

Dual language naming performance among bilingual middle-aged adults at risk for Alzheimer's Disease



The Offspring Study
BRAIN HEALTH MATTERS
LA SALUD CEREBRAL IMPORTA

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BACKGROUND

- The number of bilingual adults with Alzheimer's disease and related dementias (ADRD) is increasing.
- Prior findings are mixed, but some studies suggest that ADRD may affect bilinguals differentially across languages.

Two Models of Decline:

Symmetric Decline

- Both languages deteriorate in parallel due to shared semantic systems

Asymmetric Decline

- Nondominant language is more vulnerable due to reliance on executive control

Mixed Findings

- Some studies show greater decline in nondominant language (Gollan 2010; Smirnov 2019).
- Others show parallel or dominant language decline (Gollan 2023).
- Longitudinal data suggest nondominant language decline may emerge later or progress faster (Ivanova 2014).

AIMS & HYPOTHESES

- We hypothesize that **poorer nondominant language** performance may serve as an **early** behavioral marker of ADRD in **bilingual midlife** adults.
- We defined ADRD risk as:
 - Abnormal serum biomarkers of amyloid and tau
 - Family history of dementia (FHD)
 - Increased white matter hyperintensities (WMH)

METHODS

- All participants completed the full study visit in their testing language of choice (English or Spanish).
- Dual language naming abilities were measured with the Multilingual Naming Test (MINT) administered in both English and Spanish.
- FHD was determined through consensus diagnoses in the parent study (n=550).
- Subsamples underwent 3T MRI (n = 309) and blood collection through standard venipuncture (n = 378).
- All statistical analyses used separate linear mixed effects regression models.

