Computerized Attention Training – an intervention with older adults

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Introduction

- We are living for longer with life expectancy having increased substantially - the number of older adults worldwide is expected to triple to two billion in 2050 (United Nations, 2013).
- It is widely accepted that as we get older we will experience some decline in certain aspects of cognitive functioning e.g. executive functioning, memory and speed of information processing (Glisky, 2007), and fluid Intelligence (Salthouse, 2004).
- Cognitive interventions to ameliorate these cognitive declines have been carried out and have been to some extent successful. However according to systematic reviews carried out by Papp, Walsh and Snyder, 2009 and Reijndersa, van Heugtena,van Boxtela, 2012 the quality of the interventions were generally judged to be relatively low due to:
  - Poor randomisation methods
  - Lack of matched active controls
  - Few outcome measures/training relate to daily functioning (generalizability of the skills gained)
  - Insufficient follow-up times.

As such the present study assessed whether cognitive training - Computerised Progressive Attention Training (CPAT; Shalev et al., 2007), can be used to improve cognitive functions in ageing in such a way that benefits everyday life.

Method

	CPAT Group (12 participants)	Control Group (12 participants)
Mean Age (sd)	71.6 (7.2)	72.5 (5.7)
Gender (females)	6	6

Intervention Timeline

Baseline Measures → Training: 3 hours x 3 weeks → Outcome measures → Follow up: 4 months

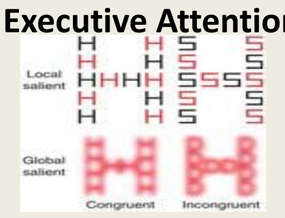
Baseline/outcome measures:

Subjective

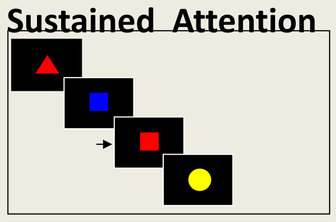
- **Semi structured interview** – 13 questions about demographics, pass times and daily functioning
- **Cognitive failures questionnaire** (Broadbent, Cooper, FitzGerald & Parkes, 1982) – 25 questions about memory and attention

Objective attention measures

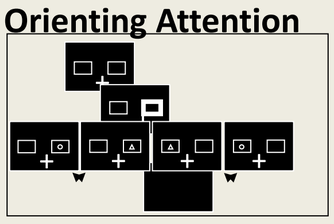
Global Local Task
Executive Attention



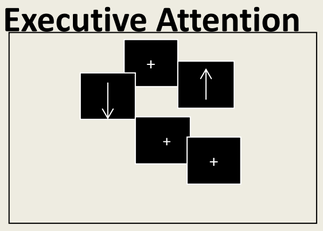
Continuous Performance Task
Sustained Attention



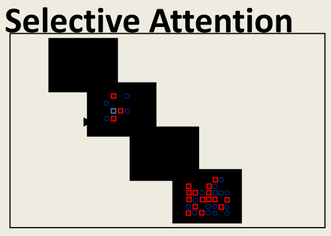
Peripheral cueing Task
Orienting Attention



