

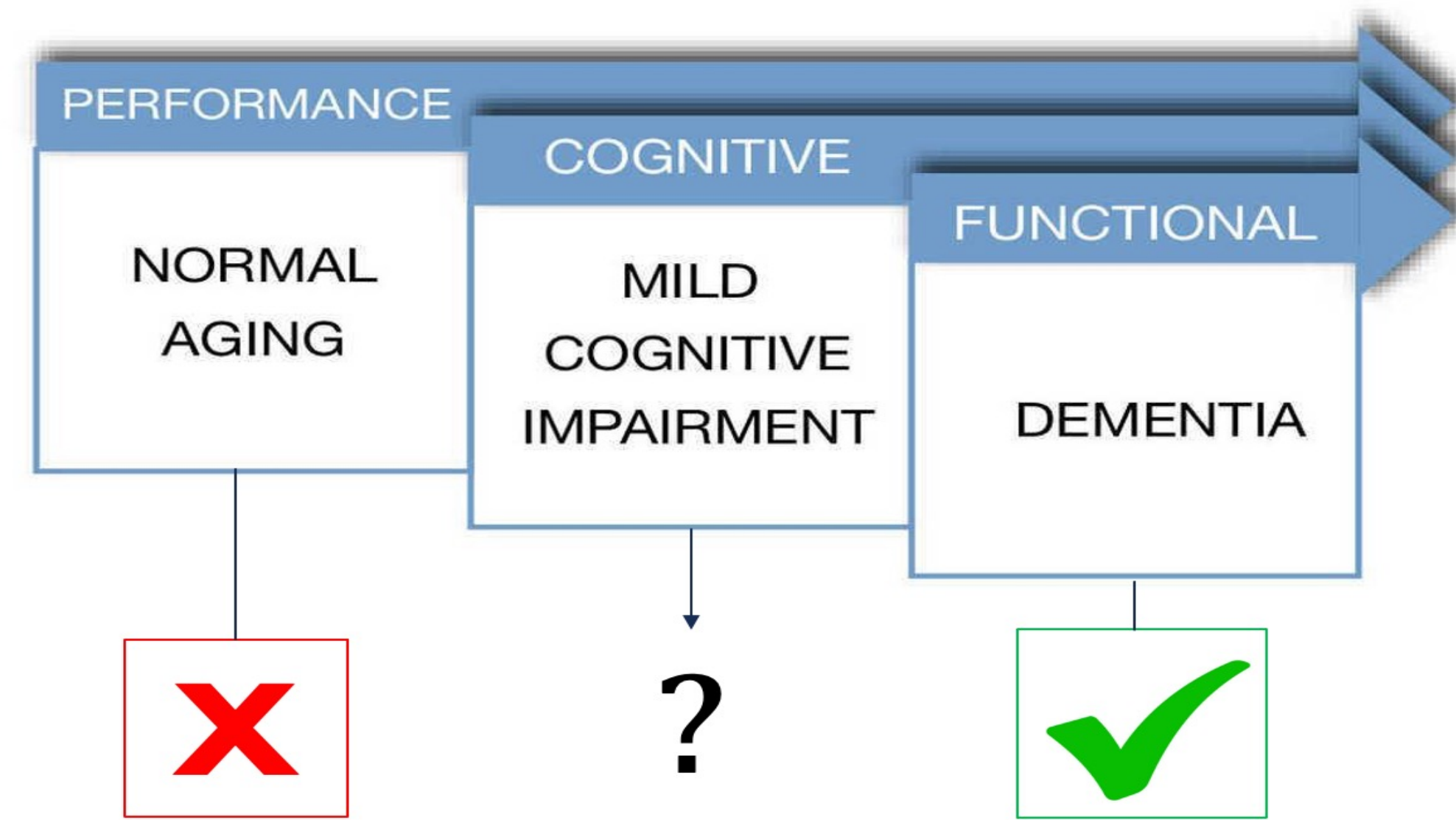
The effects of music mnemonics on the behavioural mechanisms and related brain plasticity of verbal memory and learning in aMCI

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INTRODUCTION

- Amnesic Mild Cognitive Impairment (aMCI) is a neurological disease characterized as an early stage of cognitive decline, primarily in memory function.¹
- Memory training which induces neuroplasticity in the brain demonstrates potential benefits across various populations.^{2,3}
- Studies investigating the effect of music-assisted learning have consistently shown it to be an effective aid for verbal memory, focusing primarily on dementia, neglecting aMCI.^{3,4}

