ECRONICON OPEN ACCESS

EC NEUROLOGY
Research Article

Neurocognitive Training Upon a Diagnosed Cognitive Decline/Dementia Population in a Clinical Setting Ongoing Study Since 2012

Barbara C Fisher*, Danielle Szokola and Sofia Guevara

United Psychological Services, United States

***Corresponding Author:** Barbara C Fisher, United Psychological Services, United States.

Received: October 07, 2025; **Published:** November 10, 2025

Abstract

This study has been ongoing since 2011, established in an outpatient clinical setting. The program is individually designed based upon neuropsychological evaluation and each plan is patient specific based upon NP testing. Neurocognitive training occurred in the context of psychotherapy session addressing behavioral health issues as well as related neurological and neuropsychological deficits and concerns. Re-evaluation was completed, using the same testing at the same time of day after one year of treatment to ascertain changes and determine efficacy of the program. The study consisted of 159 patients referred by their treating physician, neurologist or specialist, diagnosed primarily with memory deficits related to mild to moderate cognitive decline, however there were some cases of moderate to severe decline and early dementia. Educational level ranged from high school to graduate degrees. Findings indicate that numerous areas of memory function improved neurocognitive function delivered in the context of a therapy session addressing all aspects of the individual's behavioral health. The individualized program appears to be effective in enhancing memory function in a clinical outpatient population of varying degrees and types of dementia and cognitive decline.

Keywords: *Neurocognitive Training; Cognitive Decline; Dementia Population*

Introduction

This study has been ongoing since 2011 established in an outpatient setting; the last publication was 2018. The program is an individually designed program based upon neuropsychological evaluation and executed in a therapeutic setting. Neurocognitive therapy accompanies conventional cognitive behavior therapy to address behavioral issues, as well as related neurological and neuropsychological deficits and concerns. Sleep, exercise and remaining active are stressed during therapeutic intervention to address all aspects of an individual's daily life.

The therapist stresses positive self-care while continuing to address medical and neurological disorders in a preventive and positive manner, whether that is medication management, CPAP compliance, nutrition, hydration, and eating properly. Contact is maintained with treating physicians and specialists. Patients are typically referred by the medical field resulting from an outreach effort to encourage early evaluation and diagnosis for mild cognitive decline based upon common risk factors of cardiovascular disease or specific neurological

disorders (e.g. Parkinson's disease, Huntington's disease, stroke, brain injury, cancer (chemotherapy and radiation, long term sleep apnea) or family history of dementia.

Of the 39 patients seen and re-evaluated from 2023 and 2024 were analyzed and 3 had been hospitalized, 14 were not receiving any services (36%) and 23 continued with brain training (56%) (8 were in both therapy and brain training and 15 were in brain training) and one had graduated to therapy only (0.02%). Using these statistics as preliminary information there are less hospitalizations for this population when treated for cognitive decline using the neurocognitive training as part of a therapy program, however this is consistent with the research.

There are a number of activities and games to choose from, close to 400. A treatment program pursuant to the individual is based upon the neuropsychological assessment completed prior to treatment. An initial plan is developed based upon the assessment results and the clinical assessment working with the patient. The therapist uses this initial treatment plan and then adds and/or subtracts activities from the plan as needed based upon patient response through the course of therapy.

Memory is primarily addressed, secondarily the impact of executive function for treatment; visual and verbal memory, short term and working memory, as well as recognition and retrieval. The impact of executive deficits is addressed; selective attention, problem solving, cognitive rigidity, integration and poor sequential processing. Treatment is encased in cognitive behavioral therapy to manage life's ongoing issues as well as modifiable factors of exercise, good sleep, fluid intake and nutrition. The importance of remaining active and being social with others is stressed in treatment. Evaluation is completed on a yearly basis and provides a means of monitoring for declines in functioning as well as to provide feedback and efficacy for the program. Following post-testing, the patient is seen again for clinical assessment changes are made to the program based upon evaluation results and the patient is re-evaluated yearly for ongoing therapy.

