MCI: Can Decline to Dementia be Monitored and Delayed by Computer-Based Games?

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BACKGROUND

•The Canadian Study on Health and Aging (CSHA) estimated that 16.8% of those over 65 have Mild Cognitive Impairment (MCI).
• There is currently no accepted treatment for MCI.
• There is growing literature on “brain plasticity” & the role of computer based games for brain health improvement
• Project aims to engage people with MCI in computer-based games that are programmed to:

1. allow off-line monitoring of improvement and/or decline and
2. strengthen cognitive function through improvement in game performance.

METHODS

• 3 ARM study
• 9 weeks of supervised training
• 3 times per week for 75 minutes

POSIT SCIENCE - BRAINHQ ARM

- Posit Science Corporation is a company based in San Francisco
- Dynamic Brain is the Canadian partner of Posit Science & Canadian provider of BrainHQ
- BrainHQ has modules they have shown to improve memory, attention and brain processing speeds in healthy adults
- The modules have increasing difficulty & results are tracked on a score card.

CARLETON GAMES ARM

• Graduate students from the Carleton University Department of Systems and Computer Engineering have designed 2 games:
  - Sudoku (a numbers based game)
  - Word Search (a word based game).
• Both games have built-in signal processing and off-line monitoring capability for subject performance tracking.
• The parameters include need for cuing, speed of task completion, and number of mistakes made.

CONTROL GROUP ARM

• Computer activities that only offer limited cognitive stimulation.

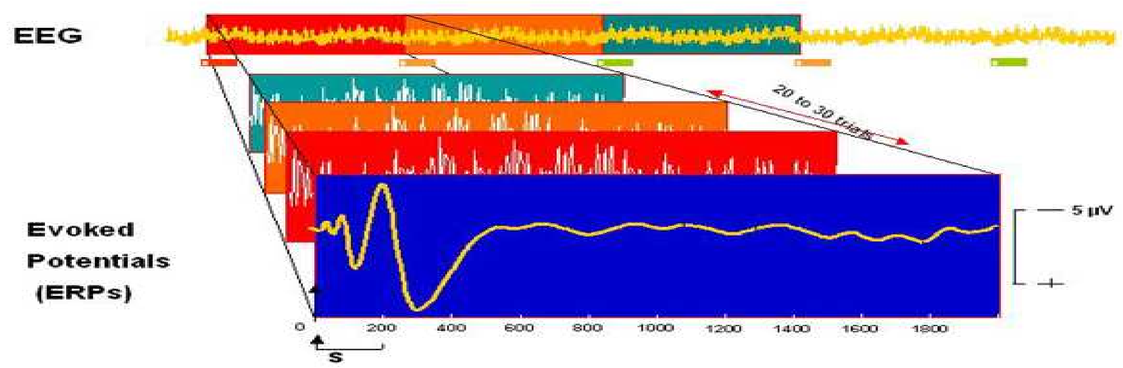
RESULTS

The table below summarizes what results can be gathered from each game in the experimental arms

Word Search	Sudoku	BrainHQ
Mouse location & movements	All keyboard entries & mouse movements	Speed & accuracy of each trial
All keyboard entries & mouse clicks	Correct/Errors relative to solution	Tracks scores and overall progress
Which letters are being selected	Solutions & if acted on (both error and solution hints)	Break down that allows for data collection specific to attention, brain processing speed & memory
Correct/Errors relative to solution		
Hints provided & if acted on		

EEG Data

This study will also pilot the pre- and post- intervention measurements of a subset of participants using electroencephalography (EEG).



HYPOTHESES

- Computer activities can improve patient outcomes by:
  - Delaying decline to dementia
  - Detecting decline earlier to allow timely treatment initiation
- Results expected by fall of 2014

ACKNOWLEDGEMENTS

• This project is funded through Bruyère Research Institute Growth Fund
• Dynamic Brain is the Canadian distributor of BrainHQ & has supplied the study with licenses
•Chartwell Retirement Residences has supplied some of the study sites for the project

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