November 2009

Computer-based cognitive interventions for persons with dementia: Feasibility and outcomes

Nidhi Mahendra  
*California State University, East Bay*

Allegra Apple  
*California State University, East Bay*

Susan Carroll  
*California State University, East Bay*

Adithya Chandregowda  
*California State University, East Bay*

Follow this and additional works at: [https://scholarworks.sjsu.edu/comm_disorders_pub](https://scholarworks.sjsu.edu/comm_disorders_pub)

Part of the Communication Sciences and Disorders Commons

**Recommended Citation**


This Presentation is brought to you for free and open access by the Communicative Disorders and Sciences at SJSU ScholarWorks. It has been accepted for inclusion in Faculty Publications by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.
Computer-based cognitive interventions for persons with dementia: Feasibility and outcomes

Nidhi Mahendra, Ph.D., CCC–SLP
Assistant Professor

Allegra Apple, M.S., CCC–SLP
Susan Carroll, M.S., CF–SLP
Adithya Chandregowda, M.S., CF–SLP

Communicative Sciences & Disorders
California State University East Bay

Funding: Alzheimer’s Association and Intel Corporation
Everyday Technology for Alzheimer Care (ETAC) Initiative
Goals of this Research Study

- **Goal**: To investigate the feasibility of computerized cognitive interventions for PWD

- **Goal 2**: To document the outcomes of using spaced retrieval training for teaching facts and procedures to PWD, both during training and after training ceases

- **Goal 3**: To identify challenges in doing this research
Research Questions

Feasibility

- Can persons with mild and moderate dementia use a computer to play computer games?

Treatment Outcomes

- Can PWD successfully learn and retain face name associations and motor procedures using computer-assisted spaced retrieval training (SRT)?

  How many training sessions does it take to achieve a pre-set learning criterion for training facts and procedures?

  Are learned facts and procedures retained 6 weeks after criterion is met with no further training?
Method

**Screening:** Interview, MMSE, Geriatric Depression Scale–Short Form (GDS–SF), Hachinski Ischemia Score, Audiometric Hearing Screening, Vision Screening, Reading Comprehension Screening

**Comprehensive Assessment:** Global Deterioration Scale (GDS), Mattis Dementia Rating Scale (DRS–2), Rivermead Behavioral Memory Test (RBMT–2)

**Spaced Retrieval Training Screening:** To determine candidacy for using SRT as an intervention (Brush & Camp, 2002)
Study Design

- **Pre-Training Phase**
  **Goal:** To increase familiarity with computers prior to training.

- **Face Name Association Training**
  **Goals:**
  To learn and retain first and last name of an unfamiliar (never met/known) and previously familiar (but could not be named) person.

- **Procedure Training**
  **Goal:** To learn and independently carry out or demonstrate a multi-step, novel, motor procedure.
Study Participants: n = 20

- Gender: 8M, 26F  Age Range: 79–91 years  Education: 8–19 years
- Ethnicity: 1 biracial, 2 Asian, 17 Caucasian
- Computer exposure: 14 –none, 2–some, 4–high
- 17 participants met NINCDS–ADRDA criteria for AD; 3 met the NINDS–AIREN criteria for vascular dementia (VaD).
- 16/20 had neuropsychological testing supporting dementia diagnosis; 14 were on Aricept or other ACE inhibitor

Cognitive Status:
- MMSE Scores: Between 10 and 30
- Global Deterioration Scale: Ratings of 3, 4, and 5
- RBMT Standardized Profile Score: Mild to moderate memory impairment
- Mattis Age– and Education–Corrected Mental Status Scores: Mild to moderately severe cognitive impairment
The Aha Findings!

- CACIs were feasible for PWD including the majority of our participants with limited or no exposure to computers.
  - Feasibility was documented for playing games and for training specific information and procedures

- Overall response to SRT for teaching faces/names and procedures was robust – computer-assisted SRT worked for a majority of our participants within a reasonable amount of time.

- PWD can and most definitely do learn and retain new information and skills. Many participants generalize learned information and procedures to situations outside of training sessions.
Surprises

- No difference in the number of sessions it took to learn novel and familiar faces and names, nor in post-treatment retention.
  - At times, familiar face/name was harder to learn, e.g., Sarah Johnson versus Theresa DelCarpio
- Nature of learning criterion (how stringent) may be more important in determining learning outcomes than type of material learned.
- PWD routinely made statements revealing the perceived value of participating in one-on-one interventions.
  - “Did you see that – I beat the computer at scrabble!!”
- Participants with VaD (vs. AD) responded less consistently to SRT and to CACIs and generally had worse outcomes.
Challenges

Recruitment
- High attrition due to illness/injury/change in cognitive status
- Difficulty enrolling diverse clients due to language barriers
- Therapeutic nihilism widely prevalent regarding interventions designed for PWD to use technology

Methodology Issues
- Learning criterion likely too stringent for persons with moderate dementia
- Greater weekly session frequency for moderate dementia patients may have made significant differences to learning outcomes.
- Learning and retention was documented tightly in this study; generalization assessed more loosely.
Complete analyses on factors that predict learning outcomes in response to CACIs

Investigate CACIs for staff and caregiver training to support indirect interventions

Document the effect of treatment dosage (frequency of weekly training sessions) on learning outcomes of PWD

Document response of clients with VaD to CACIs
Acknowledgments

- Dr. Kathryn Bayles, Professor Emeritus, University of Arizona
- Cheryl Tomoeda, College of Science, University of Arizona
- Dr. Mitchell Watnik, Department of Statistics, CSUEB
- Dr. Mary Wilson, Laureate Learning Systems

Graduate Students
  - Amanda Scullion, Cayce Hamerschlag, Nisha Engineer, Katie Schoneman, Danielle Reed

Clinical Sites
  - Masonic Home for Adults, Union City
  - Summerville at Landmark Villa, Hayward
  - Ralph and Mary Rugieri Center, Union City
  - Aegis Living and Carlton Plaza, Fremont