A Novel Method for Assessing and Training Everyday Functional Skills

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Disclosures

- I am a Chief Scientific Officer of iFunction Inc.

Presentation Overview

- Present some background information.

- Describe our novel functional assessment and training software package.

- Present data on the assessment component of the package.

- Present data on the training component of the package.

- Provide summary comments and next steps.

Background

- The development of strategies to enhance the ability to perform everyday tasks is dependent on understanding the **specific types of performance challenges** individuals encounter during task performance.

- Currently assessment of functional performance is largely based on:
  - Standardized neuropsychological measures of abilities.
  - Paper and pencil based simulations of everyday tasks (e.g., The Everyday Problems Test, Willis & Marsiske, 1993).
  - Self-ratings of performance .
  - Informants' interviews.
  - Objective performance assessments – performance of actual tasks in actual conditions.

- These methods/measures vary considerably in terms of:
  - Administration requirements
  - Feasibility and cost
  - Scoring algorithms
  - Psychometric properties
  - Nature of the data collection
  - Ecological validity

- Each of these methods are also associated with strengths and weaknesses.
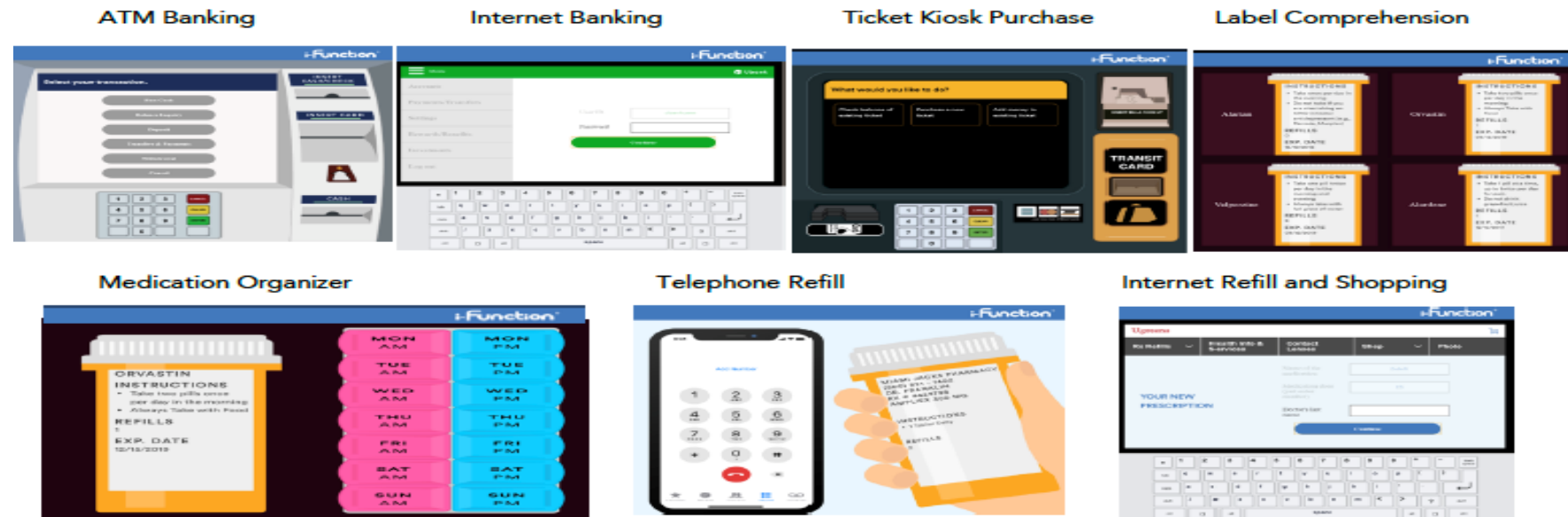
Background

- Standard Neuropsychological Tests:
  - Known psychometric properties
  - Facilitate understanding of specific cognitive changes
  - Require trained and skilled administrator
  - May be out dated – e.g., vocabulary and common references used
  - There is often disagreement among researchers about which measures are optimal for each cognitive domain and population of interest
  - Fail to capture the complexity of everyday task performance.
  - May be fatiguing and complex.
- Paper and Pencil Simulations:
  - Can be relatively easy to administer
  - Available population norms
  - Often highly correlated with performance on neuropsychological tests
  - They require participants to "pretend' or "role play"
  - Some are not current with respect to tasks
- Informant interviews:
  - Can span a range of activities and be potentially reliable
  - Require an informant who is familiar with individual
  - May be biased

iFunction Computer-Based Functional Assessment and Training Program

- Encompasses a wide range of real world activities and based on simulations of real world systems:
  - Medication Management
  - ATM Use
  - Online Banking
  - Refilling Prescriptions
  - Kiosk Ticket Purchase
  - Online Shopping

