Early Prediction of Full Mastery of a Computerized Functional Skills Training Program in Participants with Mild Cognitive Impairment

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BACKGROUND

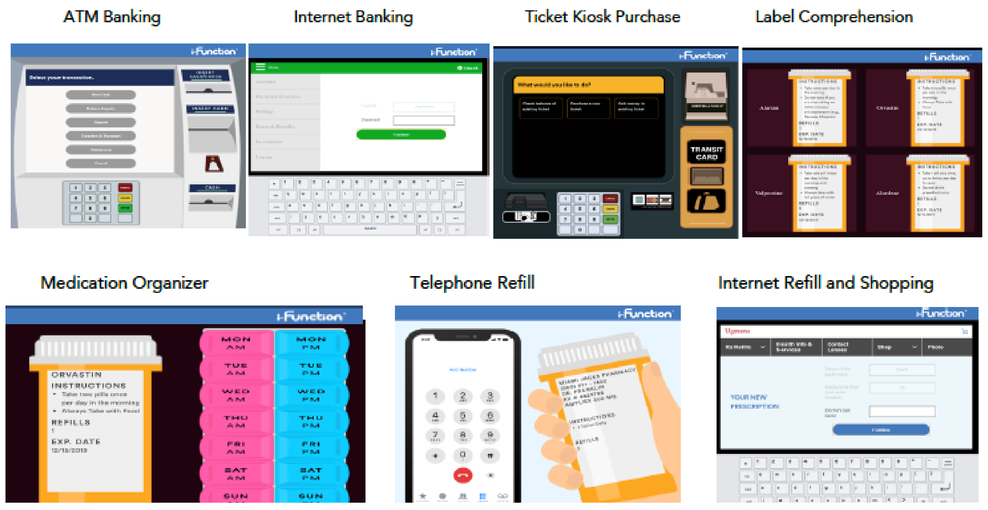
Cognitive Training

- Computerized cognitive training and skills training have been found to lead to improvements in cognition and skills performance.
- Improvements are seen in healthy older people as well as in Mild Cognitive Impairment (MCI).
- The latest generation of these training efforts are delivered fully remotely.

Challenge

- Mastery of all the tasks is achieved by less than 100% of trainees.
- Some of the trainees do not master any of the tasks, suggesting that training could possibly modified to make it more successful.
- However, early identification of high- risk cases would be required in order to modify training strategies on a momentary basis.
- How early can these cases be identified: baseline, first training?
- Is it longer time or more errors?

FUNSAT™ TASKS



DESIGN

- MCI (n=83) were randomized to skills alone or combined training.
- NC (n=69) received skills only training.
- Skills training FUNSAT: 6 functional tasks, 2 hours per week, up to 12 weeks or graduation.
- Combined training: 3 weeks Brain HQ training, followed by up to 9 weeks of skills training or graduation.
- Task performance and training gains were measured by two outcomes: speed and errors.
- Assessment Sequence:
  - Fixed Difficulty form at Baseline.
    - Time and Errors.
      - Trial x trial training gains, time and errors.
- Graduation was defined by performance of a training task with either zero errors or only 1 error/subtask twice successively. Mastered Subtasks were no longer trained.
- As our goal was early identification of potential failures to master, we focused on the first three training tasks administered.

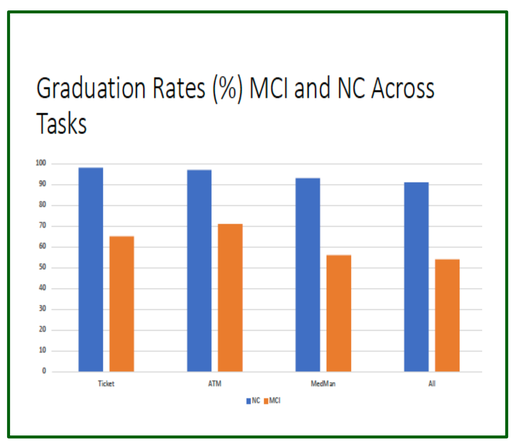
REMOTE TRAINING

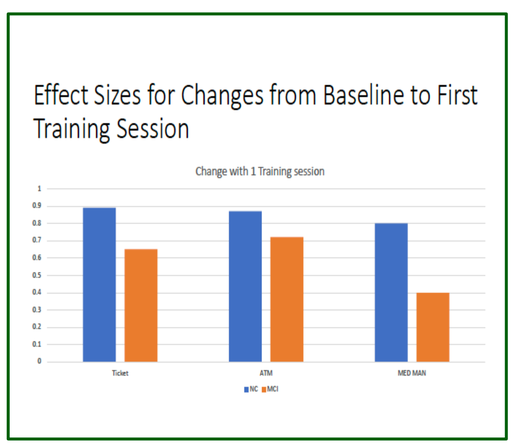
All training in this study was done fully remotely with cloud-connected devices.

