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KEY TAKEAWAY: The CCI demonstrates excellent psychometric properties across 5 years. Memory items; especially new learning and everyday recall, provide the earliest and most precise measurement signal. Informant-reported scores show greater measurement precision and more consistent prediction of diagnostic progression than self-reported scores, particularly for MCI-to-dementia conversion.

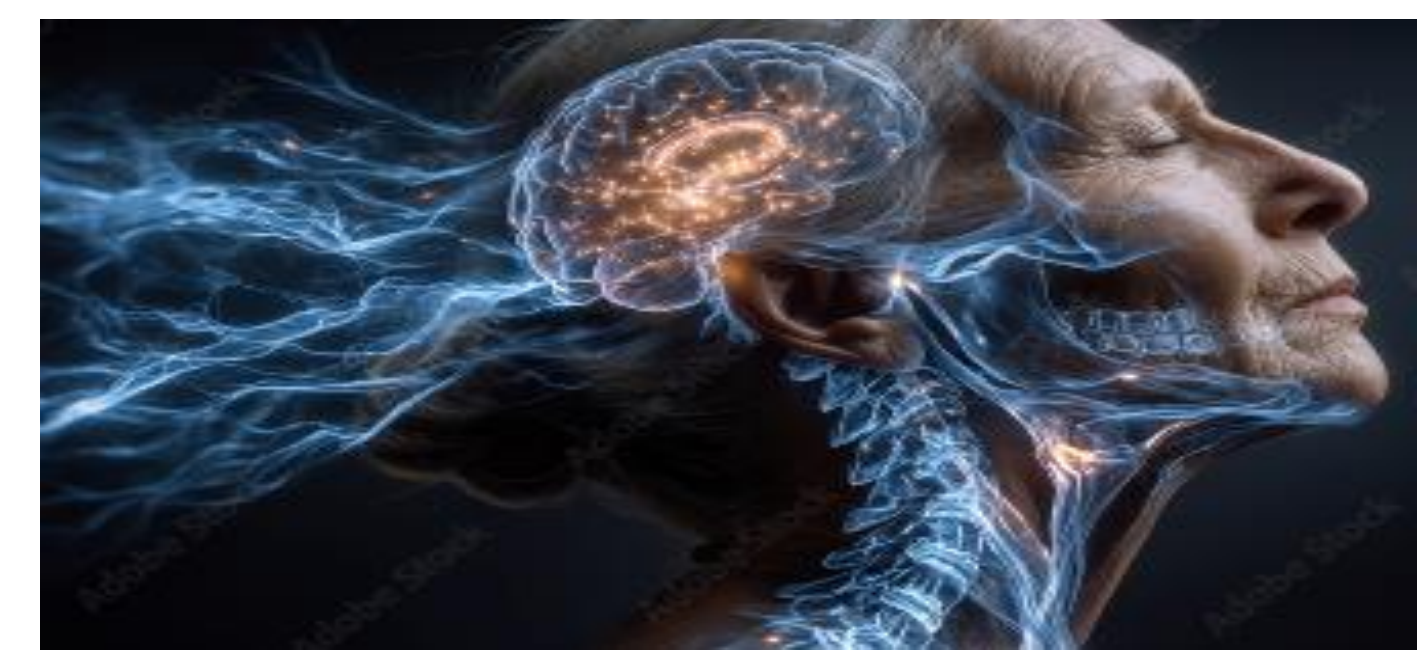
1. INTRODUCTION

Alzheimer's disease (AD) is one of the most common and debilitating chronic illnesses affecting older adults, with almost 7 million people affected in the United States in 2023, with a projected increase to over 13 million by 2060.

Detecting early changes often relies on individuals recognizing and reporting problems (**self-report**), yet this can be unreliable.

Reports from knowledgeable **informants**, such as family, friends, caregivers or study partners, may provide more accurate observations of cognitive and functional change.

The Cognitive Change Index (CCI) is a 20-item measure spanning memory, executive, and language domains.



Study objective: Compare psychometric performance of self- and informant-report CCI and identify the strongest early items.

CCI-20 Cognitive Domains

Memory
12 items

Executive
5 items

Language
3 items

CCI SCORING

- 5-point Likert scale
- 1 = no change / normal ability
- 5 = much worse / severe problem
- Total: 20–100
- Memory: 12–60
- Executive: 5–25
- Language: 3–15

The 739 self-informant pairs represent cases where both the participant and their informant completed the CCI at baseline, enabling direct comparison of self- and informant-reported scores for the same individual.

