

### Psychotherapy for Late-Life Depression: Targeted Strategies for Improving Outcomes.

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### Acknowledgments and Conflicts

- *Dr. Arean has no conflict of interest to report.*
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### Overview

- Executive control and treatment response;
- New directions for intervention development;
- Three projects addressing this problem.

### Cognition and late life depression

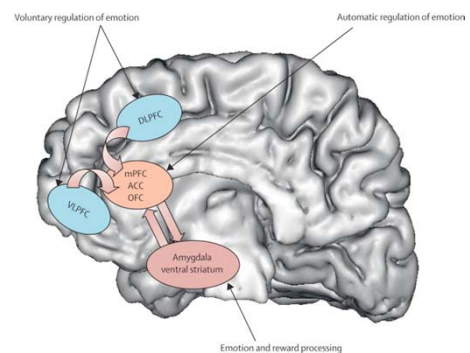
- Cognitive factors associated with LLD are:
  - Reduced Information Processing Speed;
  - Reduced working memory;
  - Reduced response inhibition and selective attention (Wang & Blazer, 2015 Annual Review Clinical Psychology).
- Executive impairments are most common and most problematic in treatment response.

### Executive Dysfunction in LLD

- Characterized by apathy, preservation, poor decision making/impulsivity (Manning et al, 2013, AJGP);
- Patients with LLD+ED have a poor/unstable response to SSRIs (EG: Sneed et al, 2007, AJGP);
- Distinct clinical presentation that is easy to assess in standard clinical interview (Morimoto et al, 2015, AJGP).



### Executive Dysfunction



### Cognitive Control and LLD treatment response.

- Cognitive Control Network (CCN; dorsal anterior cingulate cortex (dACC), and the dorsolateral prefrontal cortex (DLPFC), has the strong negative association with treatment response (so far);
- Culprit identified in LLD+ED: poor response to SSRI medication.

### RDoC and Targeted Treatment



### Research Domain Criteria (RDoC)

- Variability within diagnoses suggest different causes;
- Once we know the cause, we can treat more specifically;
- There are various causes, internal and external;
- Opportunity to streamline and target treatment, behavioral treatments in particular.

### Problem Solving Treatment

- Behavioral intervention that targets broad range of executive functions;
- Previous found to be effective for other illnesses with executive control issues:
  - Schizophrenia
  - ADHD
  - Oppositional Defiant Disorder

### COPED

- 220 adults, 65+;
- Major Depression and executive dysfunction;
- Randomized to 12 weeks problem solving treatment or supportive therapy;
- Followed for 9 months;
  - Depression (PHQ-9; Hamilton Rating Scale)
  - Disability (WHO Assessment Scale)
  - Executive Functions (Stroop, WCST)

### Outcomes

- Depression symptoms (Hamilton, PHQ-9);
- Social and occupational functioning (WHODAS);
- Executive functions (Stroop, WCST, Trails B);
- Suicide (Suicide item on Hamilton).

### PST

## Problem Solving Therapy

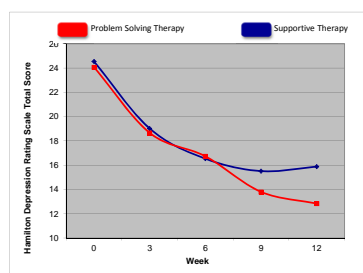
### PST Steps

- Problem list/select a problem;
- Identify a goal;
- Generate list of solutions;
- Evaluate each solution for potential success;
- Select one solution and create an action plan;
- Evaluate the outcome, solve more problems.

### COPED Study

- Results indicated:
  - Clear improvement for PST, particularly after 6 weeks of treatment; NNT = 4!
  - Improvement in mood and functioning (Arean, 2010; Alexopoulos 2011);
  - Improvement in suicidal ideation (Gustafson, in review);
  - Improvement in cognitive control (Mackin, 2013).

### Depression

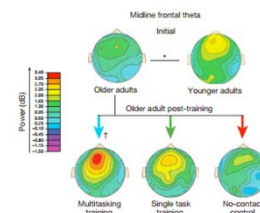


Arean et al, 2010, American Journal of Psychiatry

### Why does PST work?

- Either compensates for deficit in CCN or remediates the deficit;
- PST is similar to cognitive training:
  - Relies on regular rehearsal of skills over 8-12 weeks;
  - Process is practiced with a clinician.

