**At Home Cognitive Testing (CANTAB battery) in Healthy Controls and Cognitively Impaired Patients: A Feasibility Study**

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**BACKGROUND AND OBJECTIVES**

**Background**
- Longitudinal cognitive assessments in the community, which can aid in diagnosis of Alzheimer’s disease (AD), are difficult to achieve due to limited resources of healthcare systems. Reliable cognitive assessments, self-administered at home, can decrease the burden both within the healthcare system and in clinical trials.

**Objectives**
- To assess the feasibility of self-administered at home cognitive testing, using a digital device, in healthy controls (HC) and cognitively impaired (CI) participants.

**Design: I. Participants**

**Key Inclusion/Exclusion Criteria**
- **Age**: 60-75, utilizing digital devices; at home Wi-Fi network.
- **Diagnosis** (1) Healthy controls: no subjective or objective decline, CogState (LifeBattery™) [100] Learning/Working Memory (LWM) composite score ≥50-200*. (2) Cognitively impaired: a) Mild Cognitive Impairment (MCI) National Institute on Aging and Alzheimer’s Association (NIA-AA) criteria for MCI due to AD, reliable study partner, CBB LWM ≥80 and <90*. (b) AD dementia: NIA-AA criteria for dementia due to AD, reliable study partner, CBB LWM ≤80 and ≥90*. (c) HC: (1) AA criteria for dementia due to AD, reliable study partner, CBB LWM ≥80; (2) full time employed; (3) female; (4) no history of psychiatric disorders.

**Demographics:**
- **Age**: 66.32 ± 11.83 years.
- **Sex**: female 24 (63.16%), male 14 (36.84%).
- **Employment**: retired 9 (22.50%), full time 23 (58.82%), college degree 7 (17.78%), trade + high school 2 (5.13%).
- **Race**: Asian 2 (5.13%), African 3 (7.89%), Caucasian/White 36 (90.22%).
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**Design: II. Materials and Procedures**

**Materials**
- Tasks & device: Each task was administered twice; the task order was such that the testing of one task was completed before the other. The testing of the tasks was administered on a 10.5" iPad Pro (2017 model), resting on an adjustable keyboard stand; for distance, participants were instructed to place the hand on the iPad screen and push the iPad away until their arm was extended 180°. All tasks were administered on the iPad screen and touch response.

**Procedures**
- **Schedule**: Tasks were administered over 5 sessions, with 2 weeks between sessions, and no more than 4 tasks per session.
- **Task order**: Each task was administered twice; the task order was such that the testing of each task was completed before the other session. CI participants were required to have a study partner who commits to monitoring the use and charging of devices.

**Instrutions**
- Participants were provided with printed instructions for each task of each session, and were asked to read them before beginning a session. CI participants were required to have a study partner who commits to monitoring the use and charging of devices.

**KEY RESULTS**

**Test-Retest vs. Effect Size**

**Results: I. All tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>HC Mean</th>
<th>HC SD</th>
<th>CI Mean</th>
<th>CI SD</th>
<th>Effect Size (Cohen’s d)</th>
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</thead>
<tbody>
<tr>
<td>PAL</td>
<td>0.939</td>
<td>0.30</td>
<td>0.813</td>
<td>0.184</td>
<td>0.554</td>
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<tr>
<td>SWM</td>
<td>0.86</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.698</td>
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<tr>
<td>PAL</td>
<td>1.25</td>
<td>0.64</td>
<td>1.08</td>
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<tr>
<td>SWM</td>
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<td>0.64</td>
<td>1.03</td>
<td>0.609</td>
<td>0.609</td>
</tr>
</tbody>
</table>

**Results: II. PAL insight; participant identity**

Significant proportion of participants can learn all 12 items

**Participant Identity**
- We randomly selected 33% of videos recorded during task performance for manual quality check of participant identity. Only one task in one session was performed by a substitute.