2. METHODS

Indiana ADRC cohort
Visits 2013–2024
IRB-approved

Baseline
Self-report N=769
Informant-report N=890
739 matched self–informant pairs

Follow-up
Year 1 / Year 3 / Year 5 / Year 10

CCI: 20 items
5-point Likert scale
Total 20–100; Memory 12–60;
Executive 5–25; Language 3–15

Analyses

- Cronbach's alpha
- Weighted kappa
- Scree/eigenvalue checks
- Graded response models to estimate item discrimination, thresholds, and information. (*discrimination a*, *thresholds b₁-b₄*)
- Item information curves
- Logistic regression (odds ratios)

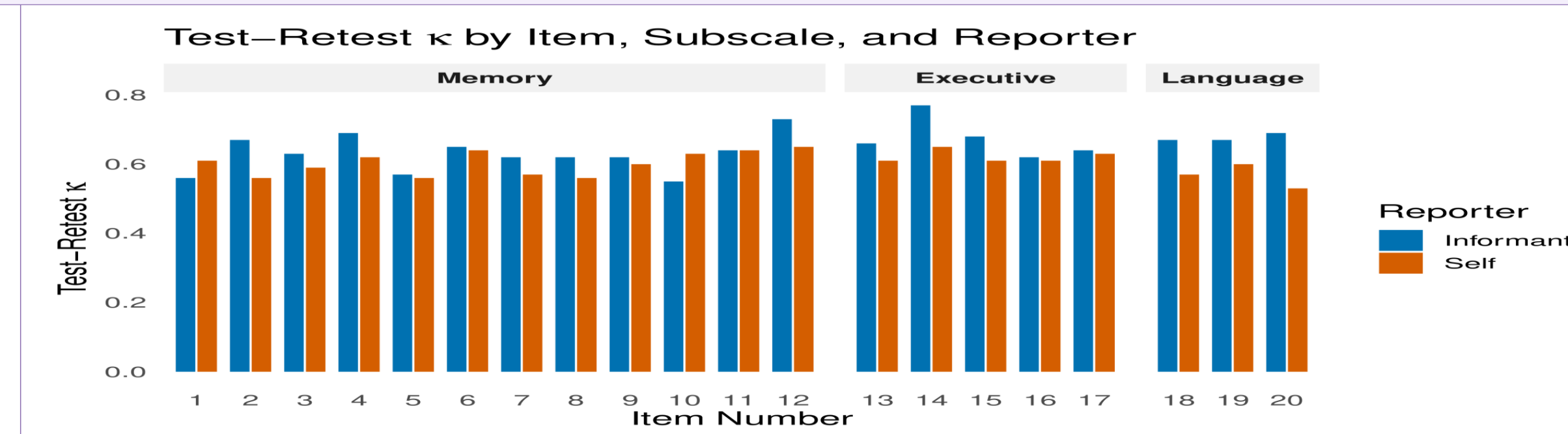
Baseline demographic and diagnostic characteristics of participants

Characteristic	Self-Report	Informant-Report
Female , n (%)	454(59.0%)	520 (58.4%)
Male, n (%)	315 (41.0%)	370 (41.6%)
African American, n (%)	163(21.2%)	185 (20.8%)
Asian, n (%)	2 (0.3%)	3 (0.3%)
Other race, n (%)	3 (0.4%)	3 (0.4%)
White, n(%)	600 (78.1%)	696 (78.4%)
Hispanic ethnicity, n (%)	12 (1.6%)	14 (1.6%)
Cognitively Normal, n (%)	459 (59.7%)	471 (52.9%)
Mild Cognitive Impairment, n(%)	200 (26.0%) ^a	212 (23.8%)
Dementia, n(%)	110 (14.3%)	207 (23.3%)
Age (years), mean ± SD (range)	66.0 ± 12.6(18.5 – 95.0)	66.0 ± 12.7(18.5 – 102.7)
Education (years, mean ± SD (range))	15.7±2.7(2.0 – 23.0)	15.6±2.8(2.0 – 28.0)

Scree plots and eigenvalues supported a dominant single factor (56.5% variance self-report; 78.5%-informant-report).

