

Can a Test of Visual Memory Help Predict Success in Post-Lingually Deaf Adults Receiving Cochlear Implants?

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BACKGROUND

WHO USES CIS

People who have moderate-severe to profound sensorineural hearing loss, traditionally bilaterally.

WHAT ARE CURRENT PREDICTORS OF SUCCESS

Demographic/audiometric values (Moberly, Bates, Harris, & Pisoni, 2016)

- Chronological age
- Duration of auditory deprivation
- Severity of hearing loss

Technical factors (Moberly, Bates, Harris, & Pisoni, 2016)

- Depth of electrode insertion
- Insertion into the Scala Tympani
- Wrapping factors

WHY IS THIS A PROBLEM

- These recognized factors are considered to be “proxy variables” for actual causal underlying processes.
- Individuals receiving CI have varied outcomes not predicted by the proxy variables.

HYPOTHESIZED PREDICTORS OF SUCCESS

Working memory (Moberly, Bates, Harris, & Pisoni, 2016; Moberly, Pisoni, & Harris, 2018; Pisoni & Geers, 2000; Pisoni et al., 2018)

- Auditory
- Visual

Linguistic skills (Moberly, Bates, Harris, & Pisoni, 2016; Moberly, Pisoni, & Harris, 2018)

- Vocabulary size
- Grammatical knowledge
- Semantic knowledge

METHODS

PARTICIPANT DEMOGRAPHICS

- 32 participants
- Average age = 62 years (range 18-89)
- Average duration of CI use = 8 years (range 2-22 years)
- Bilateral CI users = 12
- Unilateral CI users = 20
- Normal cognitive status (MMSE average = 29)

