT score uncorrelated with any measure from the broader neuropsychological battery, capturing **unique variance not sampled by existing instruments**.

The **ItFNAT** is best positioned as a second-level tool that **complements global screenings**, refining classification and reducing diagnostic uncertainty in ambiguous cases.