### Building Cognitive Reserve

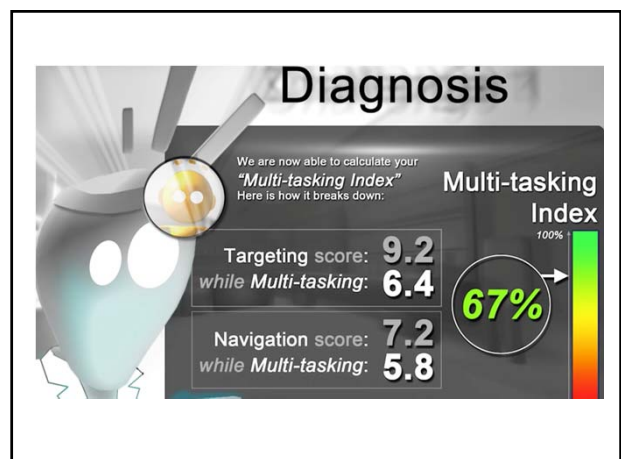
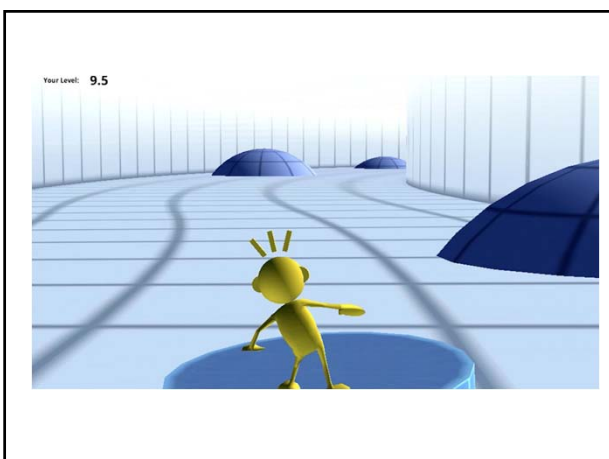
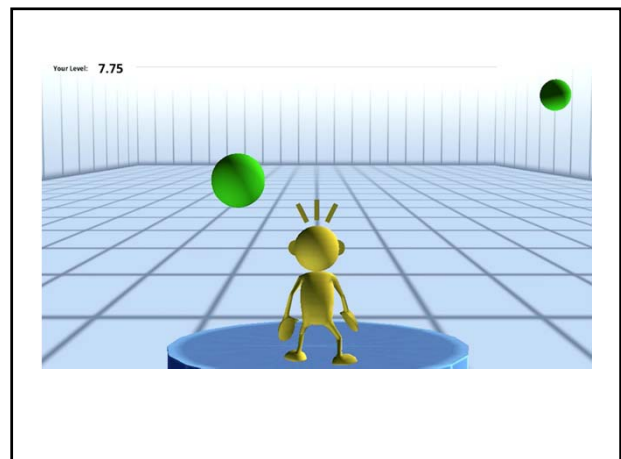
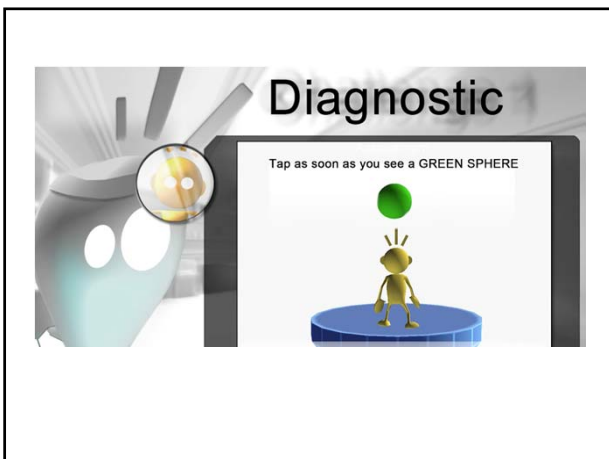