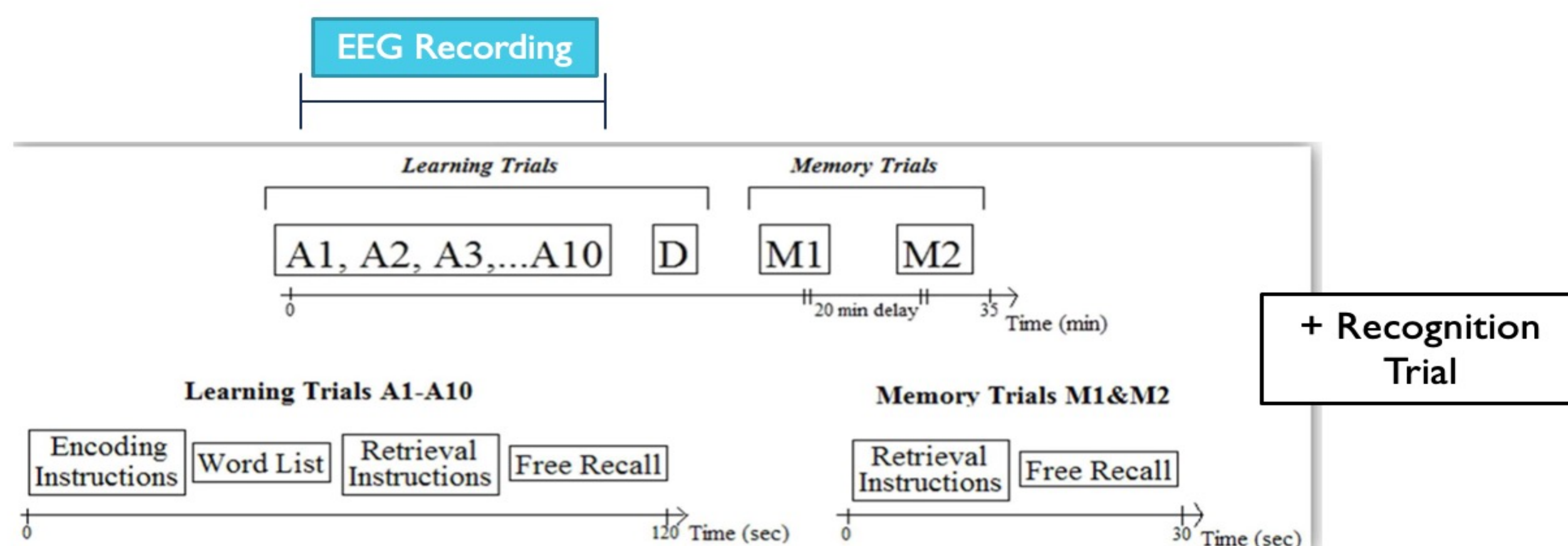


OBJECTIVES & HYPOTHESES:

- To determine whether the positive influence of musical mnemonics is apparent in this transitional stage between healthy older adults and dementia.
- Musical mnemonics will improve verbal learning and memory, in amalgamation with influence on the associated system-level brain plasticity.

METHODS

- **Study design:** A within-subject study paradigm will measure behavioural differences in memory recall of an ordered word list, presented either sung as a musical mnemonic, rhythmically spoken, or spoken.
- **Inclusion criteria:** (a) a subjective report of cognitive decline; (b) neuropsychological testing scores indicative of aMCI; (c) do not meet the clinical criteria for a dementia diagnosis; (d) native speakers of English; (e) Normal or corrected-to-normal hearing
- **Neuropsychology Testing Battery:** MoCA; TorCA; Memory Binding Test; Clinical Dementia Rating; Lawton Brody Instrumental Activities of Daily Living Scale



