CCAB–Español: The California Cognitive Assessment Battery in Spanish

Background: By 2060, the incidence of ADRD is predicted to increased 6-fold in the US Hispanic population (Matthews, Xu et al. 2019). However, cognitive testing of US Hispanics is complicated by limited Spanish-language test materials and a dearth of examiners fluent in Spanish. Here, we present preliminary results from an automated computerized battery, CCAB–Español, that administers and scores verbal and non-verbal tests in Spanish.

Method: Spanish-language equivalents of CCAB-English[1] test materials were created and presented with text-to-speech voices in a Mexican dialect. Participants (n=61; age 43-79; 64% women) completed 32 tests over three days, including verbal, visual, memory, and processing speed tests, as well as demographic and psychological questionnaires. Test were administered in participants' homes and remotely monitored by Spanish-speaking examiners. Verbal tasks were objectively scored using Consensus Automatic Speech Recognition (CASR). Selected tests were administered twice to assess test-retest reliability.

Result: Reaction times, response accuracy, error types, and speech metrics were collected and analyzed. Participant satisfaction with the battery was high, with 100% of the participants completing all three days of testing. Tests demonstrated excellent test-retest reliabilities, for example the test-retest values for delayed recall on a story recall task was .83.

Conclusion: The results from ongoing normative data collection show that CCAB-Español is an efficient, scalable platform for the comprehensive cognitive assessment of US Spanish speakers.

Possible images:
Dialect/origin distribution
Sample performance on a task as a function of age, correlation

Matthews, K. A., W. Xu, A. H. Gaglioti, J. B. Holt, J. B. Croft, D. Mack and L. C. McGuire (2019). "Racial and ethnic estimates of Alzheimer's disease and related dementias in the United States (2015–2060) in adults aged ≥65 years." Alzheimer's & Dementia **15**(1): 17-24.