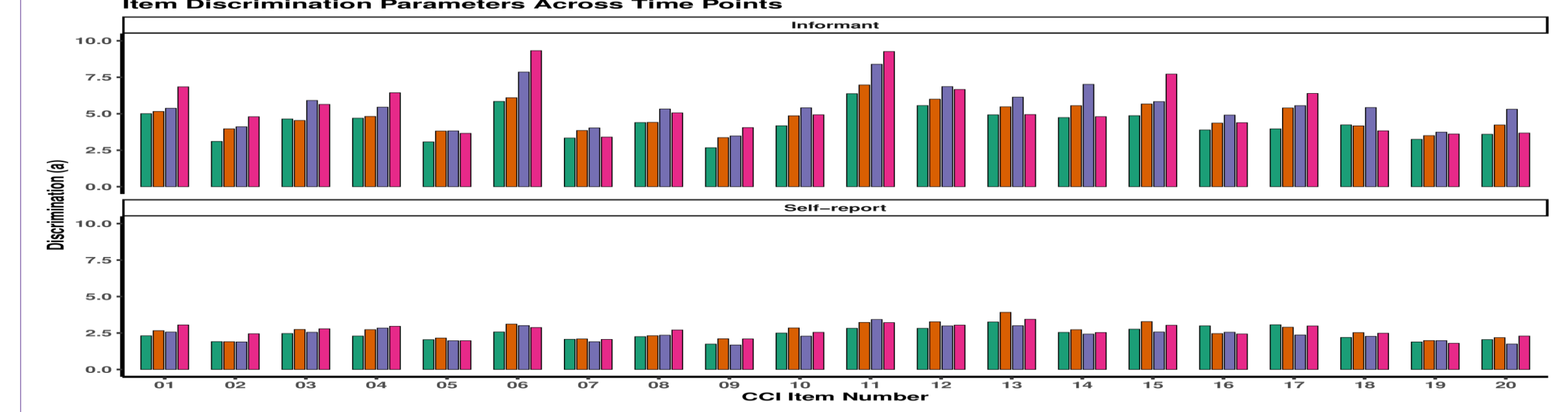
3. RESULTS

1. Reliability & agreement: Test–retest κ by item, subscale, and reporter



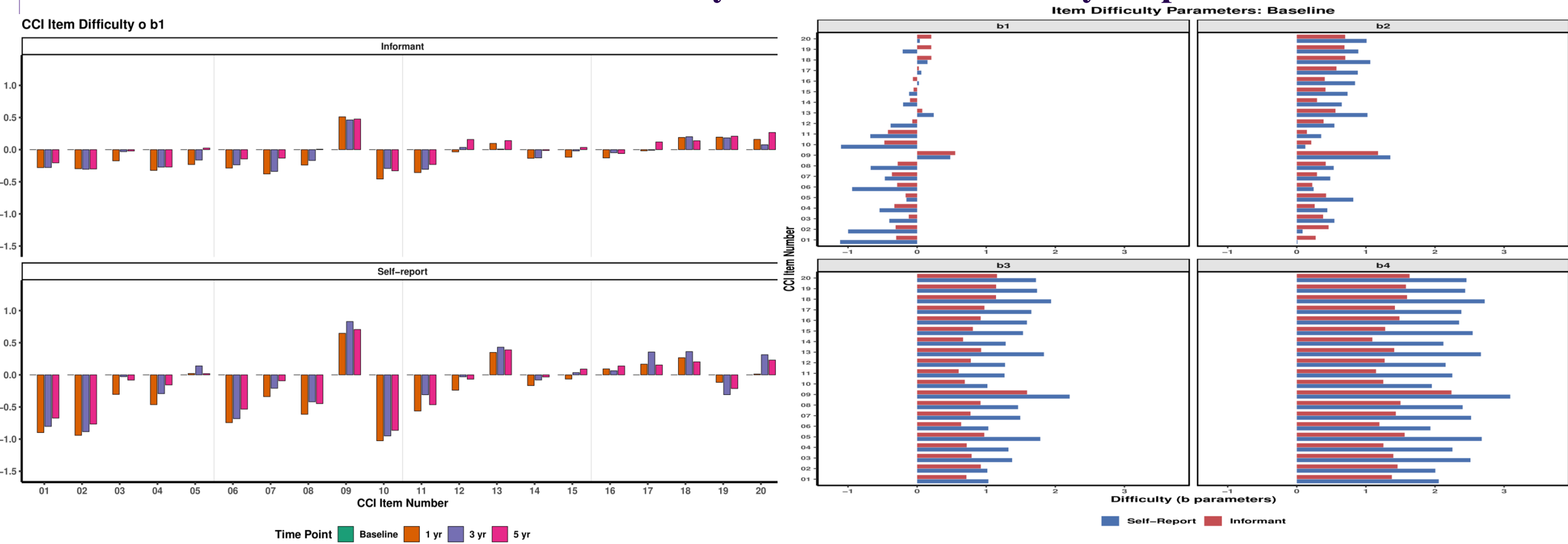
- Cronbach's α: Total CCI 0.962 self and 0.986 informant; Memory 0.942 self and 0.978 informant.
- Weighted κ showed moderate-to-substantial agreement across items.
- Highest agreement for Item

