Cognitive engagement and risk for MCI and dementia

Bob Woods

Professor of Clinical Psychology of Older People

Bangor University, Wales, UK

Three types of prevention

- Tertiary prevention: maintain function in those who have developed dementia
- Secondary prevention: prevent development of cognitive impairment in those at greatest risk e.g. people with MCI
- Primary prevention: prevent development of cognitive impairment – build cognitive reserve

Cognitive stimulation, Cognitive training & Cognitive rehabilitation (Clare & Woods, 2004)

Cognitive stimulation

- Typically group-based or social context with family carer
- Aims for general cognitive improvement and quality of life
- Standard, structured programme
- Cognitive activities must be enjoyable!

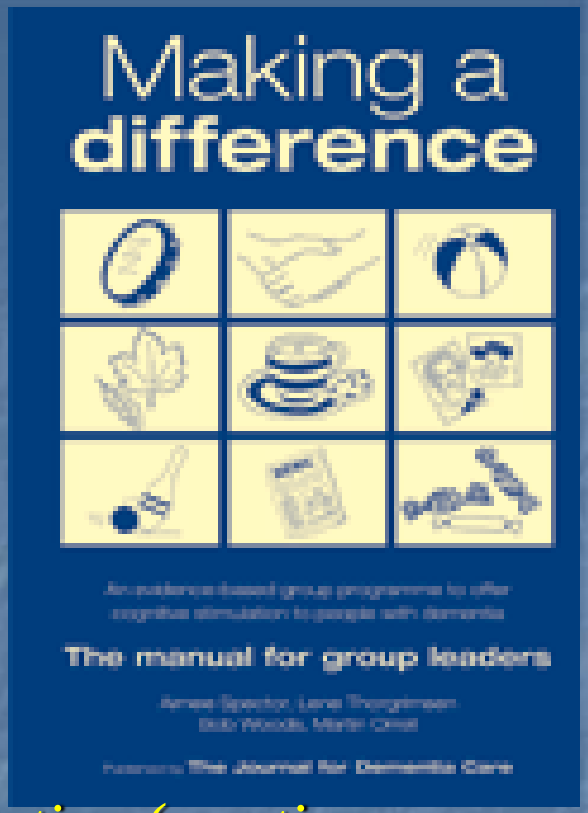
Cognitive training

- Individual or group
- Repeated practice on specific cognitive tasks
- Aim is improved cognitive function
- May be tailored

Cognitive rehabilitation

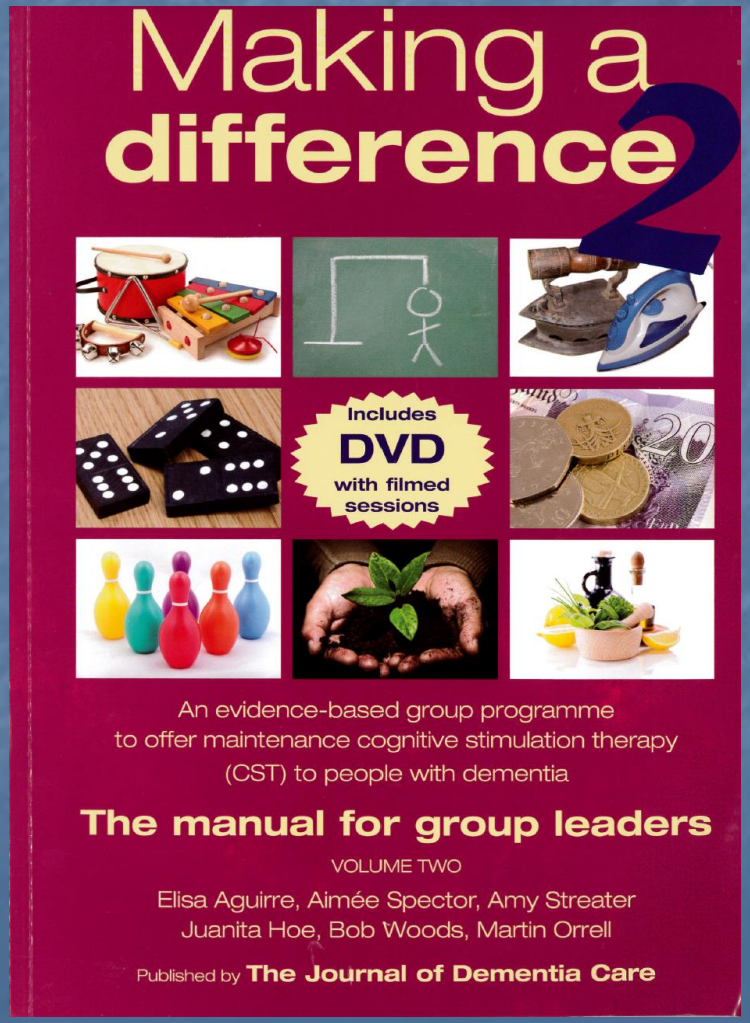
- Individual
- Specific rehabilitation targets
- Individualised programme