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[1] Woods, D., Pebler, P., Johnson, D. K., Herron, T., Hall, K., Blank, M., ... & Baldo, J. (2024). The California Cognitive Assessment Battery (CCAB). *Frontiers in Human Neuroscience*, *17*, 1305529.
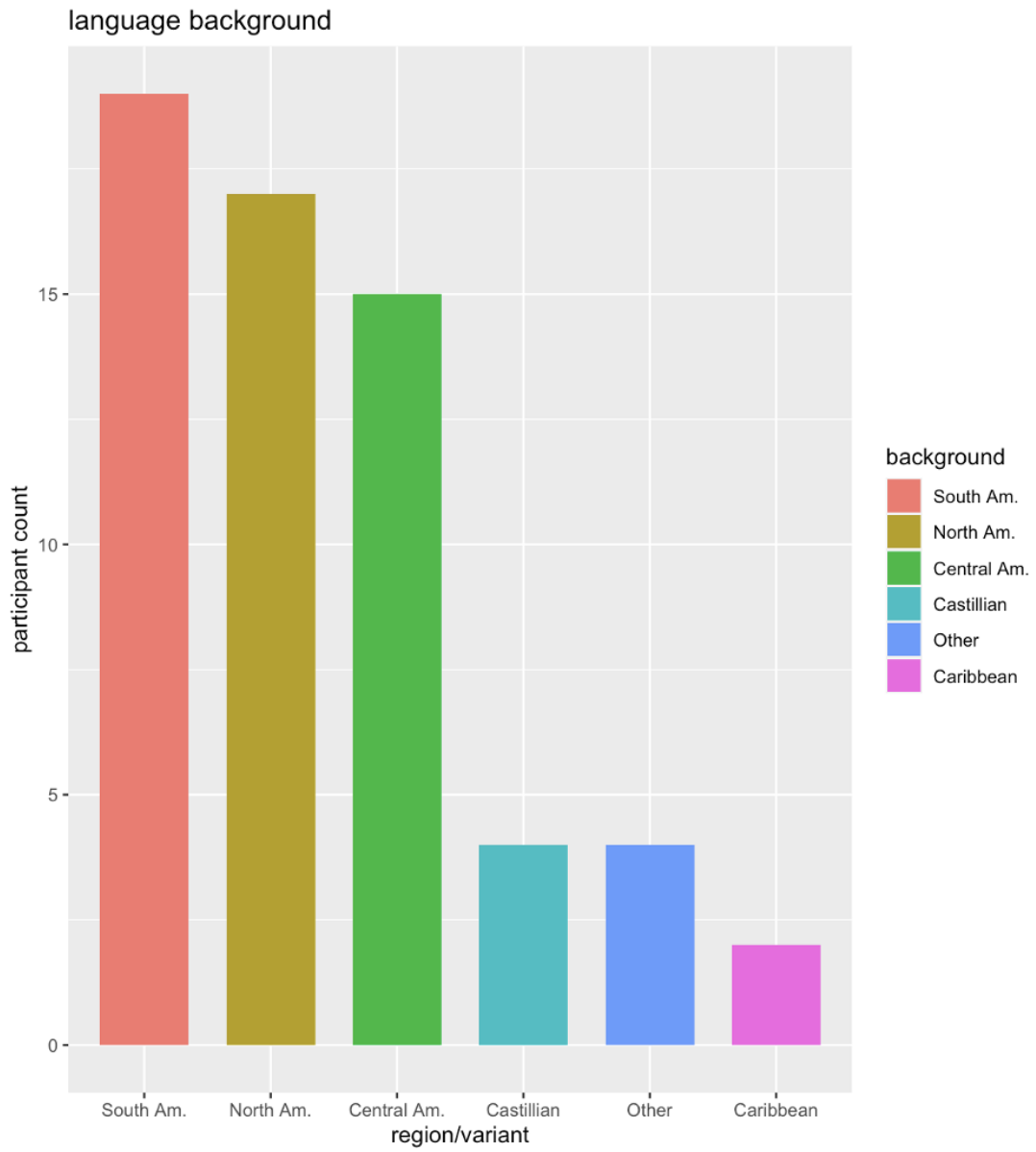
Figure 1. Language background of US Spanish speaking participants. Broad regional variant on x-axis, participant count on y-axis.
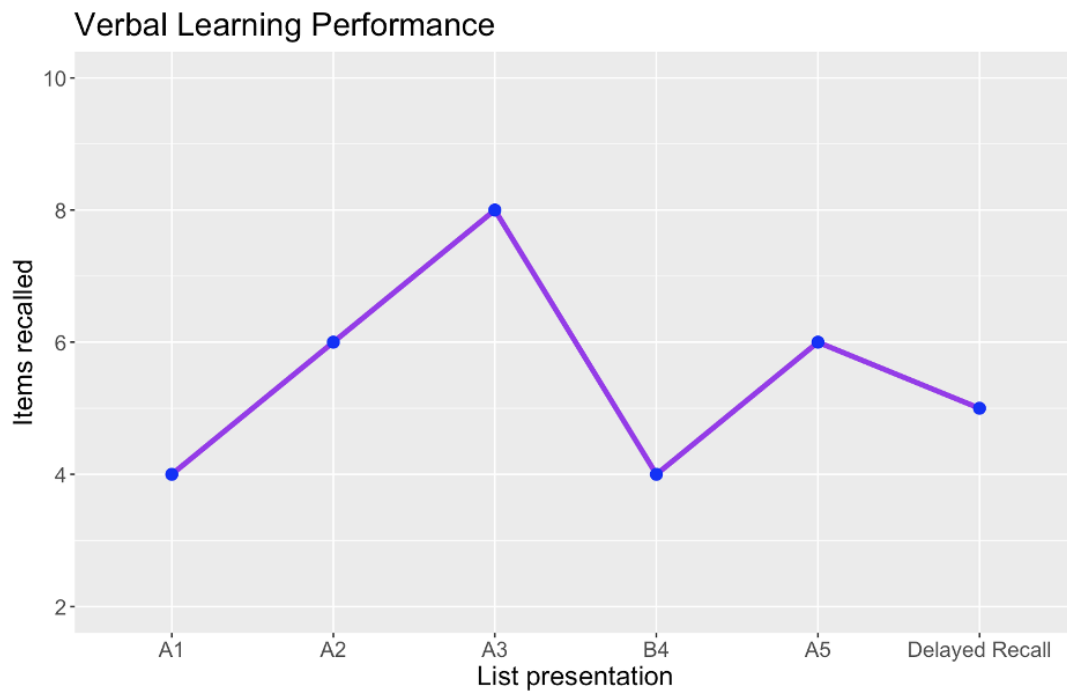
Figure 2: Sample performance on the Bay Area Verbal Learning Test (BAVLT) by a Spanish speaking participant. Participants undergo 3 trials of encoding and immediate recall on List A, then one trial of encoding and immediate recall on List B, followed by a final trial on list A. Delayed recall of List A occurs after an interval of ~ 30 minutes.