RESULTS

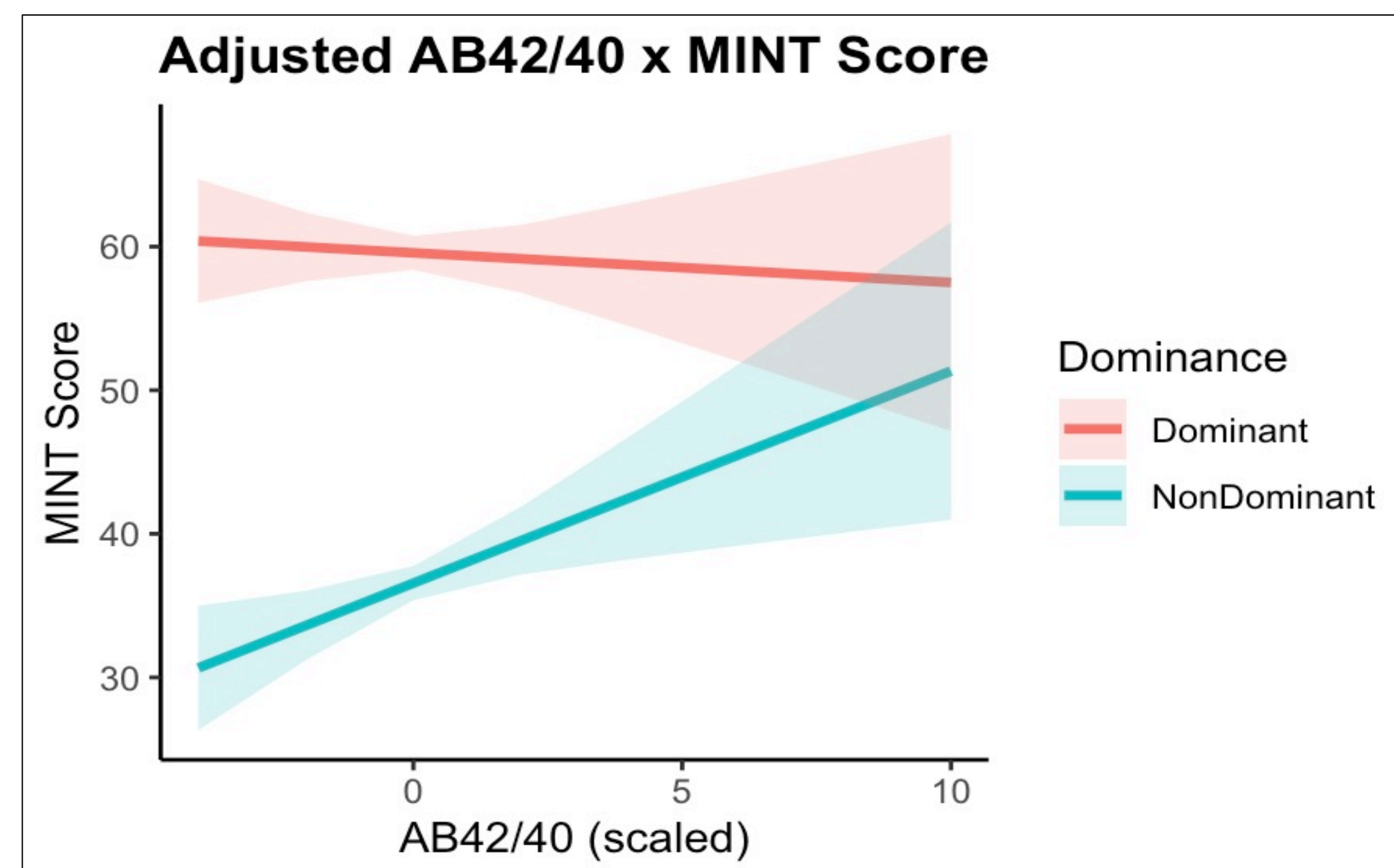


Figure 1. Lower A β 42/40 was associated with poorer nondominant relative to dominant language naming performance ($\beta = -1.7$, $p = 0.02$).

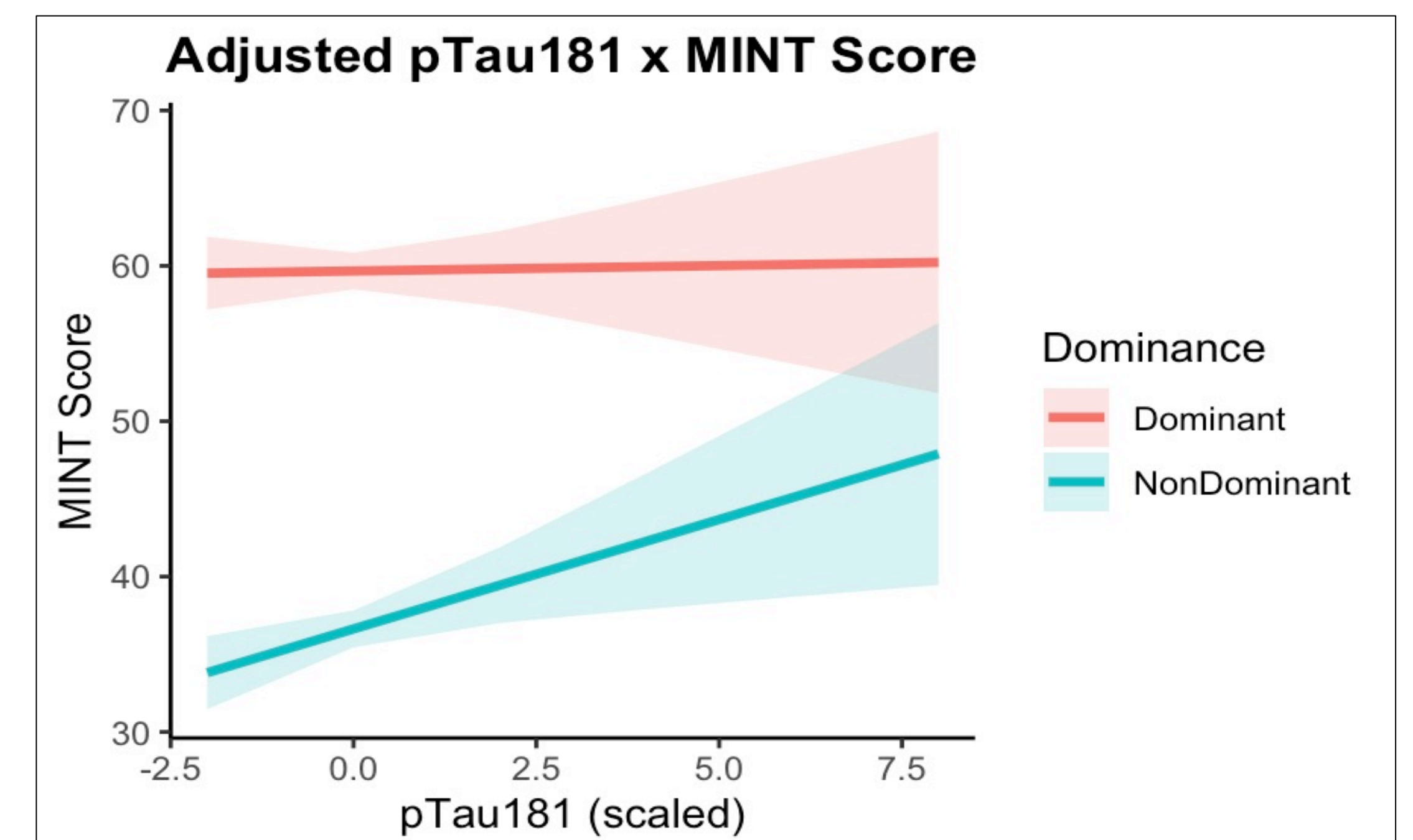


Figure 2. Higher pTau181 was marginally associated with better relative nondominant language performance ($\beta = 1.3$, $p = 0.05$).