Neurocognitive intervention has been gaining credence in recent research, along with the modifiable risk factors and exercise as a path to provide intervention to address decline associated with dementia which can be dramatic depending upon the diagnostic type. There are large scale studies conducted that have provided efficacy regarding the benefit of cognitive training and stimulation [1-4]. Cognitive training intervention and cognitive enhancement have been identified as having positive effects to impact cognitive decline (slowing down the process and/or remaining stable in the aged population [5]. Cognitive training has been shown to be a promising tool; when personalized leading to real world benefits [5]. When cognitive training was compared to physical training, there were two distinct findings; improved executive function with cognitive training and improved memory with physical training [6,7]. Modest support was shown for the potential of videogame training to improve cognitive function in healthy older adults and another study revealed only specific effects. The transfer of training to real life improvement was seen as offering mixed results [8-10]. Another study revealed that an active lifestyle was more effective than short term training interventions, impacting cognitive change over time in a dementia risk group. Simultaneous training (cognitive training in combination with physical training) was found to be the most efficacious approach [11]. Recent research found structural changes resulting from long term cognitive training as enhancing functional connectivity and delaying structural brain decline [12]. Group and individual cognitive stimulation was reported as effective in supporting cognitive function in people living with dementia at any degree of severity [13].

Methods

Adults were referred for assessment of primarily memory difficulties and diagnosed with mild cognitive decline (mild, moderate, severe) and dementia (age 48 to 90 years, n = 159).

Patients are typically referred by the medical field to rule out dementia/cognitive decline resulting from common risk factors of cardiovascular disease or specific neurological disorders (e.g. Parkinson's disease, Huntington's disease, stroke, brain injury, cancer (chemotherapy and radiation, long term sleep apnea) or early dementia/family history of dementia (and currently if biomarkers are positive for dementia).

This ongoing study is unique in providing clinical data to assess the effectiveness of a cognitive therapy/training program (that is individually designed based neuropsychological) to remediate neuropsychological deficits (primarily memory) in a diagnosed dementia population at a private clinic was assessed. Neuropsychological evaluation was administered prior to and following therapeutic intervention and results were compared.

The program consists of neuropsychological assessment, a specific battery of tests to evaluate for dementia, consisting of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Memory Assessment System (MAS), Doors and People Test, and Brief Visuospatial Memory Test-Revised (BVMT-R). Based upon the individual evaluation, a specific treatment plan is created. The plan is patient specific. The specific plan of care is creased based upon symptoms presented and neuropsychological evaluation suggested a specific targeted focus for therapeutic intervention (i.e., memory, word retrieval, impact of executive reasoning deficits). Re-evaluation occurs generally on a yearly basic and the treatment plan is modified as a result.

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Memory Assessment System (MAS), Doors and People Test, and Brief Visual Motor Test Revised (BVMT-R) were utilized to measure memory functioning pre and post treatment. The RBANS has been used extensively for critical care and in research with patients diagnosed with cognitive deficits or dementia [1-4]. The Doors and People is an accepted memory test for visual and verbal retrieval and recognition [14]. The BVMTR has been used in the aged population as a measure of visual memory [15].

The neurocognitive training is presented during the course of a therapy session providing treatment of emotional issues, addressing modifiable risk factors and ongoing daily life. Patients are seen twice per week and encouraged to play the games during the course of their week in the home setting with a carryover home program. Each patient is assigned a different protocol based upon neuropsychological evaluation and the diagnosis of specific memory types (short term, working, visual, verbal, recognition versus retrieval) as well as the impact of executive reasoning deficits (selective attention, cognitive rigidity, integration, poor sequential processing). There are close to 400 games and activities to choose from, some have been created and some are utilizing available published games. During the course of therapy, the use of the game is altered; timing may be added, increasing the items to remember, changing the pattern of recall for working memory, to cite a few examples. As the individual improves, there are increased levels of the activities. For example, there is a Geoboard that involves the use of patterns created with different colored rubber bands matching a picture presented in black and white or color that provides increasing complexity. The person copies the design and then has to recall it from memory. The task involves the use of planning, memory processes and visual perceptual analysis.

Results

Areas of short-term, delayed, visual, verbal, and overall memory evaluated improved following treatment. Paired samples t-tests revealed significant differences between pre and post treatment scores on the RBANS for immediate memory ($p = 0.001$), delayed memory ($p = 0.033$) and overall performance ($p = 0.039$). Marginally significant findings were present for visuospatial reasoning ($p = 0.052$).