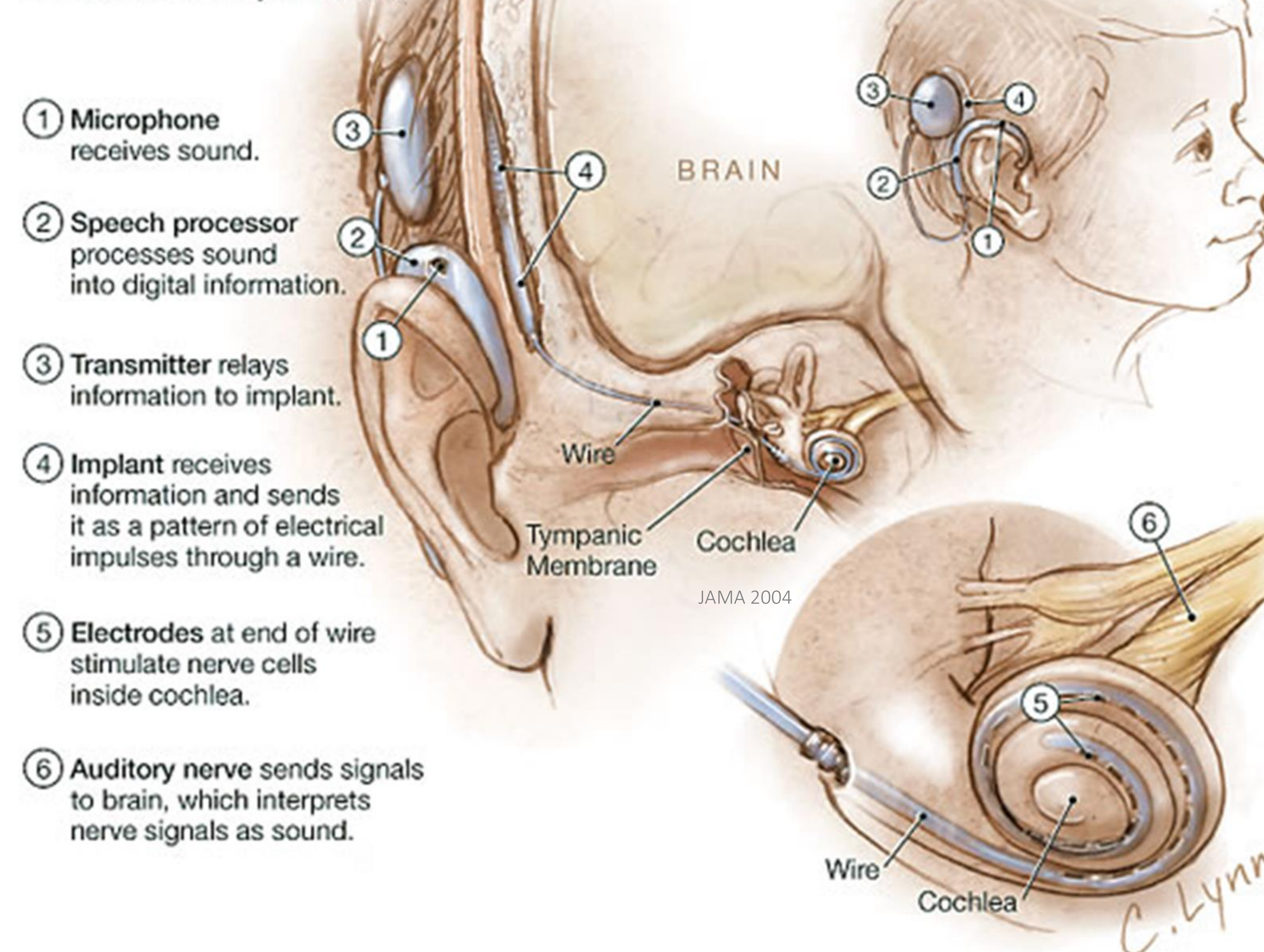
MATERIALS

- CVLT Visual version
- Harvard Standard Words
- Harvard Standard Sentences
- Harvard Anomalous Key Words
- Harvard Anomalous Words
