

Pilot Findings From A Mobile Community-based Brain Health Screening For Dementia Risk Prevention In Rural Populations

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Background

- **Rural communities face barriers** to early identification and prevention of brain health conditions (e.g., cognitive-communication decline, stroke risk, age-related neurological changes).
- **Limited specialty care access**, transportation challenges, and **healthcare workforce shortages** delay timely detection and intervention.
- **Speech and language data** offers a method to collect data in a noninvasive, natural, and move toward equitable format.
 - It may also precede other cognitive cognitive decline skills offering an earlier identification of decline
- **Building a Rural Aging and Intervention Network: Factors that Impact Trajectories (BRAIN-FIT)** provides brain health screening and individualized education in trusted rural community settings.
- **Goal:** Improve early identification and promote prevention of neurological risk in rural populations

Methods

- **Design:** Secondary analysis followed by an informed pilot study for collecting data in rural locations

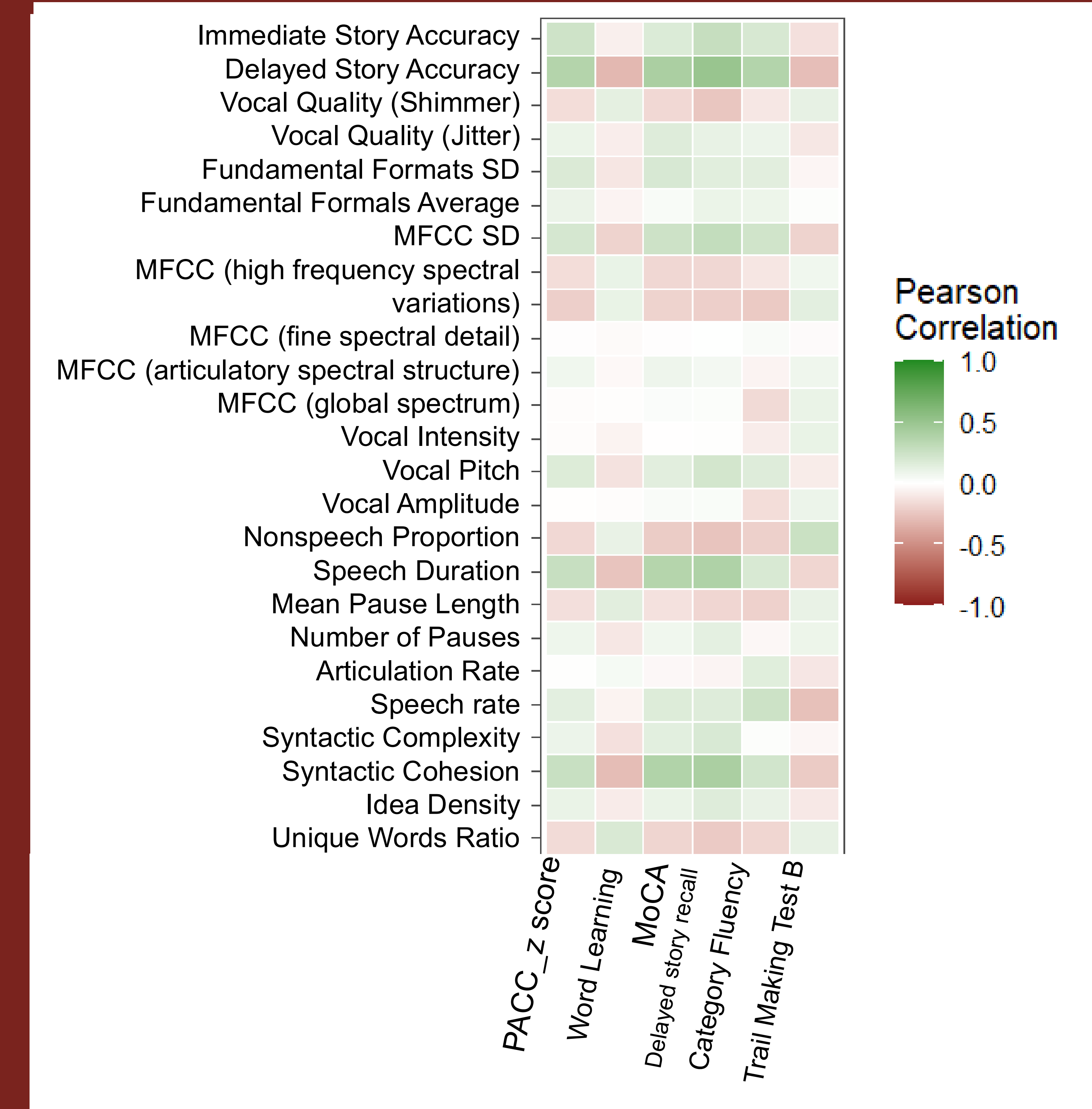
Secondary Analysis

- **Data Source:** Alzheimer's Disease Neuroimaging Initiative (ADNI) Cohort 4 Novic Storytelling Data
- **Measures:** speech-based digital cognitive assessment battery collecting features including:
 - lexical and discourse-level metrics (e.g., total word count, parts of speech, idea density, and lexical diversity)
 - acoustic features captured temporal, prosodic
 - voice quality characteristics (e.g., speech rate, pause frequency and duration, fundamental frequency, intensity, MFCCs, formants, jitter, and shimmer).

Pilot Study

- **Setting:** Community events across six locations in rural and regional communities in Spokane, Pullman, WA, and Coeur d'Alene, ID.
- **Participants:** People aged 45+ years
- **Screening Procedures:** Participants completed brief, noninvasive assessments targeting brain health and related risk indicators.
- **Evaluation Measures:**
 - Feasibility
 - Participant engagement
 - Perceived usefulness

Speech and language data is correlated with cognitive performance that can be feasibly collected in community-based and telehealth settings.



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ADNI Cohort 4

- A total of 326 unique IDs were in the ADNI Cohort 4 with complete Noivic Storytelling data
- The final dataset was female (n=198, 60.2%), highly educated (17 years of education or more; n=148, 45%), and white (n=189, 57.4%) or Black (n=72, 21.9%).

Figure 1: Speech and language data collected in the delayed storytelling in ADNI Noivic

Factors associated with PACC scores that are highly positively related are displayed in deep green and highly negatively related deep red.

Positive

- Delayed story recall is related to most PACC scores
- Speech duration is related to MoCA and delayed story recall
- Syntactic Cohesion is related to MoCA and delayed story recall