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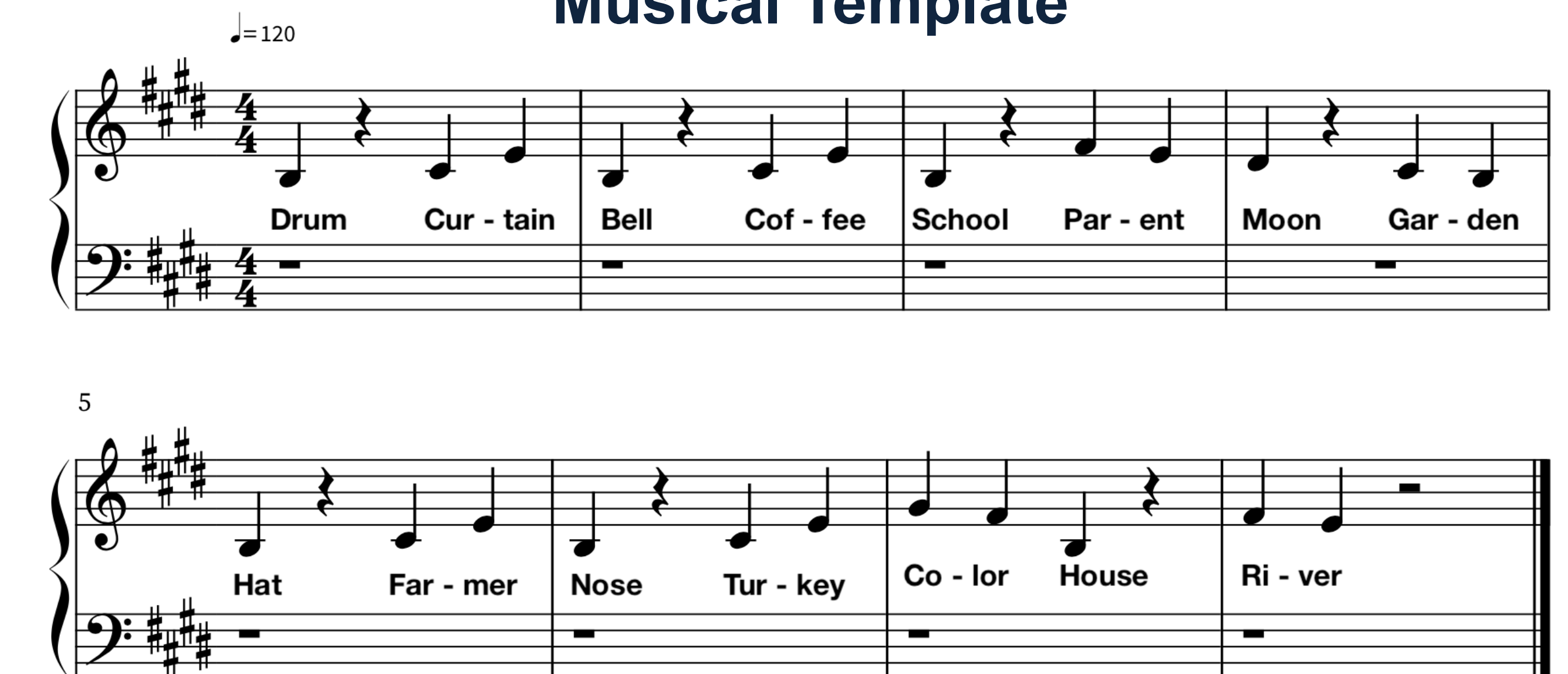
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MATERIALS & ANALYSES

BEHAVIOURAL

- The Rey Auditory Verbal Learning Test will be administered in three separate conditions:
 1. Spoken
 2. Rhythmically Spoken
 3. Sung
- Outcome Measures include:
 1. Immediate and Delayed Recall of an ordered word-list
 2. Recognition Task
 3. Serial Order and Word Chunking
- Repeated Measures MANOVA Analyses

Musical Template



NEURAL



- A 32-channel EEG headset by BioSemi will be utilized for non-invasive task-related imaging, with high temporal resolution of the brainwave measures
- Outcome Measures include:
 1. Continuous Wavelet Transform through Time-Frequency Analysis
 2. Intertrial Phase Coherence
 3. Across trials and segmented words analyses
 4. Learning-Related Synchronization'

$$LRS = \frac{\text{power_learned}}{\text{power_notlearned}} \times 100 - 100.$$

FUTURE DIRECTIONS

- The need for effective early interventions that address memory loss in aMCI has been heavily stressed in the current literature, making this research of critical importance.
- A proactive approach to memory interventions for the aMCI population is encouraged to prevent further deterioration in cognition, allowing for individuals to maintain independence and improve their quality of life.
- Fewer dementia cases will have a positive domino effect on the public health system, creating more space and availability for resources and for clinicians.

This study intends to determine the short-term and long-term effects of music-assisted learning on memory and verbal learning in aMCI and provide direction for future clinical trials.

ACKNOWLEDGEMENTS