2. Memory items detect earlier decline: item discrimination parameters across time points



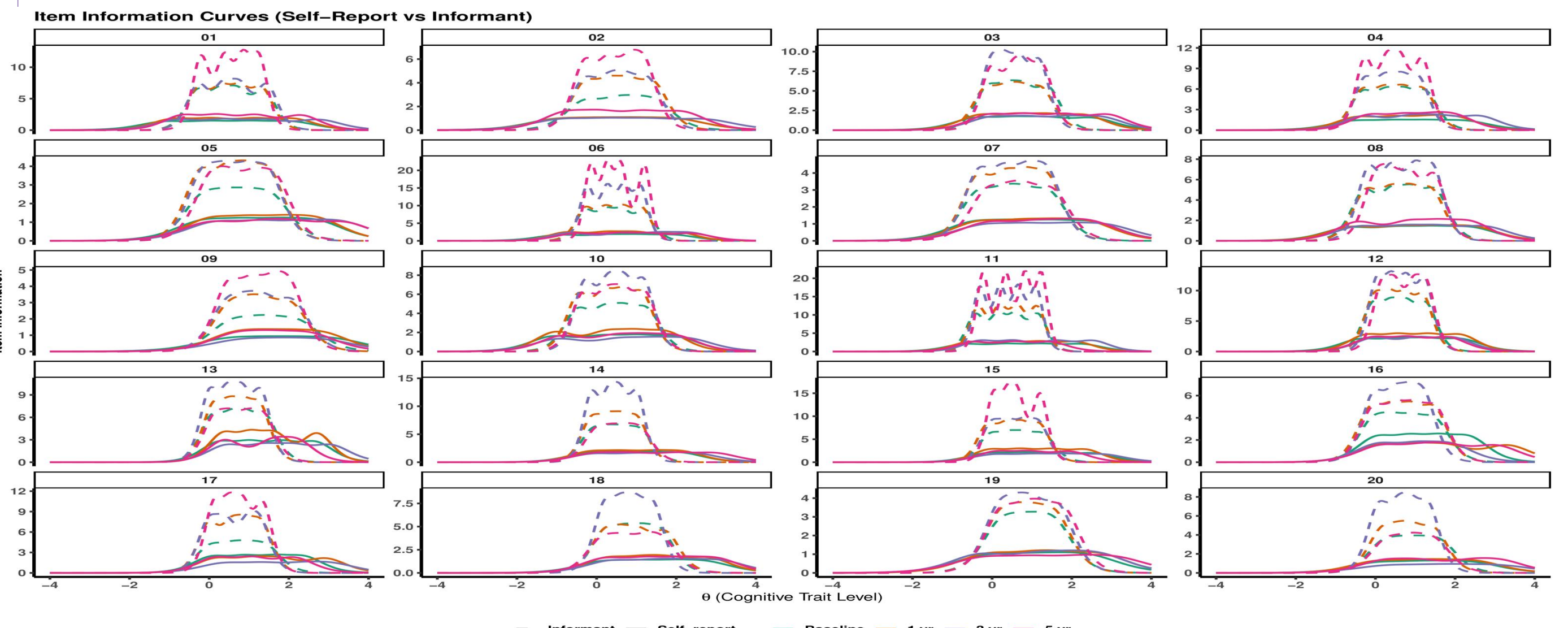
- Memory items had the highest discrimination, especially Items 6, 3, 11, and 12.
- Informant discrimination was consistently higher than self-report.
- Executive items 14 and 15 were also strong; language items were lower.