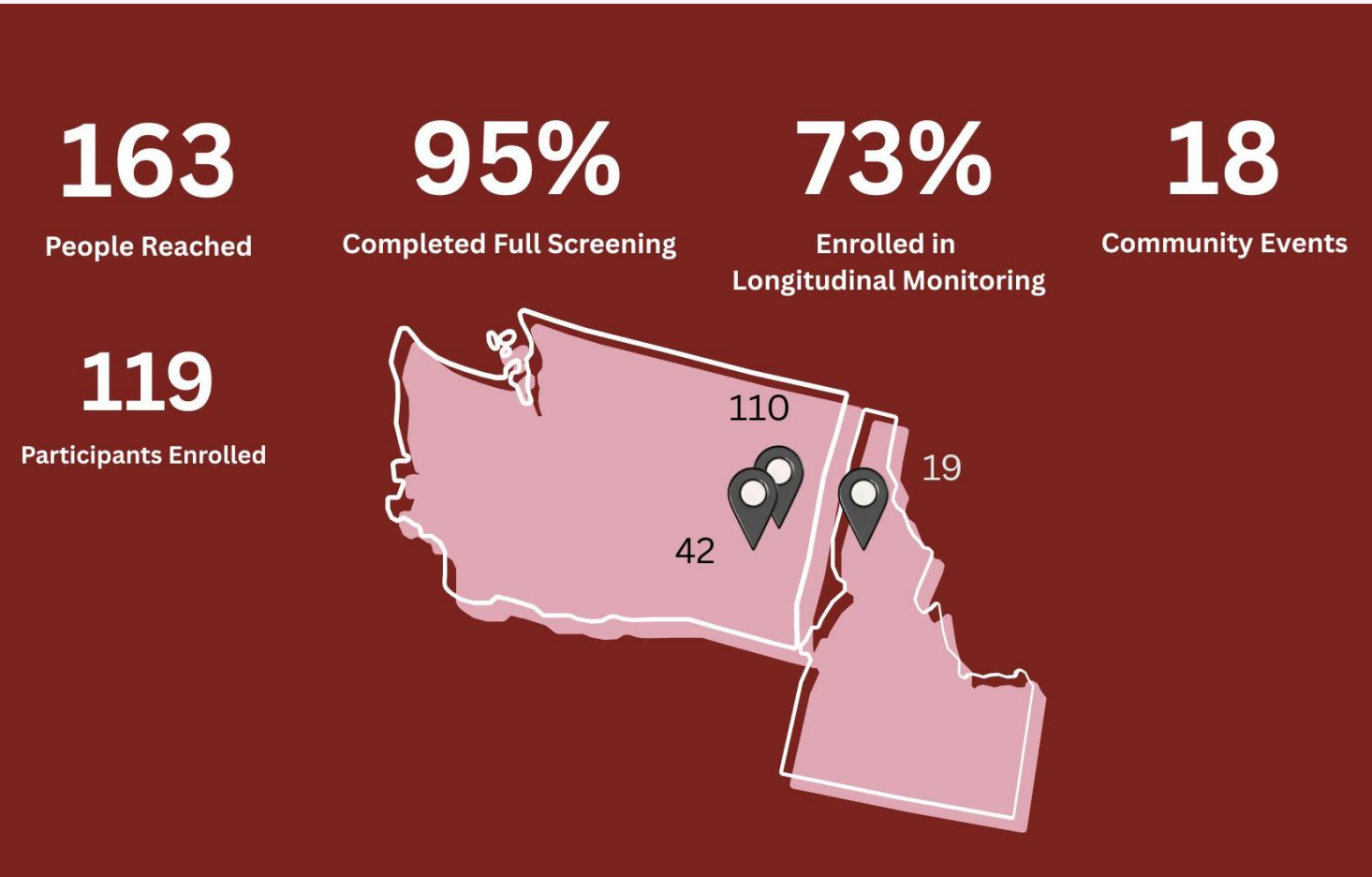
Negative

- Delayed Story Accuracy is related to word learning and trail making test B
- MFCC (vocal quality) is related to all but word learning