- Harvard Anomalous Sentences
- PRESTO

DATA ANALYSIS

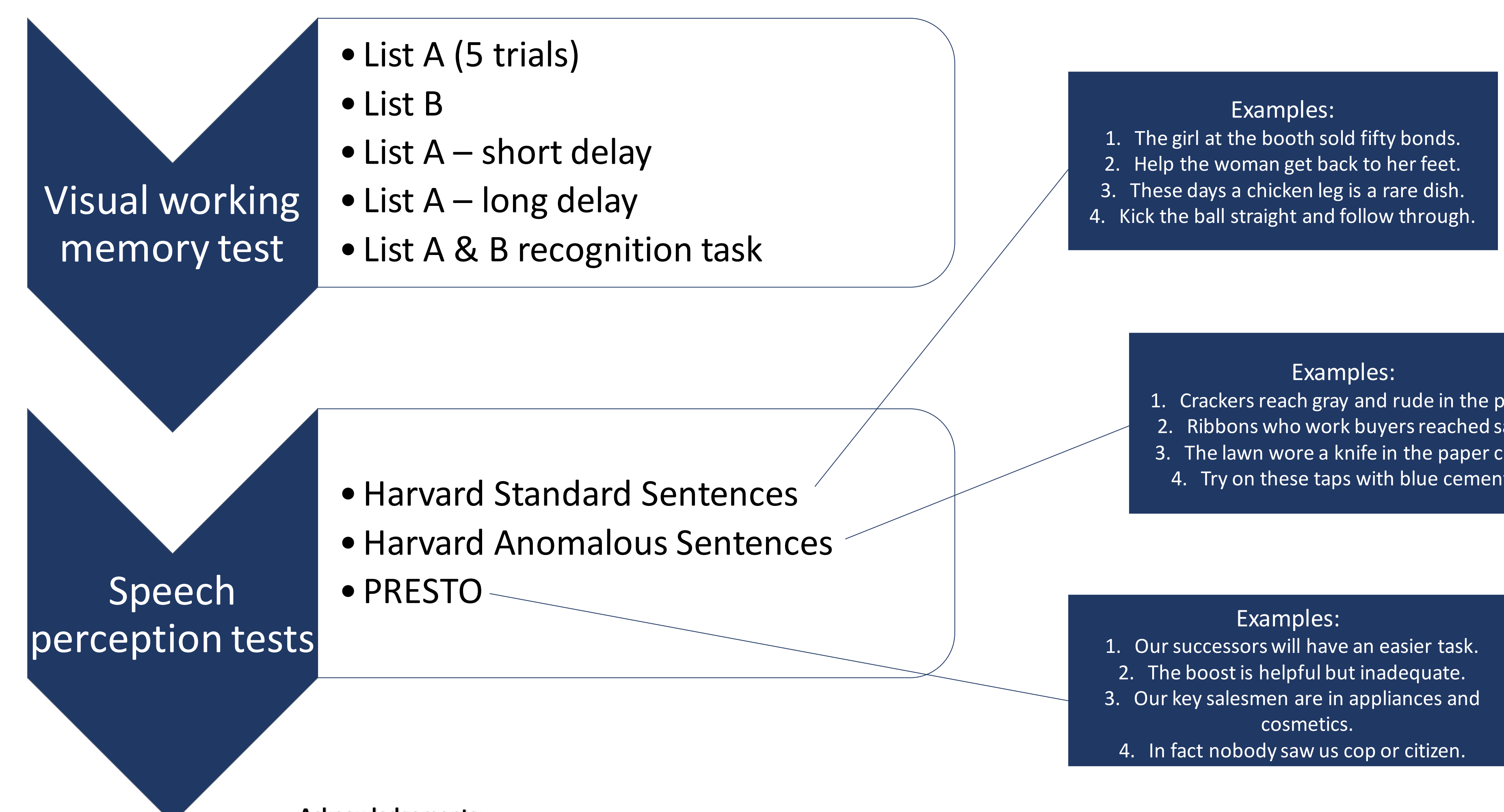
- Correlations between total recall CVLT scores and speech perception scores