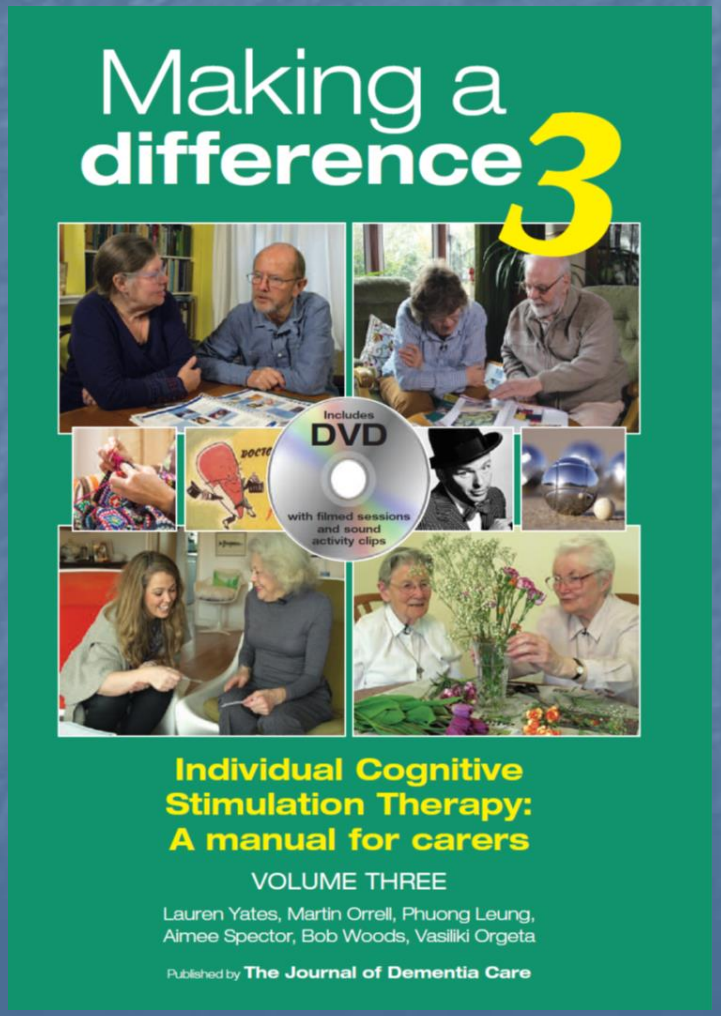
Cognitive stimulation in practice - CST



- **14 Sessions (2 sessions / week)**
  45 minutes
- 1) Physical games
- 2) Sound effects, music
- 3) Early memories
- 4) Food
- 5) Current affairs
- 6) Faces / scenes
- 7) Associated words
- 8) Using objects
- 9) Categorising objects
- 10) Orientation (creation of map)
- 11) Using money
- 12) Number-related activity
- 13) Word-related activity
- 14) Quiz, consolidation

Maintenance and Individual Cognitive Stimulation





The evidence-base for Cognitive Stimulation

(Cochrane Review: Woods et al., 2012)

- 15 trials included – 718 participants (407 CS; 311 controls)
- 'consistent evidence from multiple trials…benefit cognition in people with mild to moderate dementia over and above any medication effects.'
- Maintained 1-3 months after end of treatment
- Also improved quality of life and communication / social interaction skills (fewer studies) – perhaps more important than effects on cognitive function

Cognitive training for people with dementia

- Numerous programmes, including computerised cognitive training
- 11 randomised controlled trials (RCTs) included in Cochrane review (Bahar-Fuchs, Clare, Woods, 2013)
  - *'no indication of any significant benefit derived from cognitive training'*
- Cognitive training - repeated practice on cognitive tasks does not appear to produce effects on cognitive function beyond the tasks on which training given

Cognitive rehabilitation in dementia

- No single approach will work for everyone
- Need to look at more individualised approaches, which can still be rigorously evaluated
  - Cognitive rehabilitation:
  - 'An individualised approach where personally relevant goals are identified, and the therapist works with the person and family to devise strategies to address these' (Clare & Woods, 2004)
  - Emphasis on improving performance in everyday life (rather than cognitive tests)
  - Builds on person's strengths and developing ways of compensating for impairment

Can people with dementia benefit from rehabilitation?

