

Cross-walking proxy and episodic memory assessments to reduce selective attrition in studies of cognitive aging

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Background

- In dementia research, selective attrition can arise when cognitively impaired participants are unable to self-complete cognitive assessments.
- Proxy respondents may provide alternative assessments, but proxy-reported scores are not directly comparable to respondent-based cognitive test scores.

Objective

- To generate predicted total word recall scores for respondents with proxy assessments and retain them in longitudinal memory trajectory analyses.

Methods

Study population: Health and Retirement Study (HRS)

- *Model development sample:* 2016 Harmonized Cognitive Assessment Protocol (HCAP) participants with both direct cognitive assessment and proxy reports available
- *Model validation samples:* 2016 HCAP test set, 2022 HCAP sample
- *Application sample:* HRS Core participants followed from 2000–2022 for longitudinal application

Outcomes:

- *Respondent direct cognitive assessments:* Sum of immediate and delayed 10-word recall (total word recall)
- *Proxy reports of cognitive function:* 16-item Jorm Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE)

Statistical analysis:

- Cross-validation to compare candidate models defined by combinations of IQCODE score [linear or natural spline], respondent age centered at 75 years [linear or natural spline], proxy relationship to respondent [categorical]), and interactions).
- Applied best fit model to obtain predicted total word recall scores for HRS Core participants with proxies
- Estimated memory trajectories with GEE models; observed word recall when available and predicted scores otherwise; compared to estimated trajectories of observed word recall only with IPW for selective attrition.

Results

Table 1. Final model fit in two testing sets. The best model included spline terms for both IQCODE score and respondent age, and an interaction between them.

Testing set	RMSE	MAE	R ²
2016 HCAP held-out sample	3.21	2.57	0.22
2022 HCAP sample	3.27	2.61	0.17

Table 2. 2016 HCAP sample characteristics.

Characteristic	N = 3,029
Age (years), Mean (SD)	76.2 (7.5)
Female, n (%)	1,816 (60.0%)
Race/ethnicity, n (%)	
Non-Hispanic, White	2,187 (72.2%)
Non-Hispanic, Black	456 (15.1%)
Hispanic	320 (10.6%)
Non-Hispanic, Other	64 (2.1%)
Proxy type, n (%)	
Spouse/partner	1,362 (45.0%)
Child	796 (26.3%)
Grandchild	77 (2.5%)
Sibling	140 (4.6%)
Other	654 (21.6%)

Figure 1. Mean observed vs. predicted (cross-walked) total word recall scores by dementia status