How a Cochlear Implant Works



What is a Cochlear Implant and How Does it Work
<https://jamanetwork.com/journals/jama/fullarticle/198763>

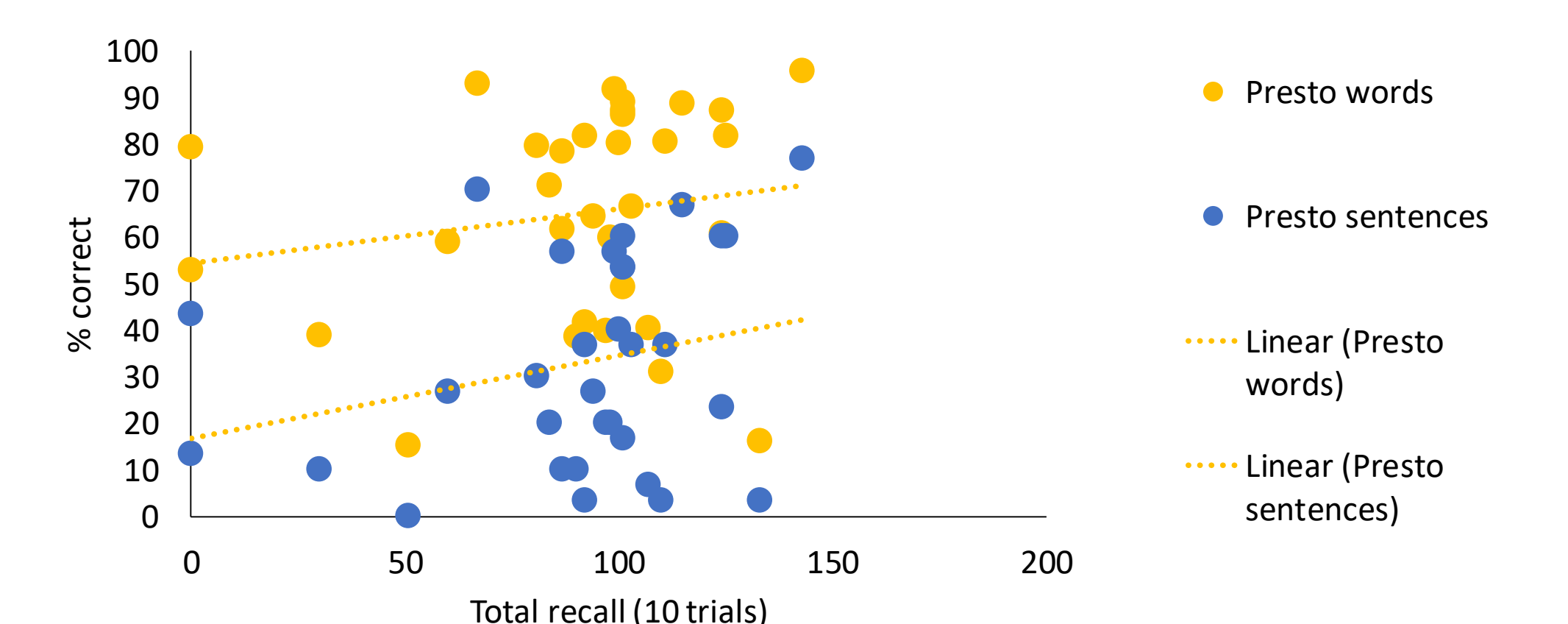
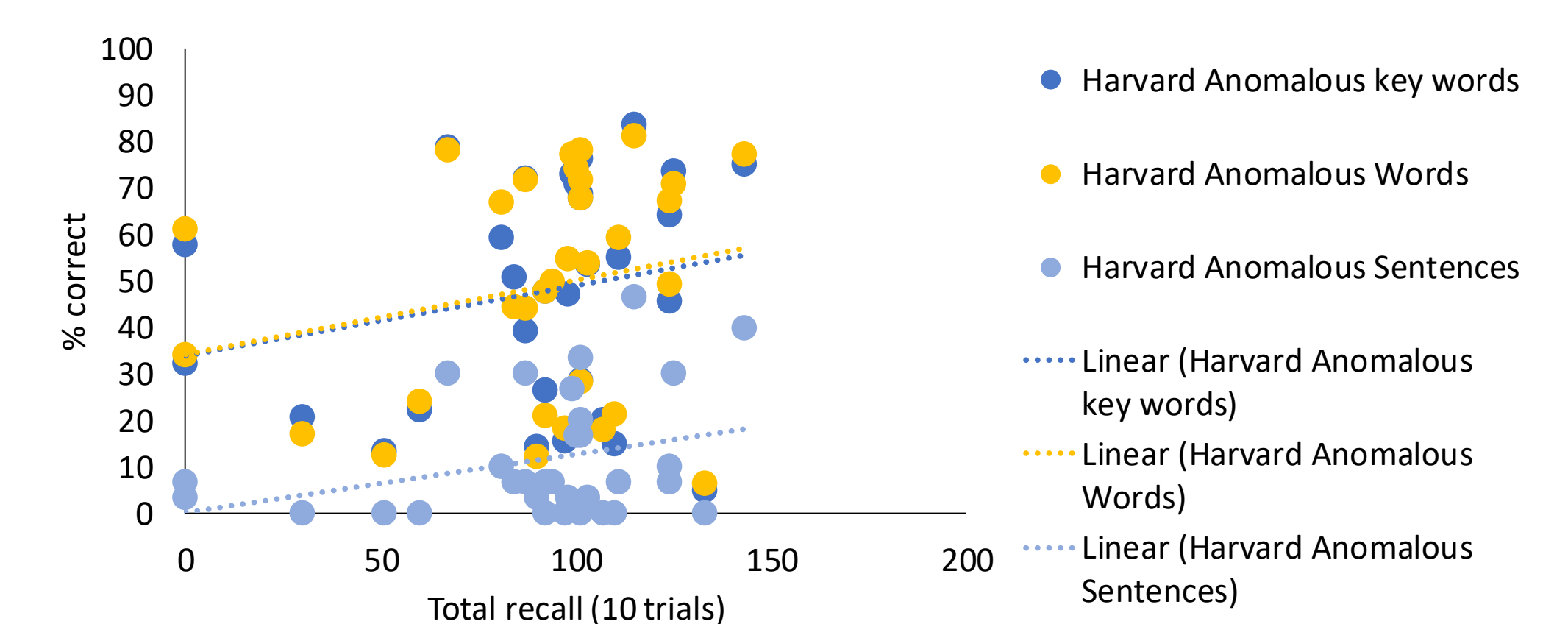
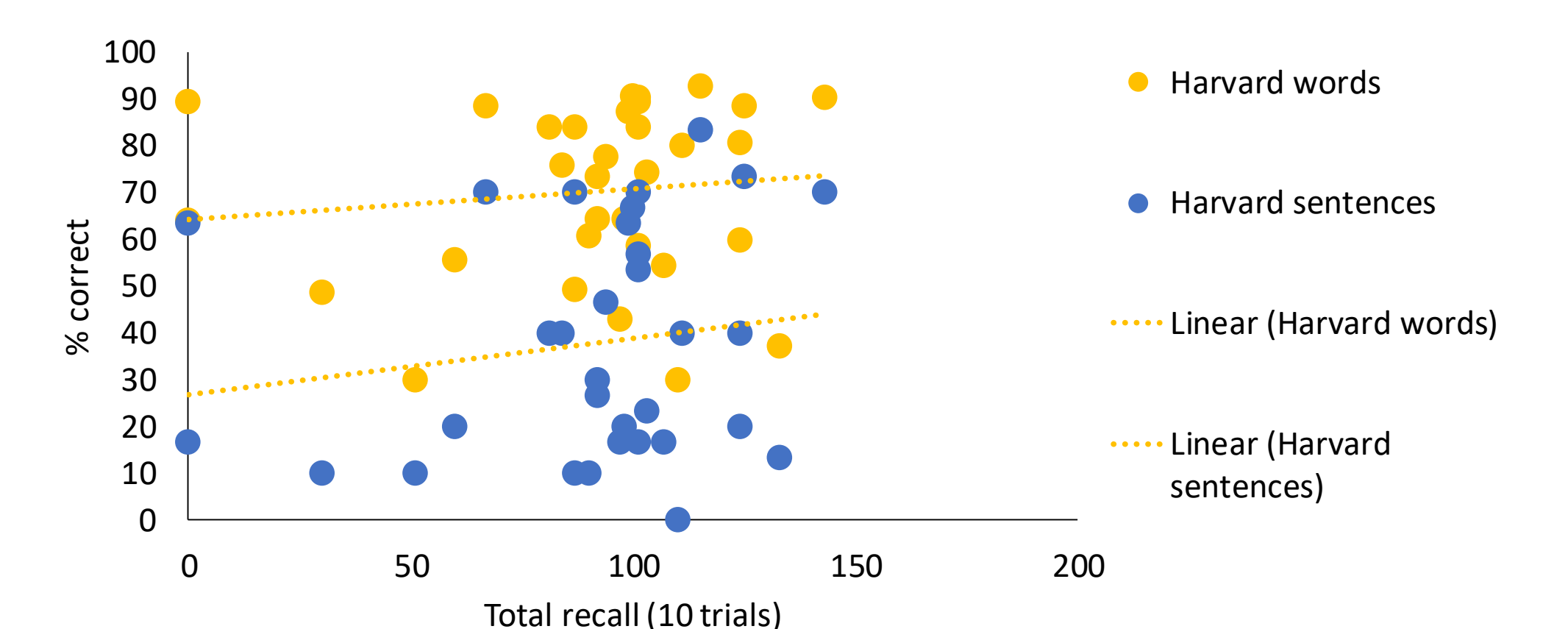
PROCEDURE



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RESULTS

- Visual memory tasks are positively correlated with speech perception outcomes.
- Regression analysis using age, education, duration of CI use, and total recall showed none of these were significantly predictive of any speech perception outcome



DISCUSSION

- Speech perception does vary based on working memory, but is likely part of a complex system
- Visual working memory tasks can be used successfully with those with cochlear implants to measure working memory without the auditory confound

IMPLICATIONS & FUTURE DIRECTIONS

- Practitioners should consider visual working memory tests as part of the battery of assessments for determining candidacy for cochlear implantation
- Future studies should assess the connection between the visual memory performance and speech perception performance specifically evaluating individual participant data in light of demographic and hearing measures

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