3. Thresholds: memory items had lower early response thresholds



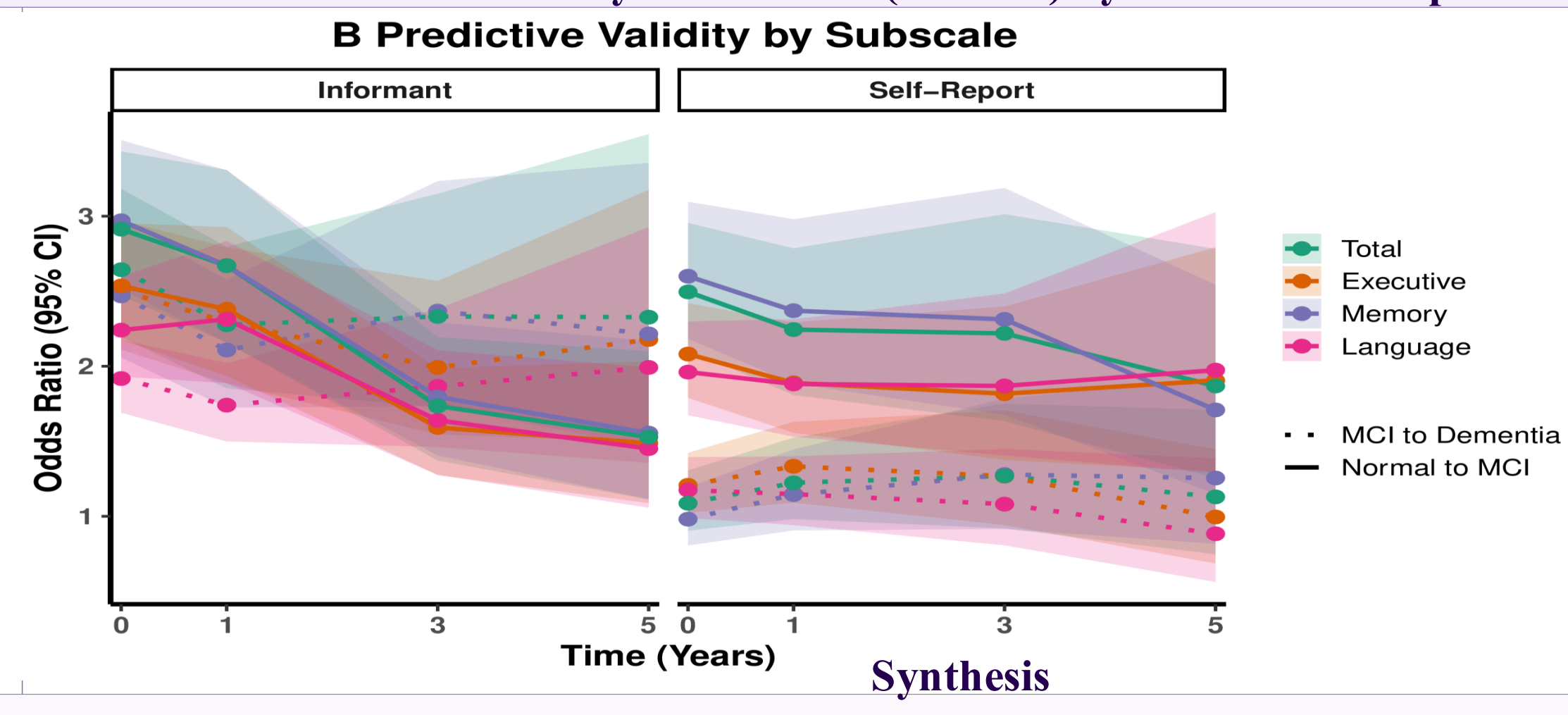
- Lower b₁/b₂ thresholds indicate earlier endorsement of subtle change.
- Memory items 4, 8, and 10 showed low early thresholds.
- Executive and language items generally required greater perceived decline.

4. Greater precision for informant report: item information curves



- Items 6, 11, and 12 had the tallest information curves.
- Informant curves peaked higher and at lower levels of perceived decline.
- Informants were especially sensitive to mild impairment.

5. Predictive validity: odds ratios (95% CI) by subscale and reporter



- Higher baseline CCI scores predicted later diagnostic progression.
- Informant-report scores more consistently predicted both CN→MCI and MCI→dementia.
- Example baseline ORs (informant): Memory 2.97 for CN→MCI and 2.47 for MCI→dementia.
- Self-report predicted CN→MCI reasonably, but was weaker for MCI→dementia.

Memory items captured earlier perceived decline; executive and language items appeared more informative at later stages. Informant ratings provided stronger precision and more consistent prediction of progression.

4. CONCLUSIONS

- The CCI showed excellent reliability and a dominant common factor.
- Memory items related to new learning and everyday recall provided the strongest early signal.
- Informant-report CCI ratings offered higher measurement precision than self-report
- Baseline informant CCI scores more consistently predicted longitudinal progression, especially MCI-to-dementia conversion.
- High-information items may support development of a shorter clinically useful screening tool.

Future Work

- Determine whether the strongest CCI items can be used to create a reduced, clinically useful screening measure.
- Validate the CCI item-level structure and predictive performance in more diverse ADRC, clinical, and community-based cohorts.
- Evaluate whether selected CCI items improve prediction when combined with biomarkers, cognitive testing, and respondent characteristics.

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Take-Home Message

Informant input enhances early detection of decline and improves prediction of meaningful clinical outcomes in aging populations. Memory items, especially new learning and everyday recall, provided the earliest and most precise measurement signal.

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