Stroop-like Task
Executive Attention



Search Task
Selective Attention



Training

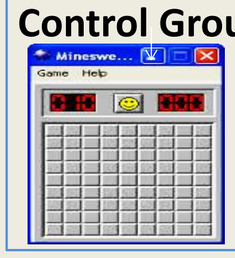
CPAT Group

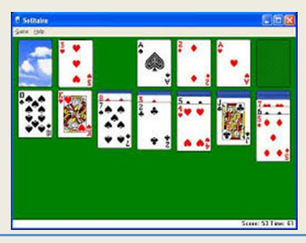
Sustained Attention

Selective Attention

Executive Attention

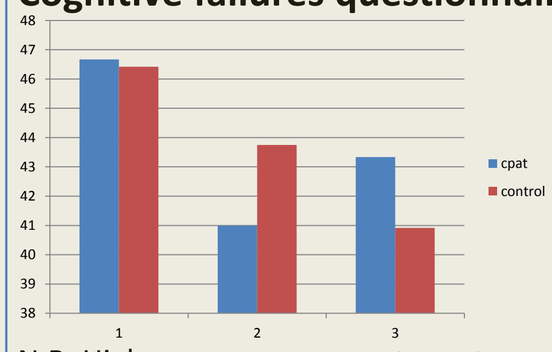
Control Group





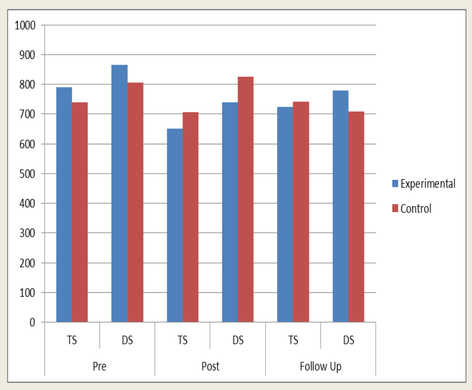
Results

Cognitive failures questionnaire



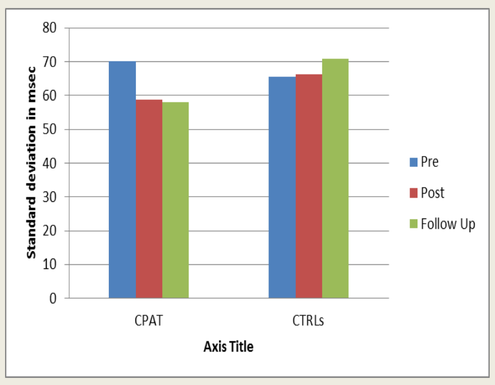
N.B. Higher scores represent greater frequency of cognitive failures

Global Local Task



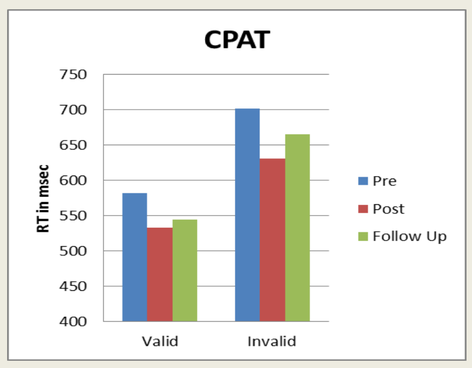
TS=Target salient, DS=Distractor salient

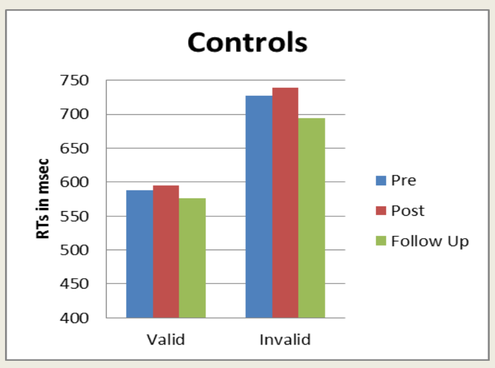
Continued Performance Task



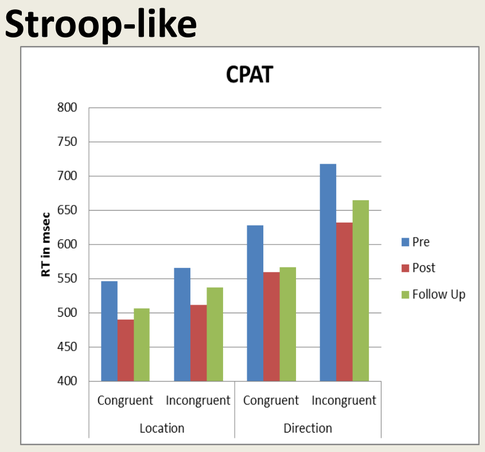
Standard deviation shows a more consistent performance in CPAT group

