Efficacy of a Home-based Speed of Processing Neurocognitive Remediation Program for Adults with HIV

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OBJECTIVE

The life-extending effect of Combination Antiretroviral Therapy (cART) and increasing incidence of cognitive deficits necessitate exploration of alternative settings for speed of processing training in older adults with HIV. This study examined the effectiveness and feasibility of a home-based speed of processing training program in improving cognitive function in middle-aged and older adults with HIV.

METHOD

Participants:
- *HIV-POSITIVE ADULTS* were targeted to be recruited from a local HIV clinic.
- *Inclusion Criteria*:
  - English speaking
  - 40 years of age and older
- *Exclusion Criteria*:
  - Homeless, mentally impaired (e.g., Alzheimer's, brain damage)
  - Blind or deaf
  - Currently undergoing radiation or chemotherapy
  - Brain trauma with loss of consciousness greater than 30 minutes
  - Having a significant neuromedical comorbidity (e.g., schizophrenia, bipolar disorder)

Cross-sectional Assessment:
- Demographic Questionnaire
- Health Information (use of cART, CD4+ count, viral load, etc)
- Cognitive Measures
  - Useful Field of View (UFOV®) Test
  - Wisconsin Card Sorting Test
  - Finger Tapping Test
  - Timed IADL Test
- 10 hours of SOP training at home (RoadTour)
- Exit Survey

Posit Science – RoadTour

Data Analysis (SPSS 14): Using an intent-to-treat approach, *t*-tests were used to examine treatment effects from pretest to posttest. Alpha was set at $p < .05$.

RESULTS

TABLE 1

Sample Description (N = 20)

Variable	Mean (SD)	N (%)
Age (years)	50.22 (6.57)	
Education (years)	13.50 (2.04)	
Gender		
Female		5 (25%)
Male		15 (75%)
Race/Ethnicity		
African American		14 (70%)
Caucasian		5 (25%)
Hispanic		1 (5%)
Years with HIV	15.57 (6.09)	
CD4+ Lymphocyte Count (cells/mm³)	483.17 (262.40)	
HIV Plasma Viral Load (copies/ml)	180,000 (13,131.19)	
Number on cART		19 (95%)

Notes. cART = combination antiretroviral therapy; SD = standard deviation.

TABLE 2

Results of Cognitive Measures (N = 20)

Variable	Mean (SD)	Pretest-Posttest (p-value)
Useful Field of View Test (milliseconds)		
Pretest/Baseline	618.65 (275.69)	.01
Posttest	497.53 (268.96)	
Wisconsin Card Sorting (% correct)		
Pretest/Baseline	66.90 (13.50)	ns
Posttest	70.13 (14.35)	
Finger Tapping Test (no. correct)		
Pretest/Baseline	46.73 (9.23)	ns
Posttest	48.14 (8.87)	
Timed IADL Test (seconds)		
Pretest/Baseline	101.19 (76.04)	.05
Posttest	86.04 (57.44)	
Engaged in Training Protocol (hours)	8.20 (3.93)	

Notes. IADL = instrumental activities of daily living; ns = not significant; SD = standard deviation. Twenty participants were enrolled at baseline; only 15 participants returned for the posttest assessment.

TABLE 3

Self-reported Cognitive Gains from Home-based Speed of Processing Training (N = 13)

Exit Survey Questions	Mean (SD)
How much did you enjoy these games? (1= not at all; 5 = extremely)	3.69 (1.03)
Do you feel these games improved your mental abilities? (1= not at all; 5 = extremely)	3.77 (0.93)
Do you feel these games improved your memory? (1= not at all; 5 = extremely)	3.54 (1.05)
Do you feel these games improved the speed in which you process information? (1= not at all; 5 = extremely)	3.77 (0.83)
Do you feel these games improved your attention? (1= not at all; 5 = extremely)	4.08 (0.76)

Notes. SD = standard deviation. Range: 1 = not at all; 2 = a little; 3 = moderately; 4 = very much; 5 = extremely. Two participants did not use the training protocol at all; therefore, they could not respond to these questions. Out of the 15 participants who returned for the posttest assessment, only 13 ever engaged in some amount of the speed of processing training.

CONCLUSIONS

Speed of Processing: Overall UFOV® scores were significantly lower ($t(14) = 2.80$, $p = .01$) on the posttest; this indicates improvements in the speed of processing domain after the home-based speed of processing training.

Everyday Functioning: Scores on the TIADL were significantly lower ($t(14) = 2.14$, $p = .05$) on the posttest; this indicates improvements in everyday functioning after the home-based speed of processing training.

Exit Survey: Most participants reported they enjoyed the games and felt the training moderately improved their mental abilities in speed of processing, memory, and attention domains.

Responses from Participants:

What did you like most about the games?

"They were fun."

"Challenging, helps with peripheral vision and focus. Also works on your memory."

"Really enjoyed it, felt it helped my mental ability."

"Thought it increased memory, fun, interesting."

KEY POINTS
1. Speed of processing training, even in the home setting, may be used to preserve cognitive function and facilitate successful cognitive aging.
2. Future studies exploring cognitive remediation therapies in alternative settings such as clinics and daycare is suggested.

Selected References

Vance, D. E., Fazeli, P. L., Ross, L. A., Wadley, V. G., & Ball, K. K. (2012). Speed of processing training with middle-age and older adults with HIV: A pilot study. *Journal of the Association of Nurses in AIDS Care, 23*(6), 500-510. doi:10.1016/j.jana.2012.01.005

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