

Feasibility and accuracy of the LILA app: Pilot study of a fully remote, self-administered, verbal list learning task for community cognitive screening

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Background

- Cost efficient and scalable screening strategies are critically needed to identify individuals who could most benefit from pharmaceutical therapies for Alzheimer's Disease (AD).
- Digital cognitive assessments that are sensitive to changes in learning and episodic memory offer the opportunity for community screening of cognitive function to identify individuals in the early stages of AD.
- LILA is a self-administered assessment completed via smartphone app, which leverages the well validated International Shopping List Test (ISLT) to assess learning and episodic memory^{1,2}.

The aims of this study were to:

1. Assess the feasibility of using LILA as a cognitive screening tool in the general population within the United States,
2. Assess the accuracy of LILA in extracting spoken words from speech and scoring test responses.

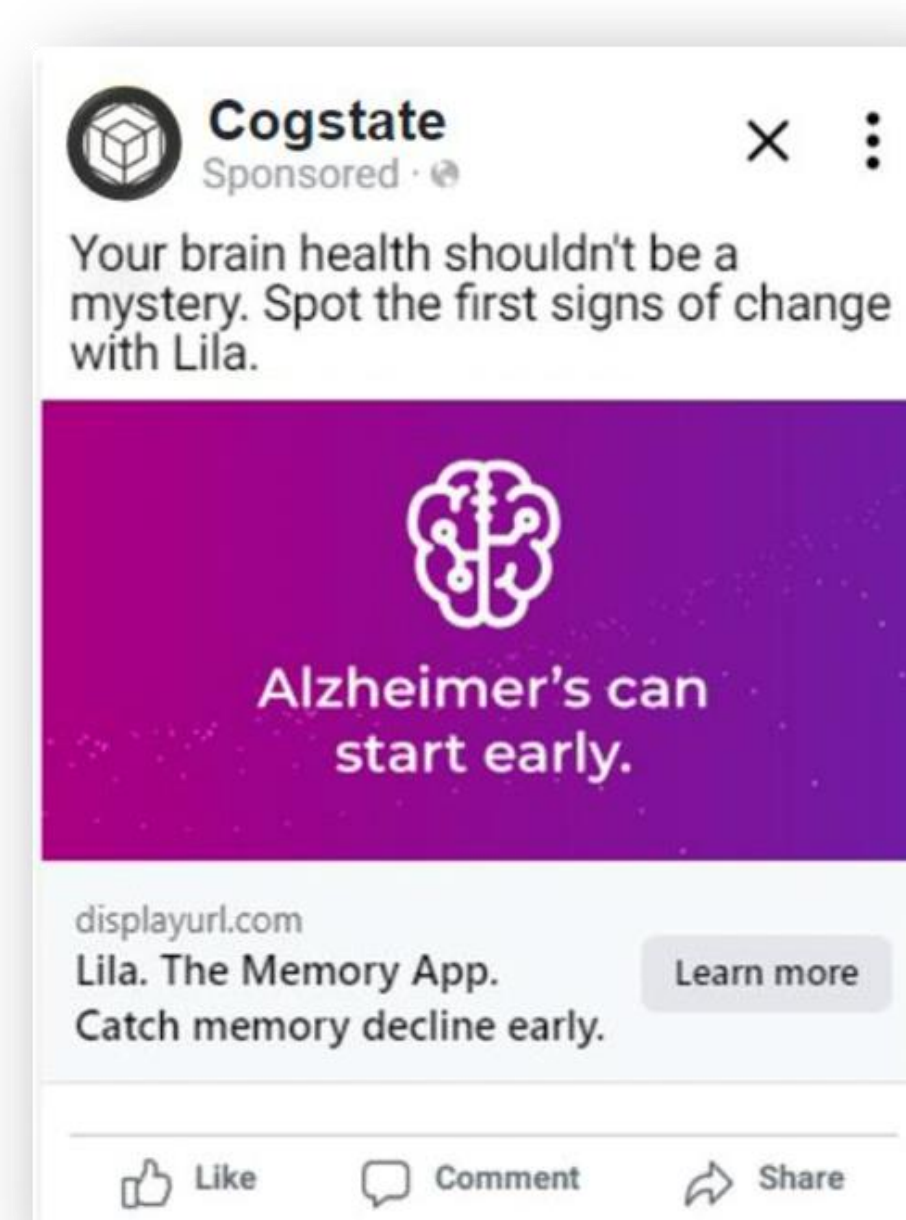
Method

Recruitment was completed via social media advertisements to individuals who were:

- English-speaking
- Aged 50-70 years
- Located in the United States

The pilot sample included n=22 participants, with a mean (SD) age of 58 (5.4) years.

Participants installed the LILA app on their personal smartphone device and completed the assessment.



The LILA assessment is a verbal list learning task for a 12-item shopping list, based on the ISLT, and includes:

- 3-learning rounds
- 10-minute delay
- 1-delayed recall round

Natural Language Processing analyzed and scored responses, generating a score for the total number of words correctly recalled by the participant for each round.

Audio recordings for each LILA assessment were manually reviewed by study staff and scored according to the number of individual words correctly recorded and number of rounds correctly scored by the NLP.