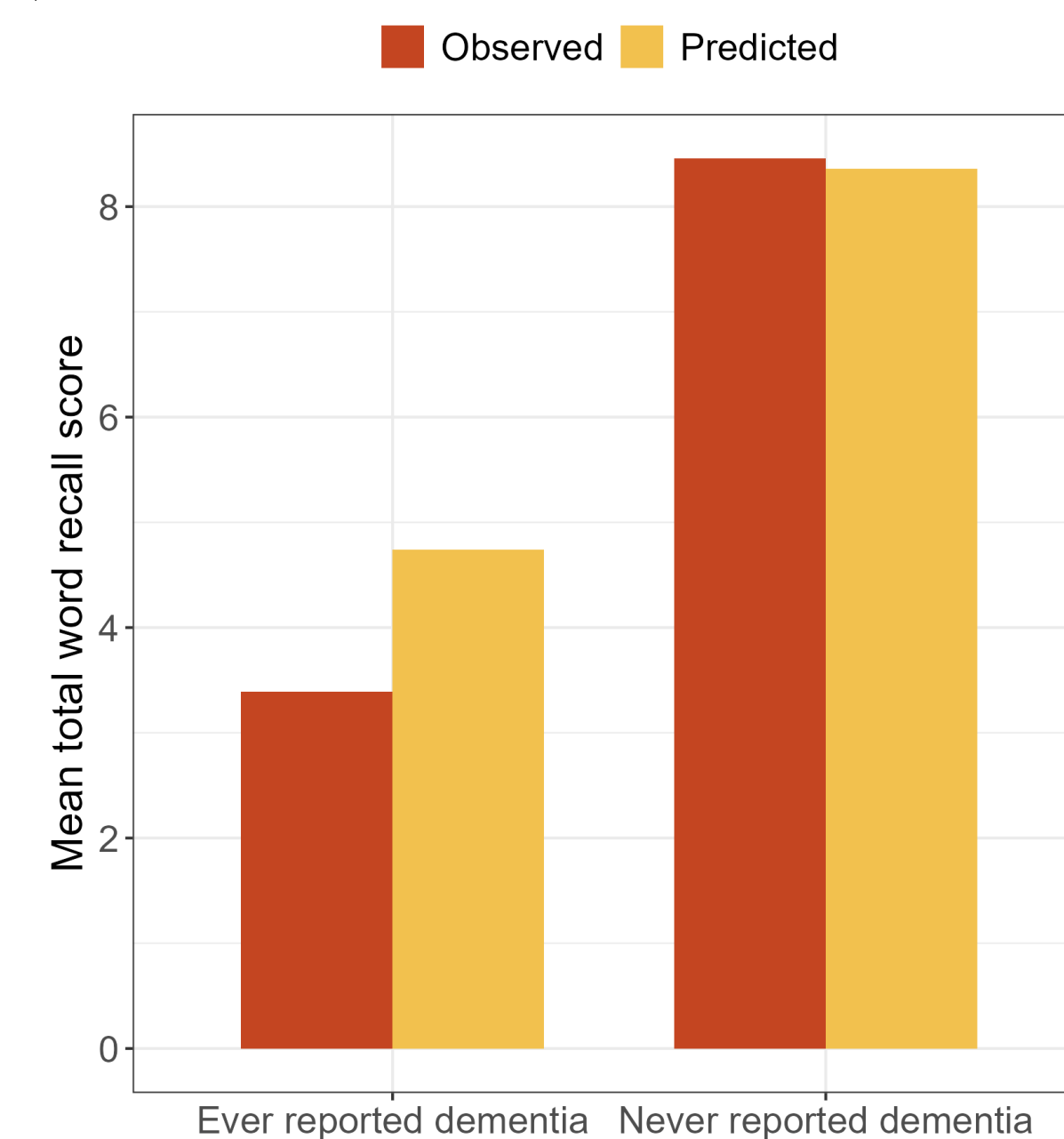
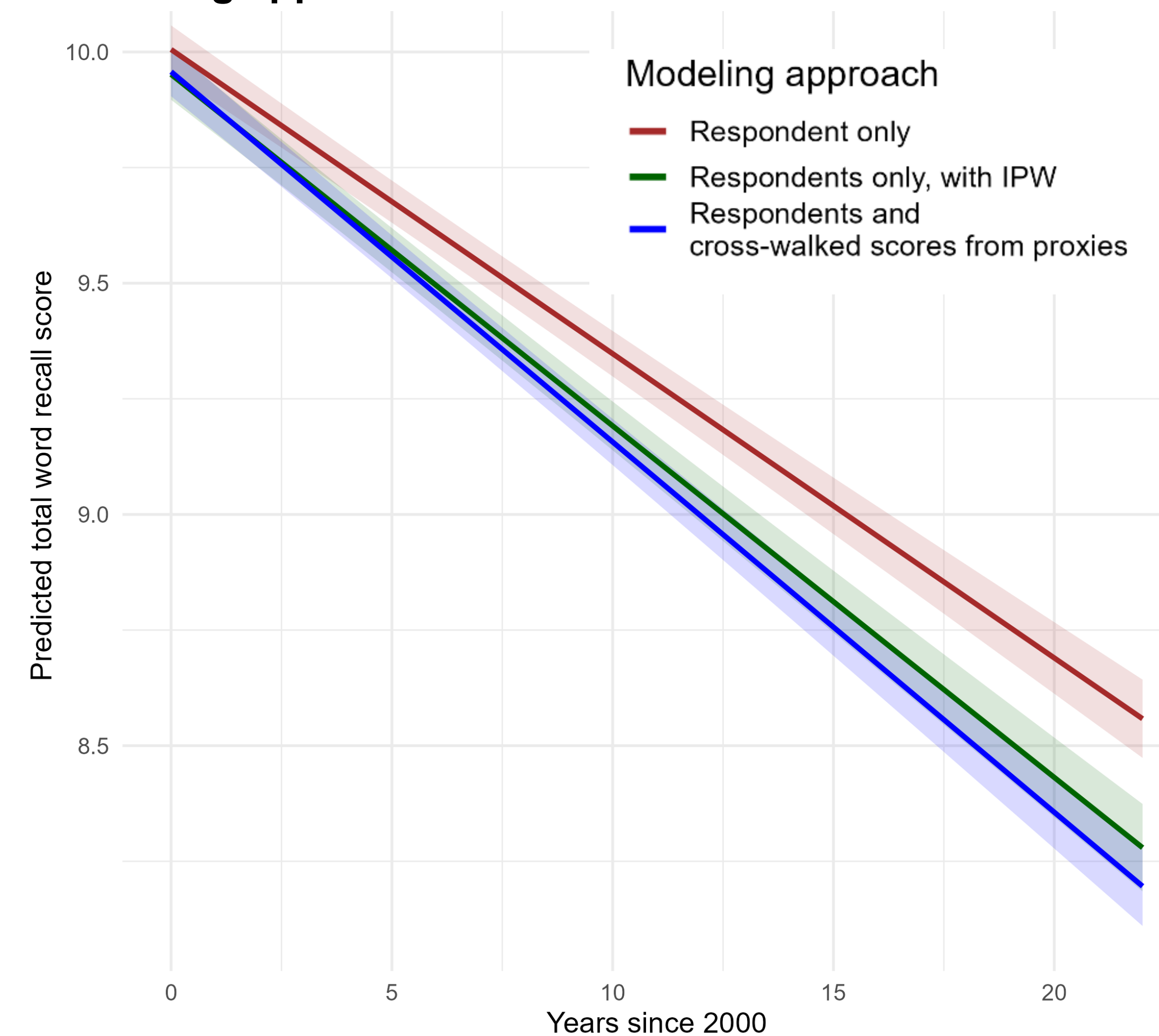


Figure 2. Total word recall score trajectories over time by modeling approach



Conclusions

A simple memory cross-walking approach performs comparably to inverse probability weighting to correct selective attrition.

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