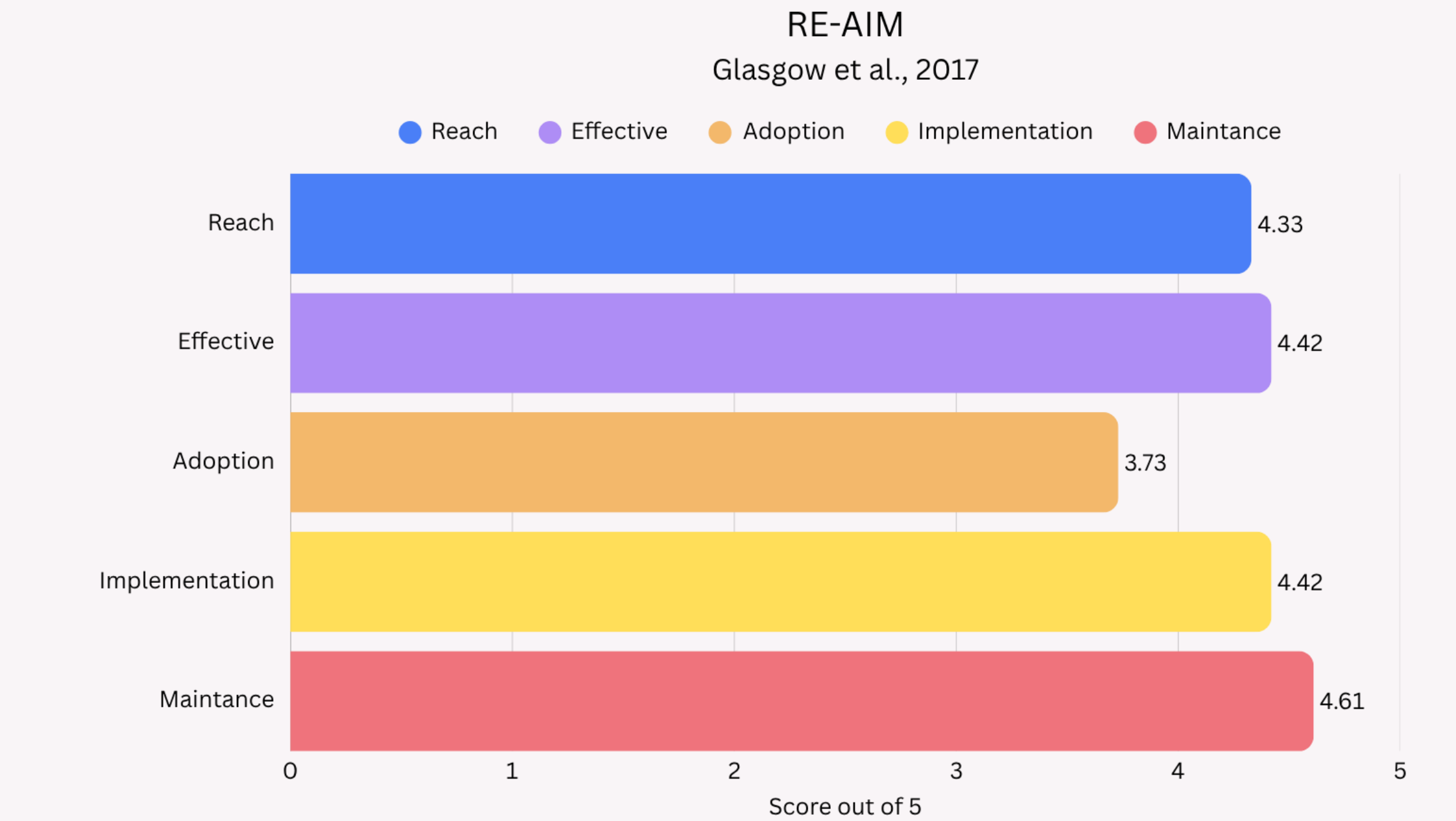
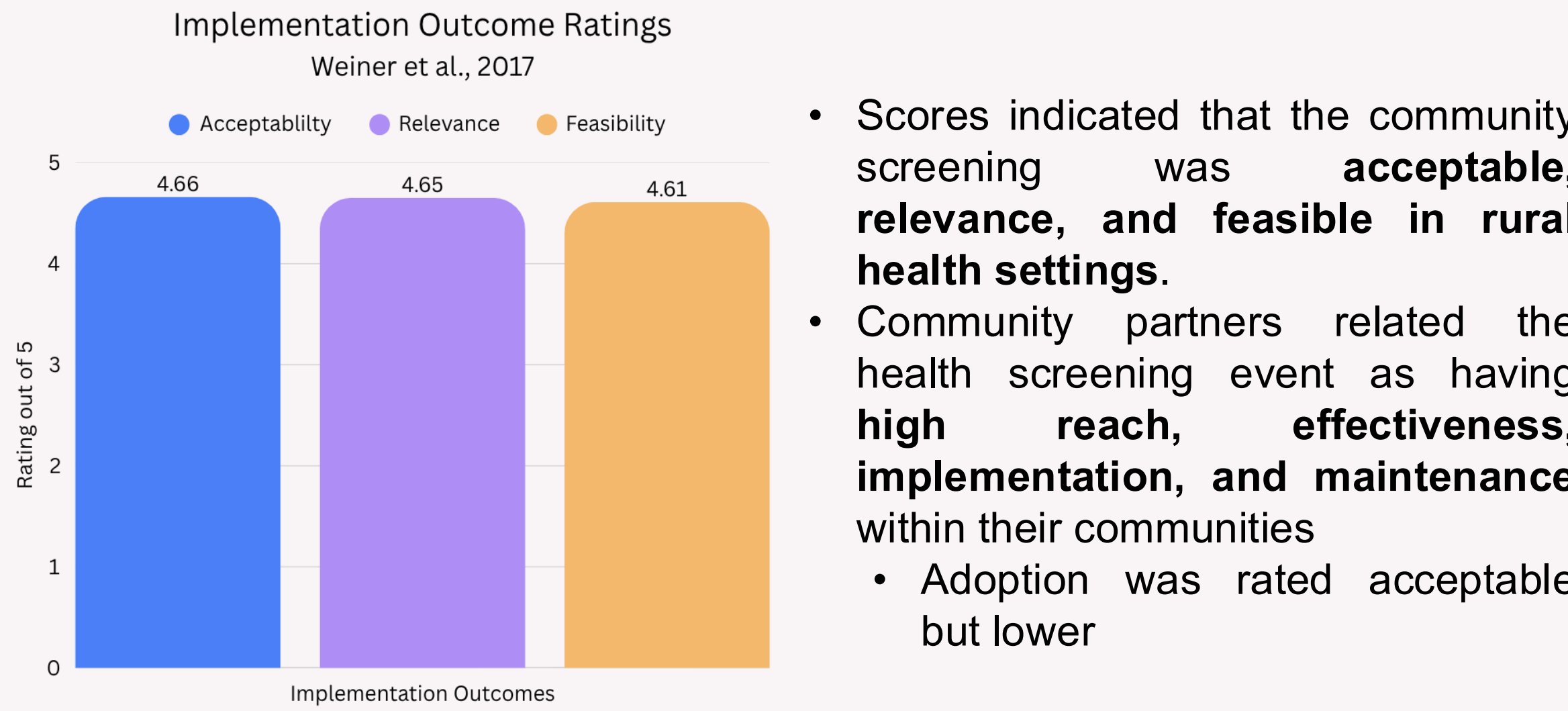


Pilot Results

Year 1 Screening Results



BRAIN-FIT Evaluation Results



Conclusions and Clinical Implications

- Speech and language data is correlated to cognitive data specifically certain speech features. Findings indicate that BRAIN-FIT is a feasible and acceptable mobile model for delivering multidomain brain health screening in rural communities.
- Community-embedded screening programs may play a critical role in expanding access to dementia risk reduction and early detection.

Resources and Contact

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