Method continued

Feasibility was determined by:

- Number of clicks on social media advertisements
- Number of registrations of interest in participating
- Completion rates for learning and delayed recall phases of the assessment

Accuracy was determined by:

- % of words correctly scored by NLP, identified by manual review of assessment recordings

Results

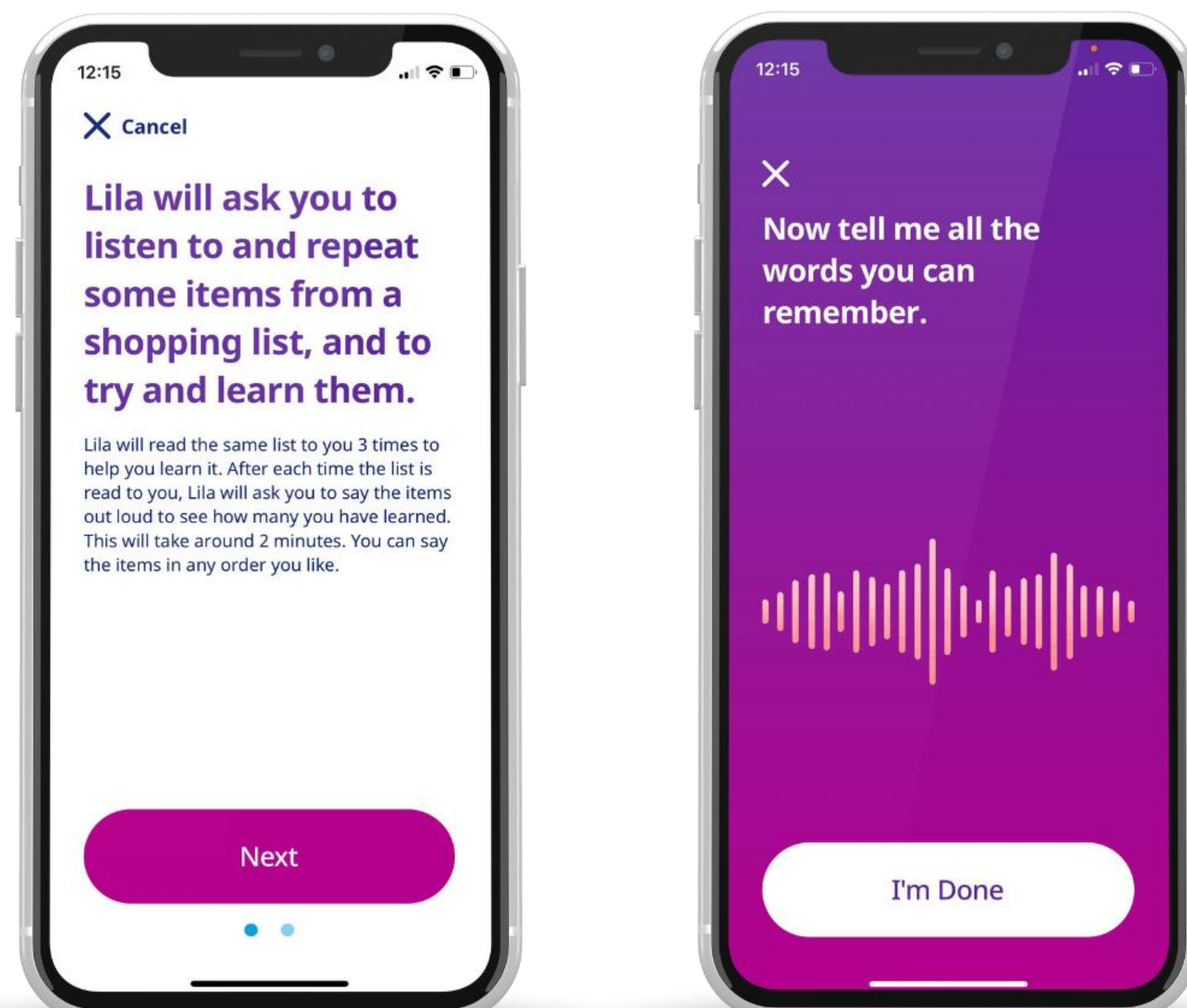
Feasibility

Community Interest and Recruitment

- Target of n=20 reached within 72 hours; recruitment closed after target was met
- 993 clicks on social media advertisements
- 142 individuals completed an enrollment form to register their interest in the study

Test Completion Rates

- 100% (n=22) of participants completed the 3-learning rounds for at least one assessment session
- 82% (n=18) of participants completed the delayed recall round for at least one assessment session



Accuracy

- 1105 words from 136 rounds captured
- 97.2% scoring accuracy from NLP
- 31 individual words were scored incorrectly by NLP, most common errors were for compound words and homophones (see Table 1 for examples)

Results continued

Table 1. Summary of common NLP word capture and scoring errors

Word Presented	Word Spoken	Word Captured	Scored Accurately
Turnip	Turnip	Turn up	No
Mango	Mangoes	Mangoes	No
Cod	Cod	Cause	No
Hairbrush	Hairbrush	Hair Brush	No
Fries	Fries	Freeze	No
Plum	Plum	From	No

Conclusion

- High level of interest was observed among middle age and older adults in completing a self-administered app-based memory assessment.
- Middle aged and older adults were able to successfully install and complete digital cognitive assessments with minimal support or supervision.
- Accuracy of the NLP was high for word recognition; however, updates are needed to account for compound words and homophones to reduce NLP scoring errors and improve overall scoring accuracy.

Taken together, the results of this study support the feasibility and accuracy of LILA as a fully remote and self-administered community cognitive screening tool.

References

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2. Lim YY, Cummins H, Bransby L, Stellman G, Fredrickson A, Edgar CJ, Maruff P. Acceptability and validity of a smartphone-administered word list learning test, LILA, in cognitively unimpaired adults. *Alzheimers Dement*. 2025 Jan 3;20 (Suppl 3): e091888. doi: 10.1002/alz.091888. PMID: PMC11710178.

Disclosures

KD Harrington, J Segura, S Archer, L Miller, R Ray, N Farouk, KM Sink and P Ventola are full-time employees of Cogstate Ltd.

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