- Focus on strengths
- Different types of memory processes are affected differently
- Forgetting, implicit memory and procedural memory may be relatively spared
- Retrieval cues may help

Memory strategies

- Internal memory aids - e.g. face-name associations
- External memory aids - Active, specific prompts
- Adapt the environment – reduce the load on memory
- Learning processes
  - Spaced retrieval (expanded rehearsal) - Cameron Camp
    - Increasing interval; effortful recall; procedural memory
  - Errorless learning may be helpful for some - Linda Clare & Barbara Wilson

Cognitive rehabilitation for people in early stages of dementia

- The development of the intervention
  - Single-case studies (Clare, 1999; 2000; 2001)
  - Manual – 10 individual sessions
- Examples of personal rehabilitation goals
  - Using a notebook or diary to keep track of events
  - Keeping track of spectacles or keys
  - Managing medication
  - Making and using a memory book
  - Taking up writing again
  - Remembering names of partners at bridge club
  - Learning to use a mobile phone

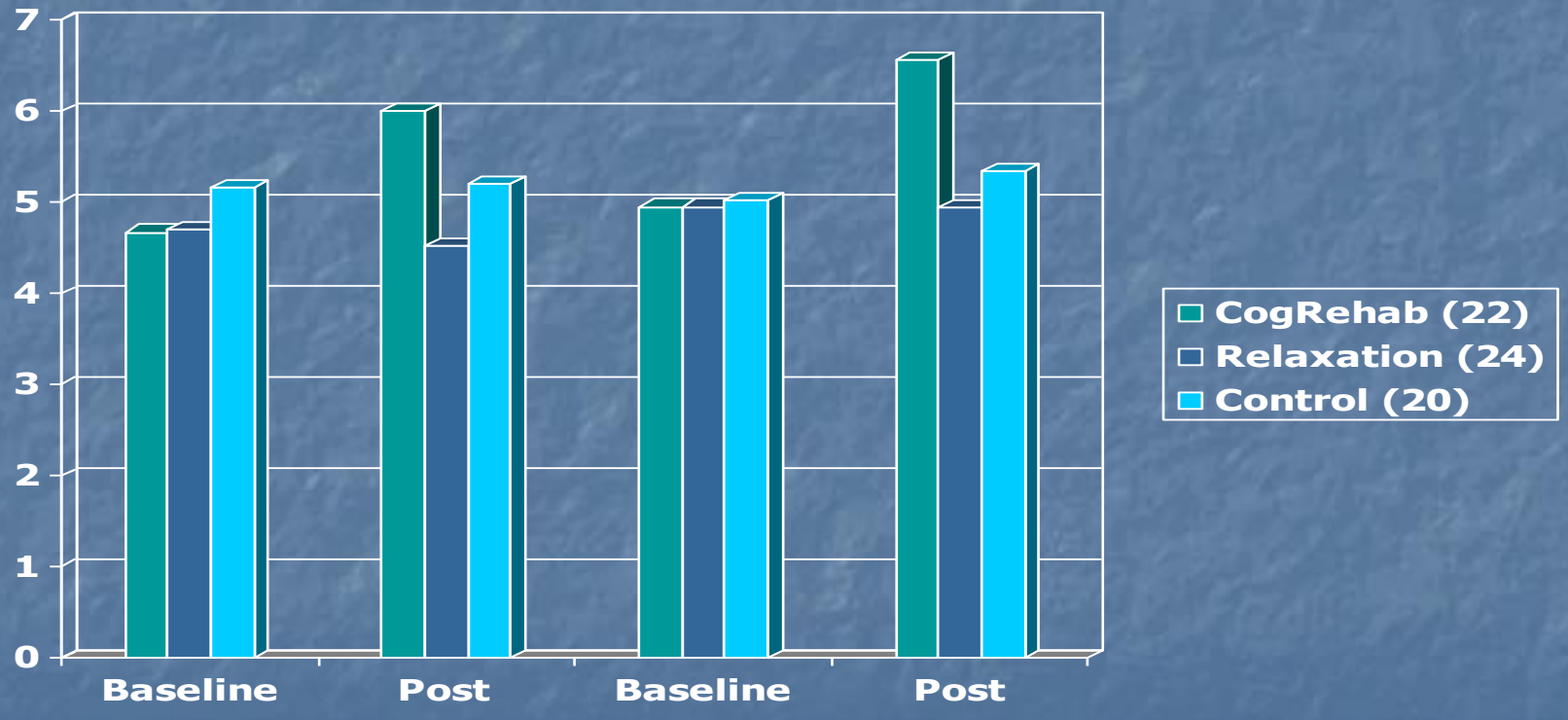
Cognitive rehabilitation for people in early stages of dementia