Significant findings were also present on the MAS for verbal memory ($p = 0.016$), visual memory ($p = 0.007$) and global memory ($p = 0.018$). Doors and People Test for overall age ($p = <0.001$), visual memory ($p = 0.018$), verbal memory ($p = 0.008$), recall ($p = 0.028$), recognition ($p = 0.005$), verbal forgetting ($p = 0.025$), recognition of pictures of doors ($p = 0.009$), recognition of names of people ($p =$

0.010) and recall of shapes (p = 0.013). On the BVMT there were significant differences pre and post testing for learning trial one (p = 0.010), learning trial three (p = 0.018), learning (p = 0.011) and delayed memory (p = 0.029).

		Pre-Testing	Post-Testing
RBANS Immediate Memory	Mean	83.14	87.90
	± SD	20.61	21.86

Table 1: *Effect of cognitive training on immediate memory performance.*

		Pre-Testing	Post-Testing
RBANS Delayed Memory	Mean	83.81	87.38
	± SD	22.13	23.87

Table 2: *Effect of cognitive training on delayed memory performance.*

		Pre-Testing	Post-Testing
RBANS Overall Memory	Mean	87.20	88.67
	± SD	18.44	19.90

Table 3: *Effect of cognitive training on overall memory performance.*

		Pre-Testing	Post-Testing
RBANS Delayed Memory	Mean	98.62	98.35
	± SD	18.31	21.20

Table 4: *Effect of cognitive training on visuospatial reasoning performance.*

		Pre-Testing	Post-Testing
MAS Verbal Memory	Mean	81.82	86.14
	± SD	14.96	15.90

Table 5: *Effect of cognitive training on verbal memory performance.*

		Pre-Testing	Post-Testing
MAS Visual Memory	Mean	92.49	95.68
	± SD	16.86	17.91

Table 6: *Effect of cognitive training on visual memory performance.*

		Pre-Testing	Post-Testing
MAS Global Memory	Mean	85.11	88.30
	± SD	16.62	18.01

Table 7: *Effect of cognitive training on global overall memory performance.*

		Pre-Testing	Post-Testing
Doors and People Overall Age	Mean	7.27	8.56
	± SD	3.74	3.95

Table 8: *Effect of cognitive training on overall memory performance.*

		Pre-Testing	Post-Testing
Doors and People Visual Memory	Mean	8.27	9.04
	± SD	3.42	3.62

Table 9: *Effect of cognitive training on visual memory performance.*

		Pre-Testing	Post-Testing
Doors and People Verbal Memory	Mean	7.04	7.53
	± SD	3.56	3.40

Table 10: *Effect of cognitive training on verbal memory performance.*

		Pre-Testing	Post-Testing
Doors and People Recall	Mean	6.90	8.12
	± SD	3.49	3.59

Table 11: *Effect of cognitive training on overall recall performance.*

		Pre-Testing	Post-Testing
Doors and People Recognition	Mean	8.21	8.81
	± SD	3.75	3.88

Table 12: *Effect of cognitive training on overall recognition performance.*

		Pre-Testing	Post-Testing
Doors and People Verbal Forgetting	Mean	9.56	10.91
	± SD	3.04	12.65

Table 13: *Effect of cognitive training on retaining verbal information performance.*

Discussion and Conclusion

Findings indicate that memory function and executive deficits can be improved by neurocognitive training encased in a therapeutic session in a clinical setting using a specifically designed, individualized program of activities to improve function. The individualized therapeutic program appears to be effective in augmenting memory and executive functioning in a clinical outpatient population. To date, this facility is unique if providing this type of neurocognitive intervention based upon neuropsychological evaluation using pre and

post-evaluation as well as serial evaluation on a yearly basis. Continuing evaluation is helpful in determining changes in the therapeutic program to promote efficacy with continually changing and evolving treatment that is individualized and based upon the patient. Findings have been documented at this facility shown in abstracts presented at area conferences since 2012 by this facility [16].

