



# The effects of using BCI software with posterior alpha rhythm neurofeedback (NFB) on cognitive processes underlying reading in persons with mild Alzheimer's disease (AD)

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# Background

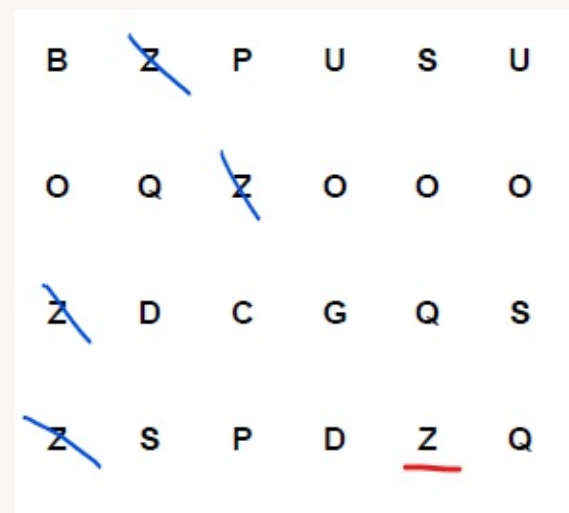
- Prior BCI research suggests NFB may improve cognitive performance
- AD is often associated with functional impairments in language and reading
- The goal of this pilot study was to develop a BCI-based NFB paradigm to investigate the effect of NFB on cognitive processes underlying reading in people with mild AD





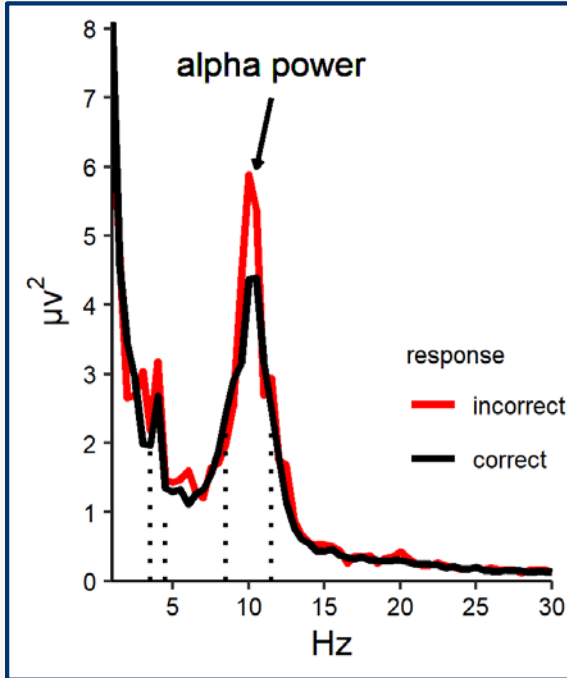
# Methods

- Participants: 6 participants with mild AD recruited; 2 completed
- Procedure: non-experimental multiple-baseline single-case research design
- Materials & Measures:
  - BCI system: BciPy & RSVP Keyboard with DSI VR300
  - Measures:
    - Letter Span
    - Letter Cancellation
    - WJTA-IV Sentence Reading Fluency

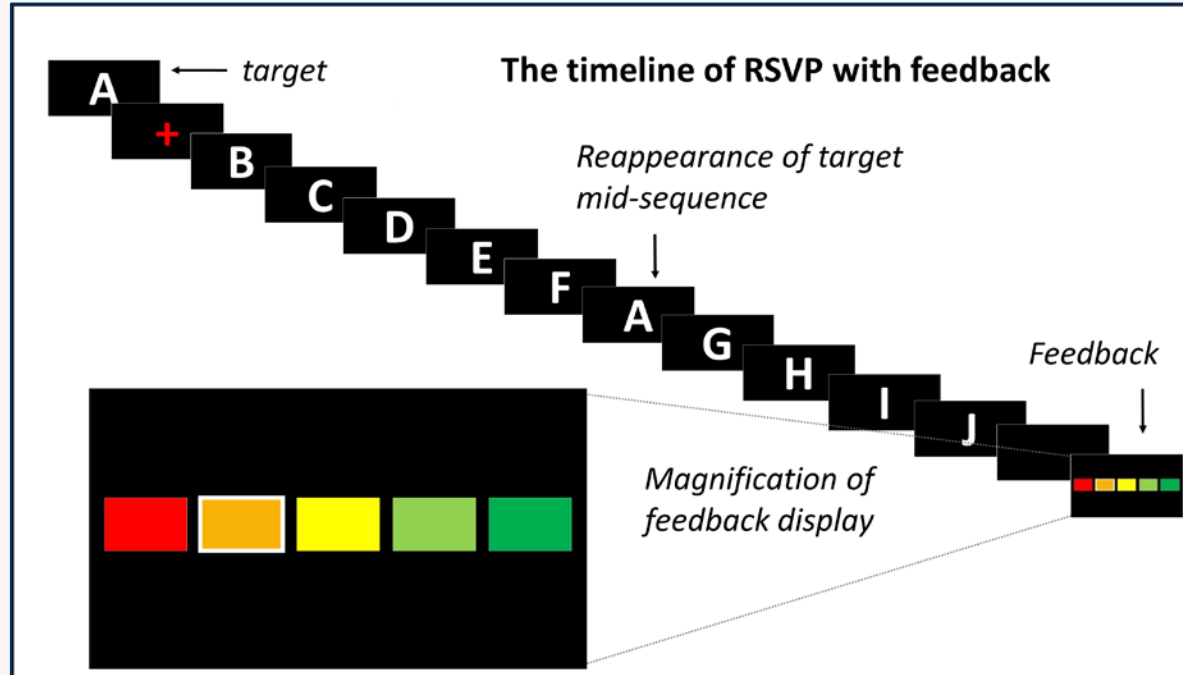




# Development & Delivery of Neurofeedback



Pilot (n = 8) - significant difference in alpha power during errors in N-1 back task