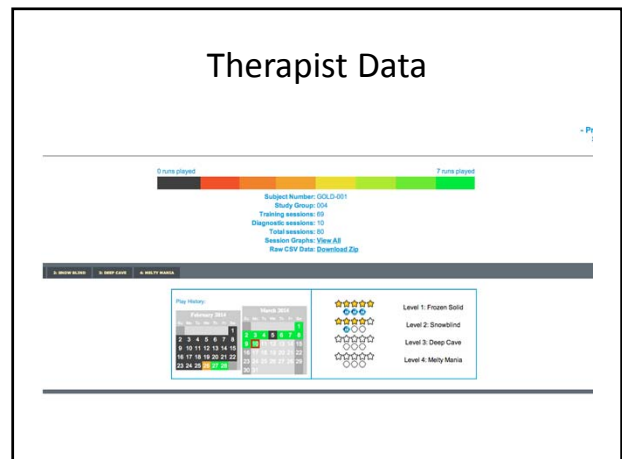
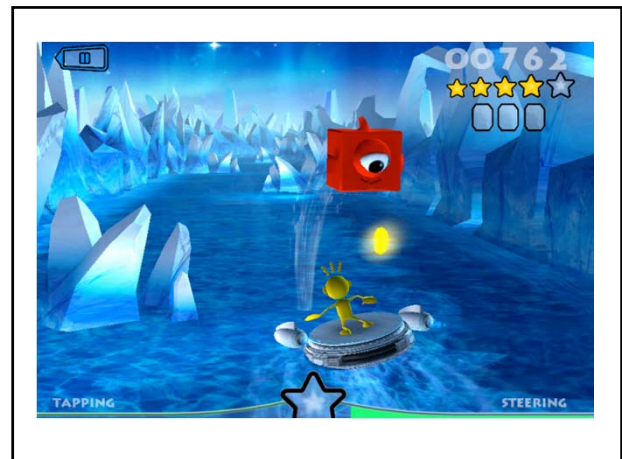
### Games to Overcome LLD Project

- Recruiting 40 participants 65+ with LLD+ED;
- Randomized to PST and Evolution/Neuroracer;
- fMRI collected baseline, 4 weeks and 8 weeks:
  - Stroop color word
  - Emotional stroop
  - Probabilistic reversal Learning task
- Depression and functioning at baseline, 4 and 8 weeks.

### Cognitive training session

- Combination of education, support and training;
- Meet for 8 weeks, first 4 weeks in training;
- Sessions include check in with therapist to review progress, troubleshoot problems in training.





About 10-15 minutes reviewing game play



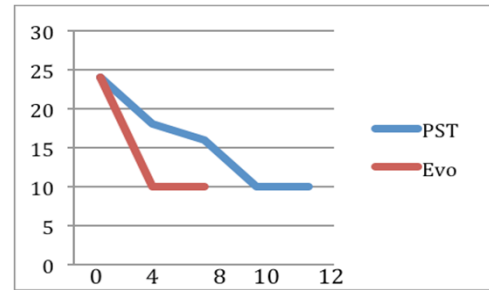
About 20 minutes in support



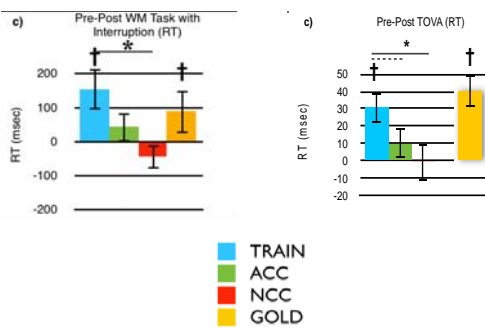
### Progress so far

- Recruiting;
- All participants able to play, with in-app demonstration of improvement in multitasking.