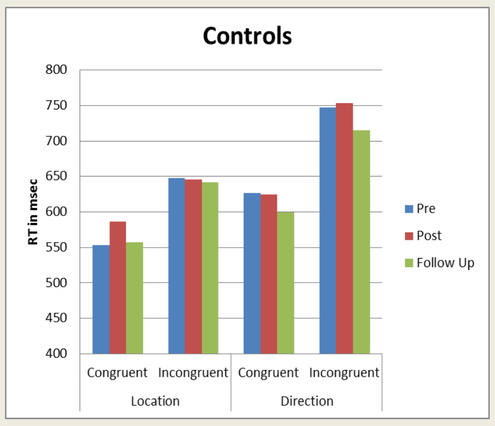
Peripheral Cueing Task



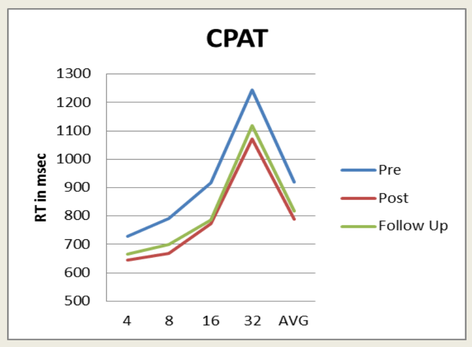


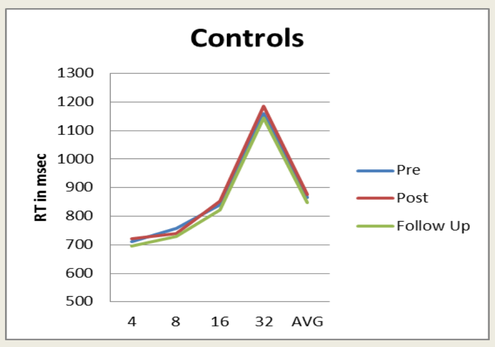
Stroop-like





Search





N.B. x axis = number of items in display

Discussion

- Results indicate improved performance for the CPAT group at Time 2 even for untrained tasks (i.e. Peripheral cueing and Stroop-like).
- The CPAT group shows a general improvement in speed of processing (rather than in a specific attention function), which is a generalizable skill benefiting everyday life.
- Subjective benefit is also shown for the CPAT group, which can lead to increased self efficacy benefitting daily functioning.
- Whilst at follow up the performance of the CPAT group does not remain as substantial as it was at Time 2 for some measurements, an improvement in comparison to Time 1 remains evident.
- Results thus suggest that attention training in older adults is efficacious.
- Future studies should investigate the effect of longer training sessions. As well as compare younger adults with trained older adults.

References

Glisky, E.L. (2007) Changes in Cognitive Functioning in Human Ageing. In Riddle, D.R (Eds) *Brain Aging: Models, Methods, and Mechanisms* . Florida: CRC Press
Papp, K. V, Walsh, S.J & Synder, P.J (2009) Immediate and delayed effects of cognitive interventions in healthy elderly: A review of current literature. *Alzhiemer's and Dementia*, 5, 50-60.
Reijnersa, J., van Hengten, C. & van Boxtel, M. (2012) Cognitive interventions in healthy older adults and people with mild cognitive impairment: A systematic review. *Ageing Research Reviews*, 12, 263-275.
Salthouse, T (2004) What and When of Cognitive Aging. *Current Directions in Psychological Science*, 13 (4), 140-144.
Shalev, L., Tsal, Y. & Mevorach, C. (2007) Computerised Progressive Attentional Training (CPAT) Program: Effective Direct Intervention for Children with ADHD. *Child Neuropsychology*, 13 (4), 382-388.
United Nations (2013), World Population Prospects The 2012 Revision, New York