(Clare, Woods, Linden et al: American Journal of Geriatric Psychiatry, 2010)

- 3-arm single-blind RCT for people in early-stage Alzheimer's (MMSE 18+), stable on donepezil
- Cognitive Rehabilitation v relaxation v usual treatment
- Funded by Alzheimer's Society
- recruited from Memory Clinics in North Wales
- Primary outcome Canadian Occupational Performance Measure (COPM) – goal performance and satisfaction
- Participants: 69 people (41 female, 28 male; mean age 77.78, sd 6.32, range 56 – 89) with a diagnosis of Alzheimer's or mixed Alzheimer's and vascular dementia

Goal performance and satisfaction

CogRehab improves significantly v relaxation and control groups ($p<0.001$); 96% of goals set by CogRehab participants fully or partially achieved



COPM - Performance COPM - Satisfaction

Cognitive rehabilitation – next steps

- Full-scale multi-centre RCT of cognitive rehabilitation in progress (Clare et al., 2013) funded by NIHR HTA programme
- 6 centres, 480 people with mild dementia
- Receive 10 sessions (over 3 months) with a therapist working on the goals they set for themselves, then 4 maintenance sessions (over 6 months).
- Outcomes – goal performance, goal satisfaction, quality of life
- Results available in 2017

Secondary prevention

- Some studies have examined cognitive training and / or memory strategies with people meeting criteria for MCI (Simon et al., 2012)
- Results promising in terms of improved memory function (Gates et al., 2011)
- Evidence for impact on conversion to dementia lacking

Primary prevention

- Cognitive leisure activities* in mid- and late-life associated with reduced risk of dementia (review: Stern & Munn, 2010)
- *Defined as ‘activities that required a mental response from the individual taking part in the activity (e.g. reading)’
- What activities are best??? *Reading, playing board games, playing musical instruments, dancing….*

Cognitive training to prevent cognitive decline

- Cognitive training is associated with improvements in performance on trained tasks and functions
- Whether it makes a difference to other areas of cognitive function or to day-to-day life is more controversial (e.g. review by Valenzuela & Sachdev, 2009)

Computerised cognitive training

- Major study conducted with BBC (Owen et al., 2010) – improvements on trained functions did not generalise to other domains
- Numerous studies – 52 included in review by Lampit et al., 2014
- Results variable – depends on the domain being trained and how the training is offered
- Unsupervised home training and sessions more than 3 times a week not effective

The ACTIVE study

Sherry Willis et al.

- Over 2800 volunteers aged 65-94 assigned randomly to one of three types of training or to a control group (Ball et al., 2002)
- Training addressed memory or reasoning or speed of processing – 10 sessions (plus booster sessions for some)
- Memory training improved immediate performance on trained memory tasks
- Speed of processing training improved immediate performance on trained speed tasks
- Reasoning training improved immediate performance on trained reasoning tasks
- Ten years later effects maintained in the reasoning and speed of processing groups but not the memory group (Rebok et al., 2014)
- Participants in all three groups reported less decline in day-to-day function than control group participants

Cognitive engagement

- Senior Odyssey Program (Stine-Morrow et al., 2008)
  - Participants randomised to either a team-based competition in problem solving or to a control group
  - Results showed improvement in fluid ability
- The Synapse Project (Park et al., 2014)
  - Learned new skills – digital photography and/or quilting 16.5 hours per week for 3 months
  - Improved episodic memory compared to non-productive control group activity

Conclusions

- Despite the clear association between cognitive activity and the development of cognitive impairment, intervention studies have yet to show outcomes in relation to disease prevention
- General increase in cognitive reserve is also elusive
- The potential for primary prevention is best evidenced through the impact of the ACTIVE interventions on self-reported daily function
- Secondary prevention may await better classification of the most at-risk group
- Tertiary prevention is already possible with cognitive stimulation and potentially with cognitive rehabilitation

Finally…

If cognitive engagement is fun and enjoyable, why not pursue it anyway!

Thank you!

- Many thanks to Professor Linda Clare (Bangor University) and Professor Martin Orrell and Dr Aimee Spector (UCL)
- @dsdcwales