### PHQ-9 Outcomes (N=25)

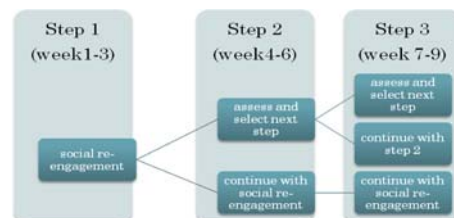
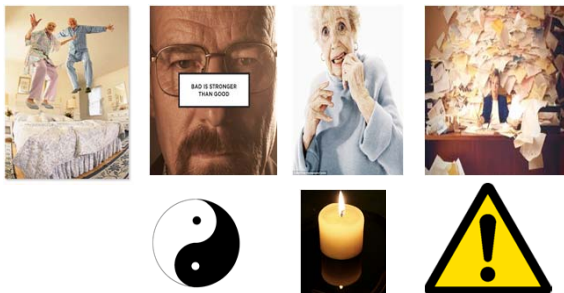


### Near and Far Transfer



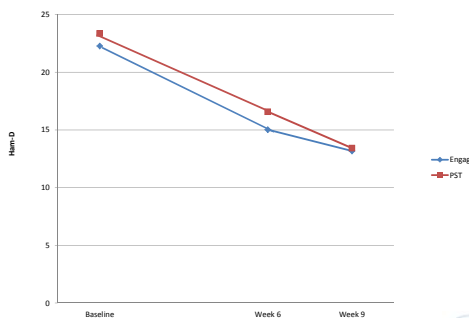
### Engage

Involving patients and clinicians in intervention design

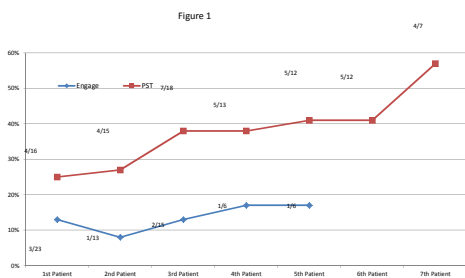


### Design

- Randomized, non-inferiority trial (Engage vs PST);
- 2-month, 6 month, and 12 month outcomes;
- Also assess time to train therapists, and number of corrections over the course of the study.