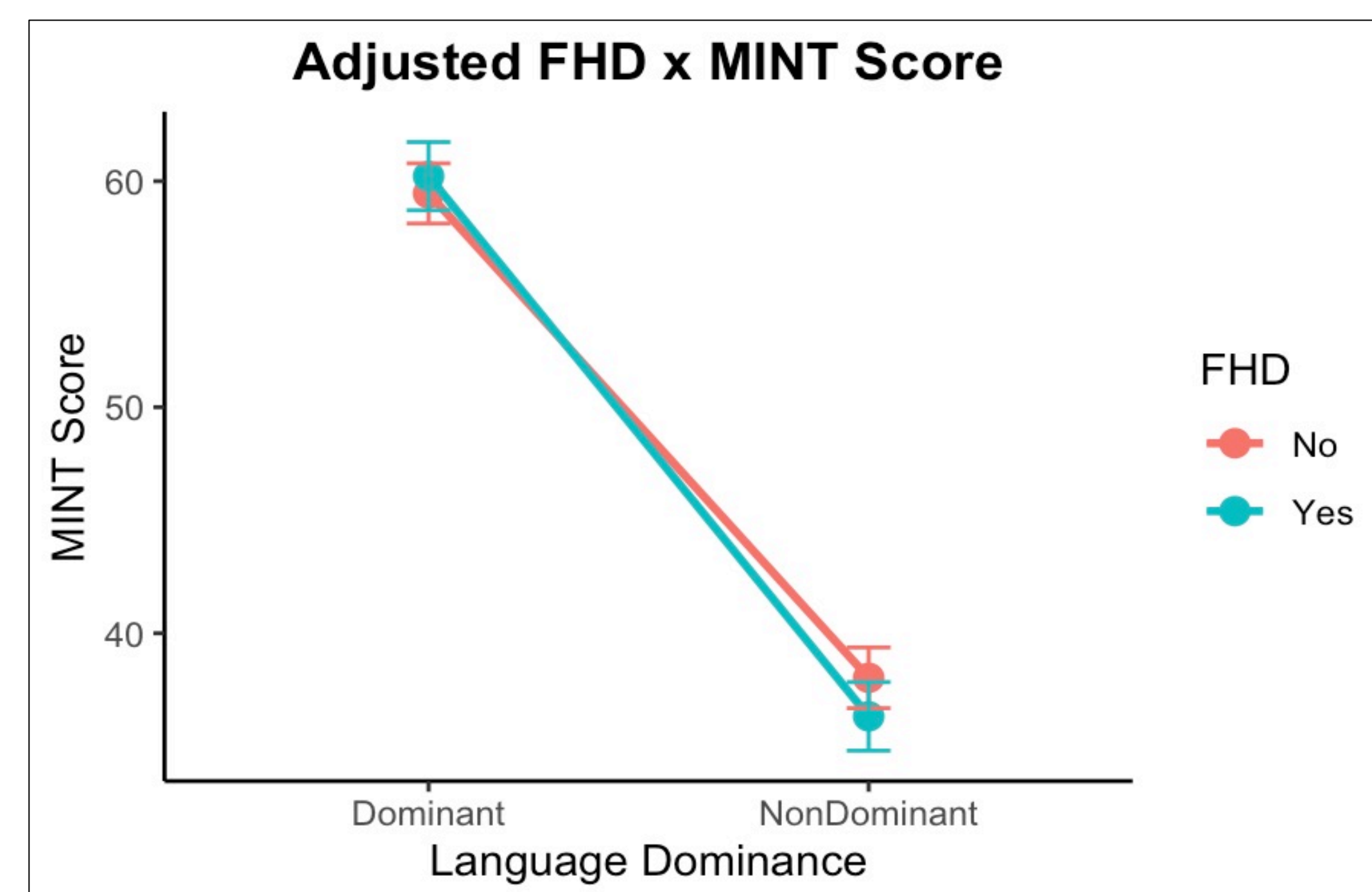
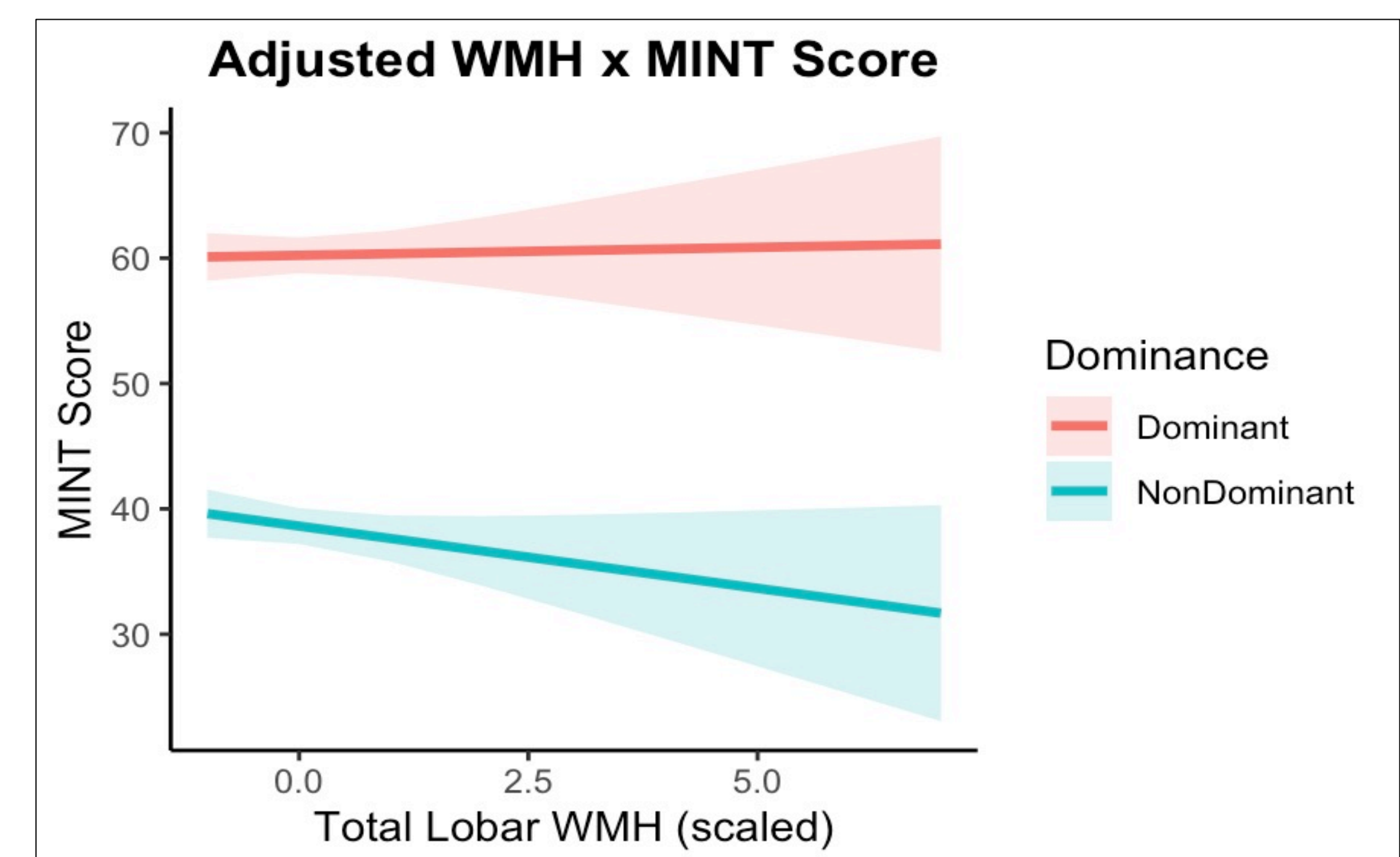