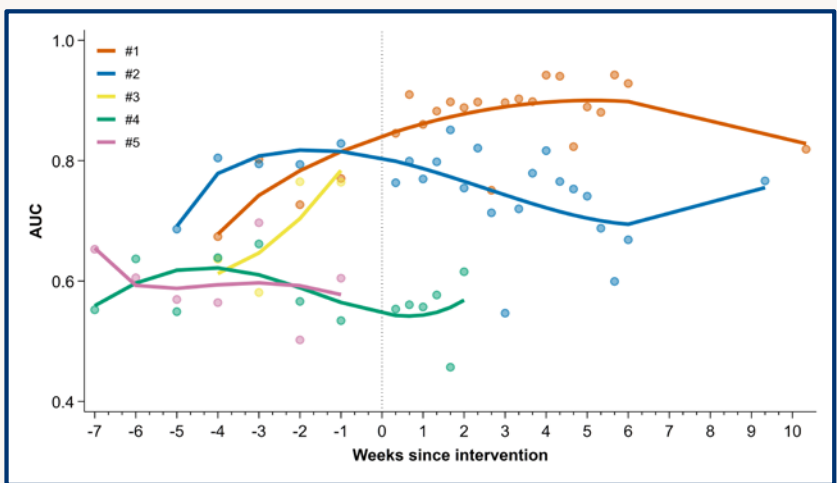


Schematic of NFB display within RSVP inquiry



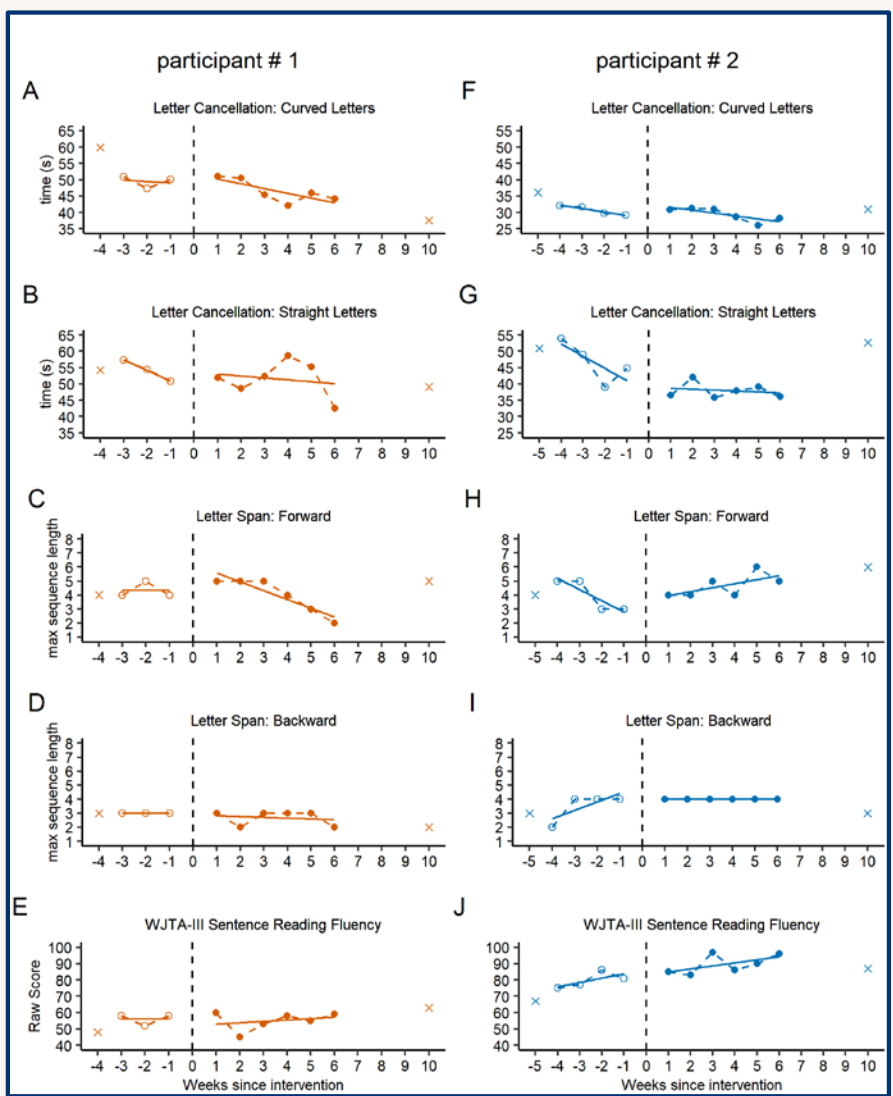


# Results



AUC results from calibration with and without NFB for all 5 participants

Effects of BCI software on reading in mild AD



Results on repeated measures for participant #1 and #2 (completers)



# Discussion

- The current study is proof of concept for delivery of NFB via BCI task for participants with mild AD
- Limitations of this study included:
  - small and homogenous participant sample (2 completers)
  - artifact contamination of EEG
  - contribution of non-specific parts of behavioral intervention
- Future research is needed to investigate the extent and generalizability of these findings





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