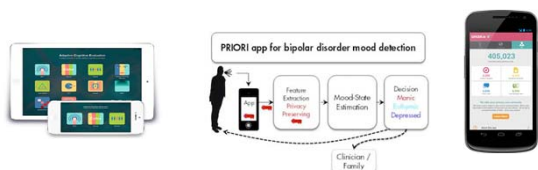
### Skill Drift Over time



**SOLUTIONS & INNOVATIONS IN MOOD ASSESSMENT ACROSS LIFESPAN.**

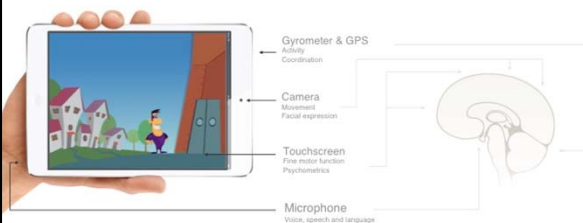
### Streamline assessment

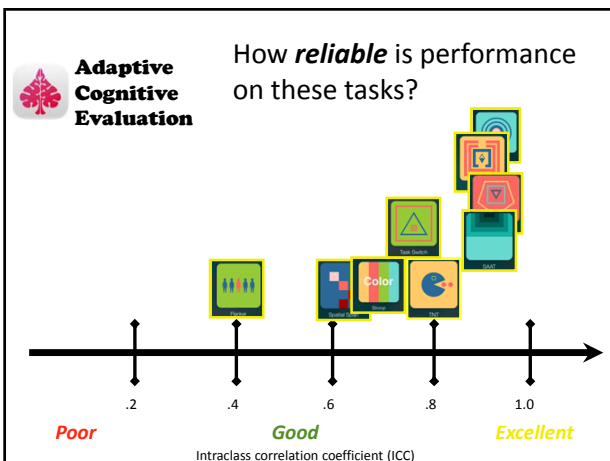
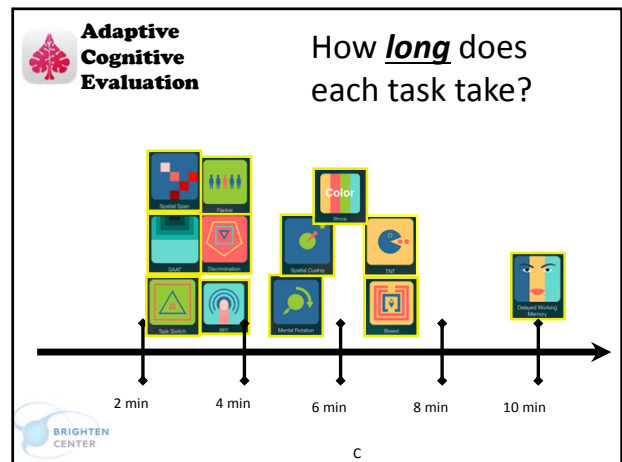
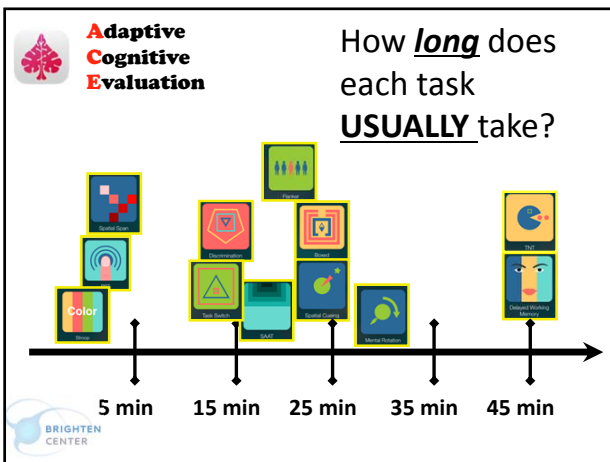
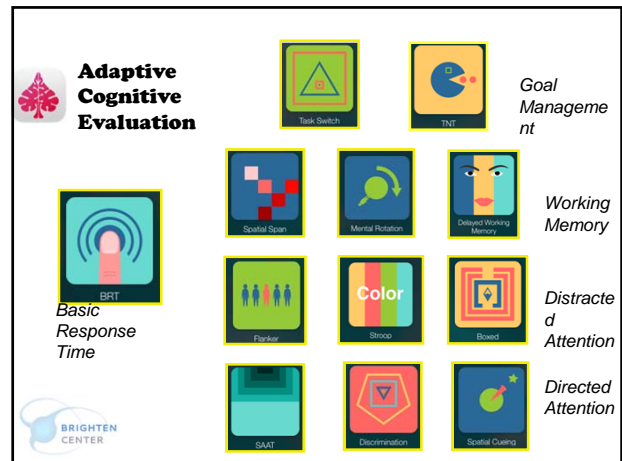
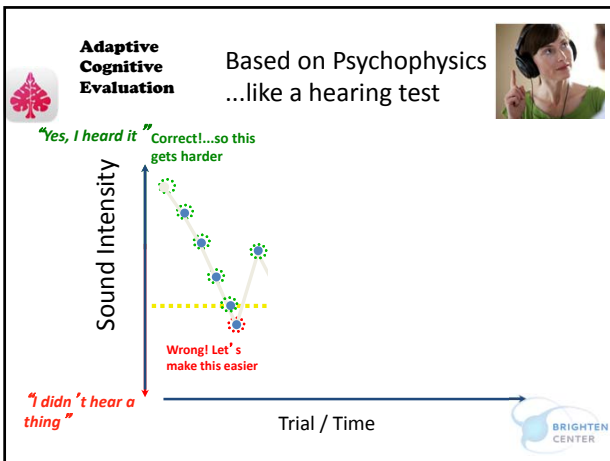
- Use of mobile technologies to deploy assessment in home;
- Monitor activity outcomes;



### A modern approach to research

The old way of conducting research is dying. It's inefficient, costly, unscalable, and frankly, not fun for patients or docs. We're mashing up knowledge from gaming, experience design, technology and science to create experiences that take advantage of all the advances mobile devices have to offer.





**Conclusions**

- Behavioral interventions hold a valuable place in targeted treatment;
- We have demonstrated that an intervention that targets executive functions results in positive mood, functional and cognitive outcomes;
- Interventions could be better streamlined for easier access, through the use of technology.