Training Tasks and Visual Depictions

ATM Banking · Internet Banking · Ticket Kiosk Purchase · Label Comprehension · Medication Organizer · Telephone Refill · Internet Refill and Shopping

iFunction Computer-Based Functional Assessment and Training Program

- Multi-media format and built using an iterative user-centered design approach.

- Real time performance data is collected automatically.

- Can be easily translated for other cultures and languages.

- Alternative forms of assessment component are available.

- Training is customized and built on an adaptive training approach with guided feedback
.

- Remotely deliverable and does not require clinician for administration.

- Includes an administrator tracking dashboard.

Task Simulations

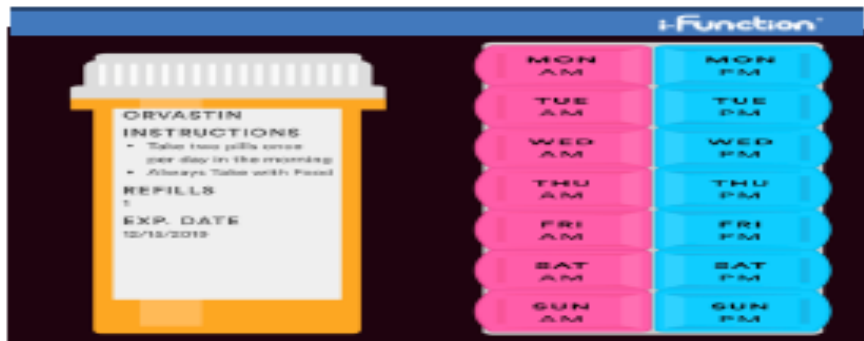## Training Tasks and Visual Depictions

ATM Banking

Internet Banking

Ticket Kiosk Purchase

Label Comprehension

Medication Organizer

Telephone Refill

Internet Refill and Shopping

Previous Assessment Studies *(funded by NIH)*

Highlights of study with patients with Severe Mental illness and non-impaired older adults (NIOA) with the initial Program

- All tasks separated NIOA and patients, with p values ranging from $p = .04$ to $p < .001$ (5/individual performance metrics)

- Correlations between task performance and NP tests shared from 10-25% of the variance

- Correlations with the UPSA-B averaged $r = .40$

- Test retest reliability in patients ranged from $r = .53$ to $r = .77$

*Assessing functional performance using computer-based simulations of everyday activities. Schizophrenia Res. 2017 May; 183:130-136.

Previous Assessment Studies (funded by the NIH)

Highlights of study with aMCI patients with initial program *

- MCI patients more impaired on the different tasks than non-impaired participants (ps<.001).

- Functional task performance correlated with processing speed and executive functioning measures

- High test retest reliability over 0.8 for 2/3 tasks; the other task is no longer in development

- Across tasks, 13-40% of aMCI cases performed below the 5th percentile of the non-impaired participants

Ongoing SBIR Study (funded by NIH)

- 152 Community dwelling participants: 76 non-impaired older adults and 76 with aMCI (CDR 0.5; MOCA<26).

- Participants are randomized into one of two conditions: Functional Skills Training (FST) or FST & Cognitive Training (CT).

- 12 week training protocol: up to 24 sessions; two 60 minute sessions per week.

- Training customized using assessment component.

- Within each domain (e.g. online banking) training begins with the easiest tasks (e.g., check balance of savings account).

- Train at least 2 tasks per training session.

- Assessment: Baseline, immediate post-training, 2-months post-training using alternate forms.

Summary and Next Steps

- Diagnoses of cognitive impairments and outcomes of treatment trials need to extend beyond use of standardized cognitive test batteries.

- Our novel software package is promising:
  - Easy and enjoyable to use across for impaired and non-impaired aging adults
  - High face and ecological validity
  - The assessment component has high test-retest reliability
  - The assessment component correlates with measures of cognition
  - The training component is efficacious for impaired and non-impaired aging adults

- Next steps include"
  - Expansion of the task domains – e.g., using a Smartphone
  - Examination of maintenance of training gains
  - Examination of near and far transfer