Limitations of the Study

There is no patient control group given that this was completed in an outpatient setting with the goal of treating dementia and memory deficits. There is always the risk of a practice effect given the familiarity with the measures however in testing individuals with memory difficulties this becomes less of an issue as well as, one year has typically lapsed between evaluation. Two of the four measures have different versions available for re-testing. Six months has been the general known rule for practice effects no longer being considered as a variable which is specifically noted in various test manuals. On the RBANS there was a largely absent practice effect after one year, mean re-test scores increased by 5 points for the index scores excluding language which was 2 points after 39 weeks [17]. Depending upon the form, there was a gain of 2 to 4 raw score points for the BVMT-R after 56 days in healthy participants. On the Doors and People Test there was no change in the brain injured group over time [18,19].

Bibliography

1. Shah TM., *et al*. "Enhancing cognitive functioning in healthy older adults a systemic review of the clinical significance of commercially available computerized cognitive training in preventing cognitive decline". *Neuropsychological Review* 27.1 (2017): 62-80.

2. Moruzzi., *et al*. "Randomized trial on the effects of a combined physical/cognitive training in aged MCI subjects: the Train the Brain study". *Scientific Reports* 7 (2017): 39471.

3. Ngandu T., *et al*. "A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at risk elderly people (FINGER) a randomized controlled trial". *Lancet* 385.9984 (2015): 2255-2263.

4. Valenzuela M and Sachdev P. "Can cognitive exercise prevent the onset of dementia? Systematic review of randomized clinical trials with longitudinal follow-up". *American Journal of Psychiatry* 17.3 (2009): 179-187.

5. Turnbull A., *et al*. "Unifying framework for cognitive training interventions in brain aging". *Ageing Research Reviews* 81 (2022): 101724.

6. Kuster Olivia C., *et al*. "Cognitive change is more positively associated with an active lifestyle than with training interventions in older adults at risk for dementia, a controlled intervention clinical trial". *BMC Psychiatry* 16.1 (2016): 315.

7. Chapman Sandra B., *et al*. "Distinct brain and behavioral benefits from cognitive vs. physical training: a randomized trial in aging adults". *Frontiers in Human Neuroscience* 10 (2016): 338.

8. Van Muljden Jesse., *et al*. "Online games training aging brains limited transfer to cognitive control functions". *Frontiers in Human Neuroscience* 6 (2012): 221.

9. Ballesteros Soledad., *et al*. "Brain training with non-action video games enhances aspects of cognition in older adults, a randomized controlled trial". *Frontiers in Aging Neuroscience* 6 (2014): 227.

10. Baniqued Pauline., *et al*. "Cognitive training with casual video games points to consider". *Frontiers in Psychology* 4 (2014): 1010.

11. Gavelin HM., *et al*. "Combined physical and cognitive training for older adults with and without cognitive impairment: A systematic review and network meta-analysis of randomized controlled trials". *Ageing Research Reviews* 66 (2021): 101232.

12. Gozdas E., *et al*. "Long-term cognitive training enhances fluid cognition and brain connectivity in individuals with MCI". *Translational Psychiatry* 14.1 (2024): 447.

13. Paggetti A., *et al*. "The efficacy of cognitive stimulation, cognitive training, and cognitive rehabilitation for people living with dementia: a systematic review and meta-analysis". *Geroscience* 47.1 (2025): 409-444.

14. Alan D Baddeley., *et al*. "Doors and People: A Test of Visual and Verbal Recall and Recognition". Manual (1994).

15. Duff Kevin. "Demographically-corrected normative data for the Hopkins verbal learning test-revised and brief visuospatial memory test-revised in an elderly sample". *Applied Neuropsychology: Adult* 23.3 (2016): 179-185.

16. Fisher BC and Szokola D. "The efficacy of neurocognitive training upon a diagnosed mild cognitive decline/dementia population in a clinical setting: Ongoing study since 2011". *Neurol Sci J* 2.1 (2018): 1-4.

17. Duff K., *et al*. "Predicting change with the RBANS in an elderly sample". *Journal of the International Neuropsychological Society* 10.6 (2004): 828-834.

18. Wilson BA., *et al*. "Improvement or simply practice? The effects of twenty repeated assessments on people with and without brain injury". *Journal of the International Neuropsychological Society* 6.4 (2000): 469-479.

19. Mac Pherson SE., *et al*. "The doors and people test: the effect of frontal lobe lesions on recall and recognition memory performance". *Neuropsychology* 30.3 (2016): 332-337.

Volume 17 Issue 12 December 2025