

Improved visual sustained attention after cognitive training in MCI

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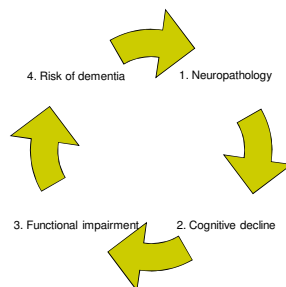


Overview of MCI

- MCI is defined as a measurable deficit in cognition in at least one domain, in the absence of dementia or impairment in activities of daily living.
- Making the diagnosis requires clinical judgement as impairment is a relative term
- Increased risk of progression to dementia



Cascade of changes in MCI



Aims of the study

- Do MCI participants retain the capacity to learn and improve on novel tasks?
- Investigate impact of training on
 - Cognitive functioning
 - Perceptions of ability to remember
 - Mood



How?

- Use computerised cognitive training
 - Novel exercises
 - Train a range of cognitive abilities
 - Require sustained attention
 - Provide a progressive challenge
 - Provide feedback on performance



Previous research

- Several Italian studies using this approach in MCI (Ciprani 2006; Rozzini 2007; Talassi 2007)
 - Non-random allocation to groups
 - Non reporting of between-group data
- Barnes et al (2009) using PositScience software
 - Trend toward significant finding but inert control group also showed effects



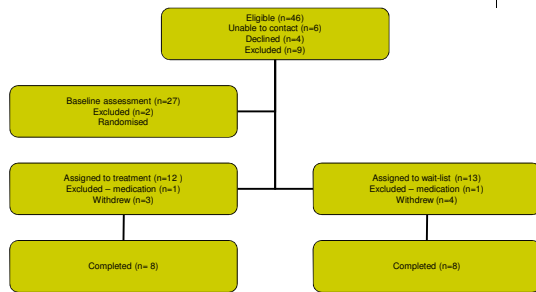
Design

- RCT comparing treatment with wait-list control
 - Participants completed baseline testing and were randomised into either treatment/control group
 - Training was done at home over 8-12 weeks
 - N = 16 completed training (8 in each group)
 - Post-training assessors were blind to treatment group

Entry criteria

- Diagnosis of MCI – all subtypes.
- Intact global cognitive functioning - score >23 on the MMSE
- Absence of untreated psychiatric illness or substance abuse problems.
- Absence of visual, auditory or motor impairment that would hinder use of a computer.

Participant characteristics



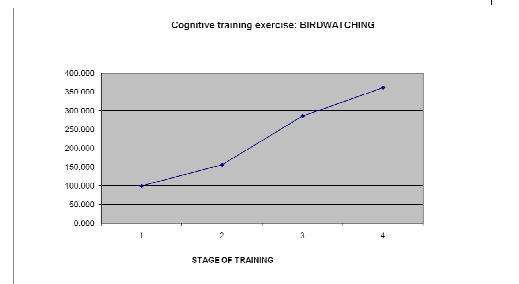
Results: Baseline data

	Immediate Mean (Std. dev.)	Delayed Mean (Std. dev.)	t (2,14)	p value
Number of participants	8	8		
Age	69.00 (7.69)	76.38 (6.47)	-2.074	.057
Gender	5 Females 3 Males	3 Females 5 Males		
Years of education	13.25 (2.12)	12.00 (2.77)	1.01	.329
MMSE	28.5 (2.26)	27.5 (2.39)	.858	.405

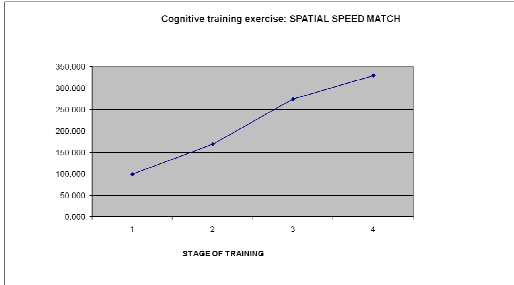
Results: trained tasks

- Performance on all tasks improved significantly across 4 blocks of learning trials
- Level of improvement varied markedly
 - Highest level of improvement for attention/processing speed tasks
 - Less improvement on memory tasks

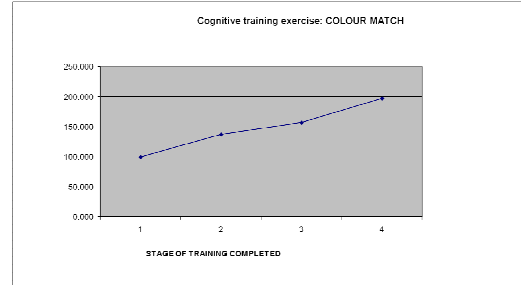
Improvement across learning trials: Visual attention



Improvement across learning trials: Spatial recall task



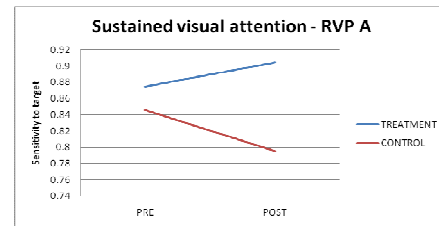
Improvement across learning trials: Processing speed task



Transfer of training?

- Neuropsychological tests - all ns except
 - Visual sustained attention $F(2,14) = 11.95$ $p < .004$
- Self report measures
 - Memory functioning – ns
 - Memory Functioning Questionnaire
 - Memory Controllability Index
 - Mood – ns
 - DASS21

Visual sustained attention



Similar findings in other studies

- Edwards 2002
 - Improved processing speed
- Wills et al 2006 ACTIVE trial
 - Improved processing speed
 - Unverzagt 2007 reanalysis of ACTIVE data selecting retrospectively defined memory impaired – improvements in processing speed
- Smith et al 2009
 - Improved processing speed

Limitations

- Small n
- Absence of normal elderly comparison group
- Use of non-clinical setting
- Adherence to treatment schedule

Discussion



- Participants with MCI retain the capacity to learn with practice
- Low dose may have reduced treatment effects
- Improvement on visual sustained attention is welcome but should be replicated

Future research



- Attempt to replicate this finding
- Use multiple baseline single-case design
- Utilise 1:1 rehabilitation approach
- Structured clinical environment

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