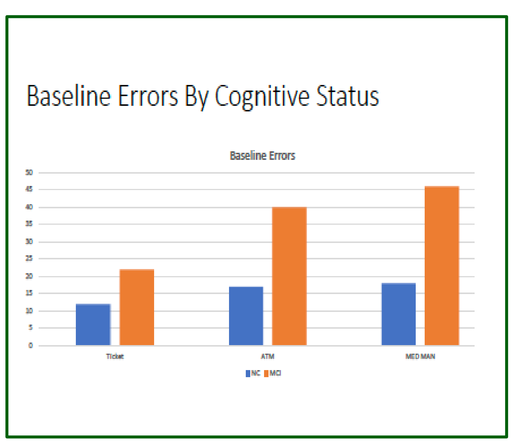
DATA ANALYSES

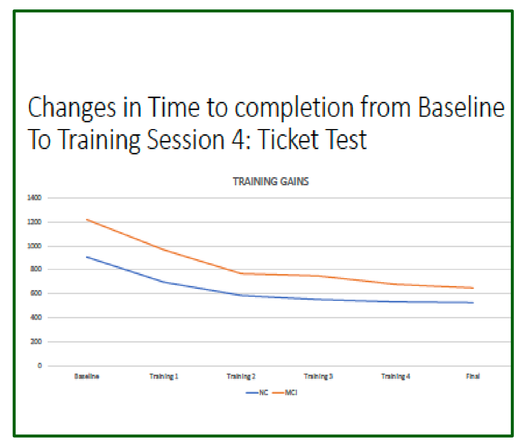
- Classification Analyses.
- Classify all-task graduation.
- Stepwise Discriminant Analysis.
  - Enter all 3 baseline scores [Time and Errors] and change from baseline.
  - Identify Best Predictors.
  - Identify Classification Accuracy [Graduator or not].
- ROC analysis to quantify sensitivity/specificity of prediction.

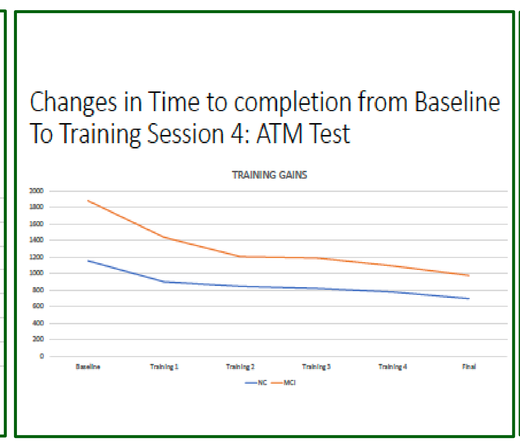
RESULTS

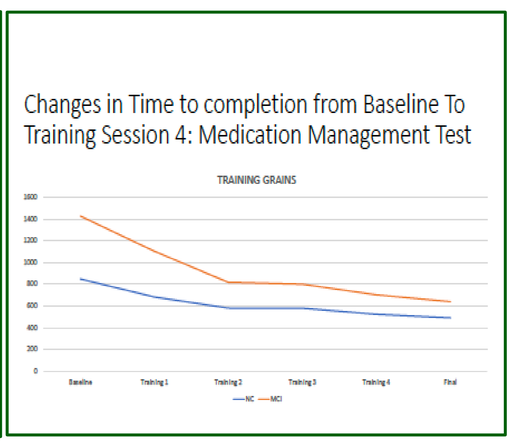








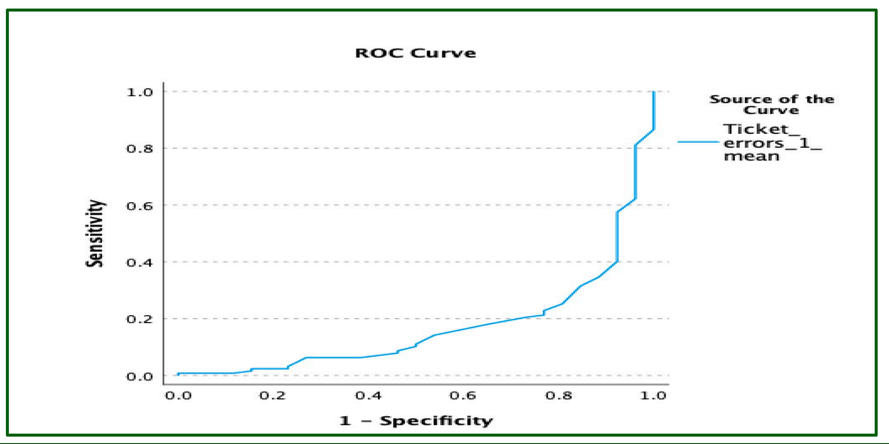




Stepwise Discriminant Analyses

Variables Entered: all Three Tasks

Analysis 1	Analysis 2
Time and Errors	Errors and Gains after 1 Training Session
Ticket Errors: F=41.84	Ticket Errors: F=40.38 Change in Ticket Errors: F=39.66
Classification Accuracy: Overall 82%; Graduators: 94% AUC: .83	Classification Accuracy: Overall 87%; Graduators:93%



IMPLICATIONS

- Substantial training gains with remote training across conditions and samples.
- Gains are substantial even after one training session.
- Most participants master all training tasks.
- Non-graduators can be identified with high accuracy at the baseline assessment of the first task in the battery.
- Thus, errors during the first 15 minutes of assessment are the best predictor of 12-week training outcomes, suggesting that alternative training streams could be developed and deployed to participants at high risk of failure to master all tasks.

DISCLOSURES

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