Verbal Fluency Performance in Older Adults on a Novel Computerized Test Battery

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Introduction

Verbal fluency is a sensitive measure of semantic impairment in dementia that **appears several years prior to diagnosis**. This early impairment has been associated with neural changes and altered activation in key regions of bilateral temporal and frontal cortex. In the current study, we report verbal fluency findings from a large group of healthy older adults on a **new computerized battery: California Cognitive Assessment Battery.** The CCAB utilizes **advanced automatic speech recognition** and transcription software. Participants are tested remotely in their homes at baseline and **followed longitudinally at 6-month and 1-year intervals.**

Participants

n = 291 healthy older adults
174 male, 117 female
Mean age: 70.9 (SD = 6.6), range 56-89
Mean education: 16.6 (SD = 2.9), range: 12-20

Test Materials

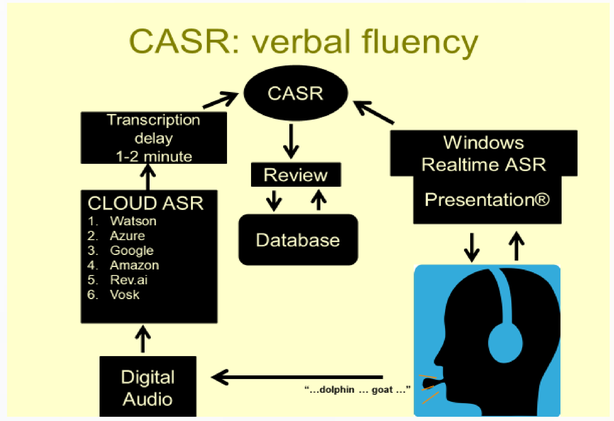
- California Cognitive Assessment Battery (CCAB)
  - automated battery administered remotely at-home
  - re-administered at 6-months and 1-year thereafter
  - includes cognitive tests & psychological questionnaires
- 6 categories of semantic verbal fluency

Countries	Furniture
Sports	Animals
Fruits	Vegetables

Procedures

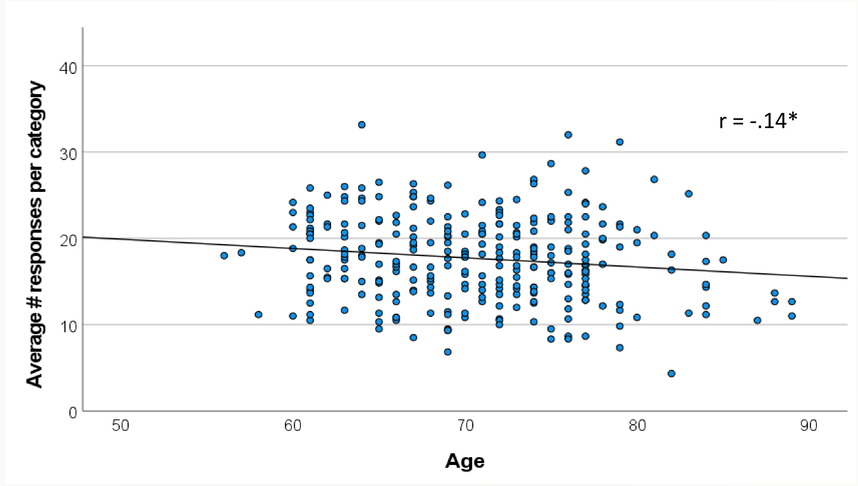
- 60 secs for each category
- Remote, at-home testing
- Web-based examiner interface
- Automated instructions and verbal transcription

Data Analysis: Automatic Transcription

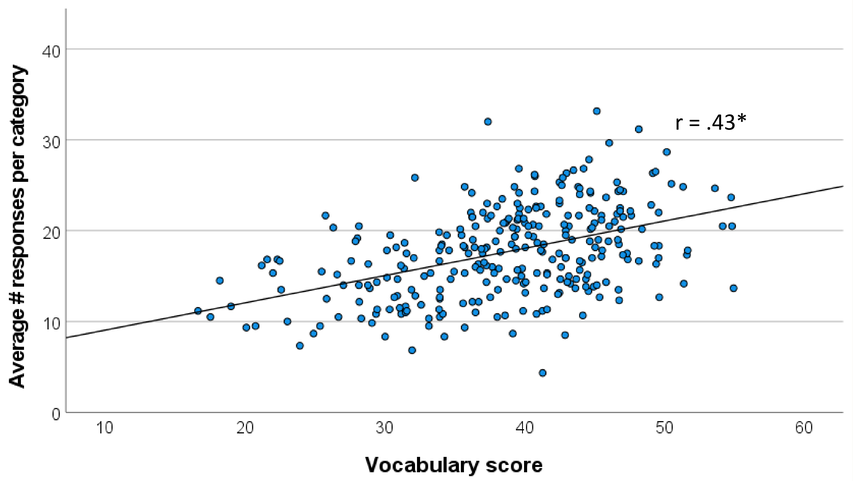


*6 ASR engines produce automatic transcriptions

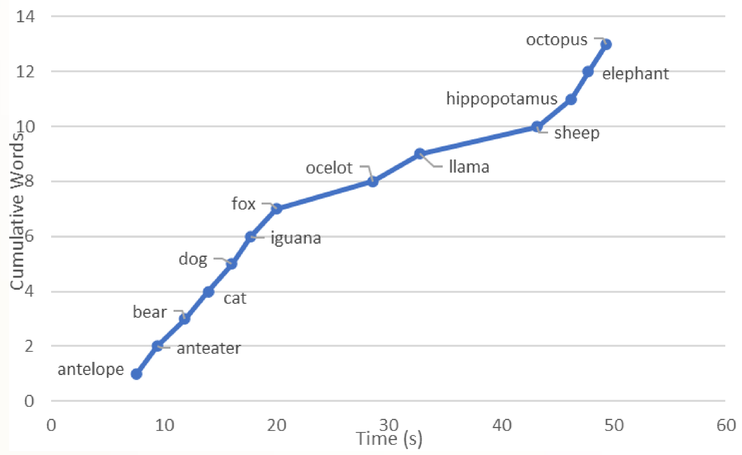
Results: Verbal Fluency decreases with age



Results: Verbal Fluency strongly related to Vocabulary



Results: Sample Participant Data



Results: Summary

- **Increased age associated with poorer verbal fluency** for Animals, Vegetables, Sports, Furniture, and Fruits.
- However, **vocabulary and education are much stronger predictors** of verbal fluency.
- **Female gender is associated with better verbal fluency** overall.
- Semantic clustering (degree to which responses are grouped by semantic relatedness) not related to age.
- Verbal fluency not related to psychological factors (e.g., depression, anxiety).
- **Test re-test reliability** was good = 0.75

Discussion

- The current results show that **verbal fluency is impaired with increasing age**, but that **Vocabulary is the strongest predictor** of performance.
- These findings highlight the **need for stratified norms** that take into account additional demographic variables, in order to better **track and predict cognitive decline in aging individuals**.
- The current study also demonstrates the **utility of a computerized cognitive battery with automatic transcription** that can be remotely administered in patients' homes.

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