Computerized Functional Skills training in Older People with Schizophrenia

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Abstract

Cognitive enhancement with pharmacological or remediation strategies is a topic of major interest in severe mental illness. Despite success in enhancing cognitive performance, these intervention strategies have not been shown to improve their distal target of everyday functioning without additional skills-based interventions. In many locations, however, there is no availability of psychosocial interventions, leading us to develop a technology-based skills training system and testing its efficacy in this study. Herein we present the results of a computerized training system focused on everyday skills that require the use of technology.

Twenty people with schizophrenia and 12 healthy older adults participated in this study. Two different functional skills, ATM banking and telephone voice menu utilization for prescription refill, were trained using cognitive remediation principles (strategy learning, titrated difficulty, feedback). These training tasks used "walk-up" strategies not requiring the use of a human trainer and were delivered in a 60-minute training sessions. Dependent variables of time to complete the fixed difficulty version of the task and number of errors made were examined prior to and after the training sessions.

The two subjects samples had an average age of 53, with 63% male participants and 67% with a high school education or less. All participants earned less than $40,000 per year. Both groups of participants demonstrated substantial and statistically significant improvements in task performance with training. Healthy controls reduced their time to completion of the ATM task by 50% (4 minutes to 2) and their performance on the refill task by 66%. Patients performed more poorly at baseline on both tasks, but also reduced their performance time by 60% on both tasks. After training, there was no difference in time to completion of either of the tasks across the two subject samples.

Computerized skills training without a human trainer significantly improved functional capacity in healthy older people and people with schizophrenia. There was no cognitive enhancement therapy provided and performance in an abbreviated neuropsychological assessment did not improve significantly over the training period. These results suggest that computer-delivered functional skills training can improve functional capacity and that this intervention may be an important adjunct to pharmacological or remediation focused cognitive enhancement, with a goal of improving everyday outcomes through a combination of improved cognitive functioning and improvement of functional capacity.

Background

- Deficits in the ability to perform everyday living tasks are common among people with severe mental illness or cognitive impairments.
- Normative age-related changes in cognition can also result in challenges in performing everyday tasks especially tasks that require new learning.
- At present, there are cognitive remediation interventions that can be delivered remotely via technology and there is a need to develop remote assessment techniques that reflect the demands and complexities of everyday tasks.
- Cognitive remediation strategies have clearly failed to improve functional outcomes without concurrent skills training
- The same could easily be expected from medications that enhance cognition
- Skills training is generally available only at academic medical centers

Current Study

- We developed training versions of realistic functional tasks
- The two tasks included a telephone voice menu for prescription refill and a Automatic Teller Machine
- There were several features of these simulations
- All had a realistic appearance with graphics that directly followed from real world tasks
- The training used CRT principles, with increasing levels of detail following errors and maintenance of gains across training sessions
- We trained both healthy and schizophrenia participants who reported lack of facility with performing these tasks.
- The tasks used "walk-up strategies"and no human trainer was involved in the training of the tasks
- All instructions and feedback came directly from the task

Task Demands

ATM	Refill Task
Enter PIN	Dial Pharmacy
Check Balance	Enter Script Number
Transfer Money	Select Pick-up time
Withdraw Cash	Select Pick-up date
Deposit Checks	Repeat for second

Disclosures

Methods

Participants

- The sample include 20 patients with schizophrenia and 12 non-impaired older adults recruited from the community
- Age ranged from 28-71
- 63% of participants aged 55+
- 63% male
- Education – 67% with a high school degree or less
- Race – 59% Black/African American
- 22% White Hispanic/Latino
- 4% White Non-Hispanic/Latino
- All participants reported yearly household income of less than $40,000
- Majority of participants (30%) indicated they were unemployed due to disability

Training Strategy

Instructions were provided directly by the program, as was error feedback.

Feedback and instructions were provided incrementally

For example, this is the training stream for errors entering a PIN:

PIN entry error (s).

- Your PIN is 1234. Please enter your PIN and press enter.
- Your PIN is 1234. Please press the numbers in your PIN on the keypad and press enter
- Your PIN is 1234. Please press 1, followed by 2, then 3, and then 4 on the keypad and then press enter.
- Your PIN is 1234. Watch the keypad for the correct sequence of presses. Then repeat the four presses and press enter.
- Your PIN is 1234. (Key lights) Press the 1 key. (Key lights) Now press the 2 key, (Key lights) Now press the 3 key, (Key lights) Now press the 4 key.
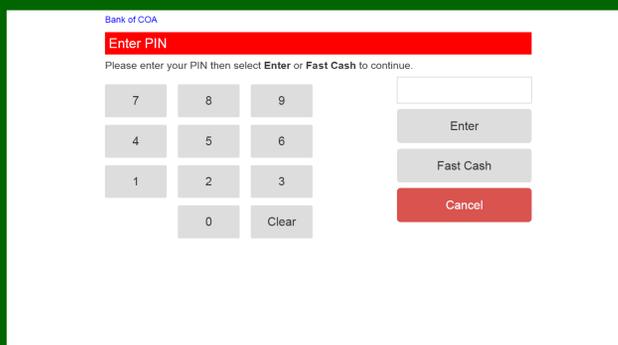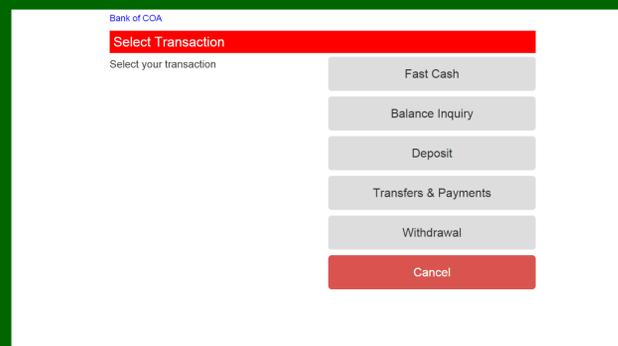
Training Sessions
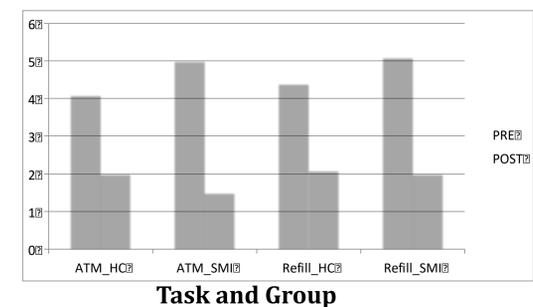
4 sessions in 2-week timeframe
6 ATM tasks and 4 prescription tasks per training session

Thus, 24 training sessions for ATM and 16 for refill

Pre-test and Post test with alternate forms

Results

Time to completion in minutes

Task and Group

Error Free performance:

No participants completed the task without errors at baseline

Endpoint:
ATM (2 successive administrations)
HC
2/12 no errors
3/12 One error

Refill ((2 successive administrations)
8/12 no error

Discussion:

- In today's "technologically driven world" the performance of routine tasks such as banking, transportation, medication management, shopping and way-finding involves the use of new and evolving technologies.
- 16-24 training sessions was adequate to markedly improve performance on these realistic simulations of everyday tasks
- Efficacy was seen for HC and schizophrenia patients
- CRT (and pharmacological cognitive enhancement) has been shown not to improve outcomes as monotherapy
- Skills training is required, but it typically unavailable or not covered by health insurance
- Recent developments do not suggest marked promise for changes in this situation
- This skills training platform does not require a human trainer and thus eliminates demands for professional credentials
- Current work is expanding this platform to mulitple additional skills training modules