Figure 3. Positive FHD and greater WMH burden had on average lower nondominant compared to dominant language performance, although these associations were not significant ($p = 0.05$ and $p = 0.18$, respectively).



Characteristic	Overall (n=552)
Age, M(SD)	54.8 (10.9)
Female, n(%)	398 (72.1%)
Education (years), M(SD)	12.8 (3.2)
Parent's Education (years), M(SD)	6.7 (4.0)
Family History of Dementia, n(%)	205 (37.1%)
English Proficiency, M(SD)	5.00 (1.64)
Spanish Proficiency, M(SD)	6.41 (1.04)
English Age of Acquisition, M(SD)	15.0 (10.8)
Spanish Age of Acquisition, M(SD)	2.33 (4.89)
Dual Language Daily Use, n(%)	321 (58.2%)

CONCLUSIONS

- Our results partially support our hypothesis that worse naming performance in the nondominant language could be an early clinical marker in middle-aged bilingual adults.
- Unexpectedly, pTau181 was associated with better naming performance among those tested in Spanish ($\beta = 1.9$, $p = 0.01$). However, this result was attenuated after adjusting for English age of acquisition, which suggests confounding between degree of bilingualism and its sociodemographic determinants (i.e., educational and migration pathways of language acquisition).
- All other results were attenuated after stratification by testing language. The two groups significantly differ in degree of bilingualism, indicating limited direct comparability.
- Future research is needed to characterize patterns of language decline in multilingual populations at risk for ADRD with:
 - larger, more diverse cohorts
 - longitudinal designs