COGNITIVE REHABILITATION OF INDIVIDUALS WITH MS

CMSC 2015

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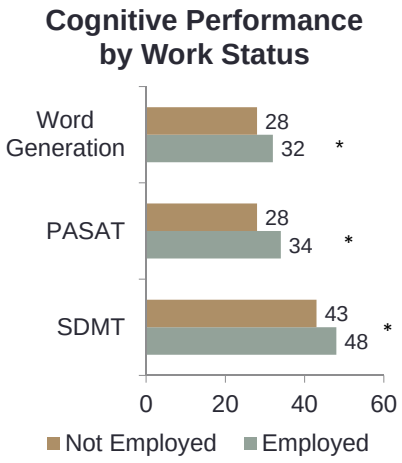
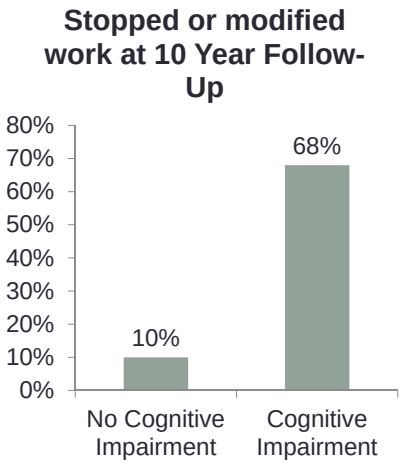
Cognition and Employment

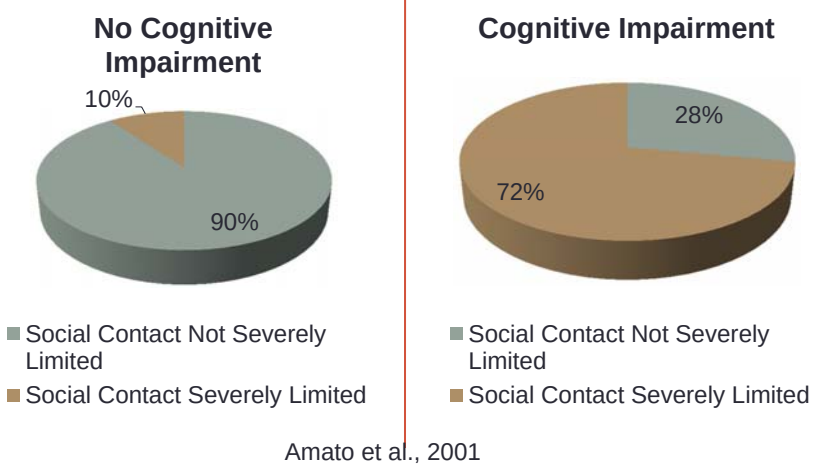


Honarmand et al., 2011



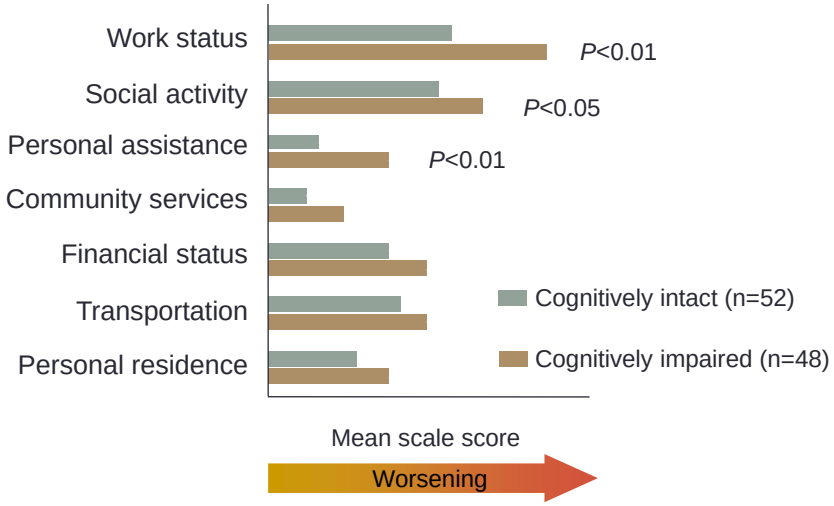
Amato et al., 2001

Cognitive Impairment Impacts Social Functioning



Amato et al., 2001

Impact of Cognitive Dysfunction on Daily Functioning



Rao et al. *Neurology.* 1991;41:692-96.

Memory and Adherence to Disease Modifying Therapies

	Verbal Memory (Delayed Recall)	Prospective Memory
Self-report	-.29[a]	-.38[b]
Electronic monitoring	-.34[a]	-.31[a]
Diary records	-.41[b]	-.28[a]

[a]*P*<0.05, [b]*P*< 0.01.
Verbal Memory=Auditory Verbal Learning Test
Prospective Memory=Memory for Intentions Screening Test

Bruce JM et al. *J Behav Med*. 2010;33:219-227.

Cognitive Functioning and Activities of Daily Living

During In-Home Evaluation

- Individuals with cognitive impairment displayed more difficulties with:
  - Meal Preparation
  - Appliance Operation
  - Bed Making

Rao et al. *Neurology.* 1991;41:692-96.

Cognitive Functioning and Performance on Structured Tasks

	Manage Medication	Bill Paying	Complex Cooking
Executive Function	-.39***	-.46***	-.48***
Processing Speed	-.50***	-.36*	-.43**
New Learning	-.26*	-.32*	-.36**
Memory	-.27*	-.21	-.34**
Working Memory	-.16	-.24*	-.22

Kalamar et al., *Neuropsychol,* 2008; 22: 442-9.

What is Cognitive Rehabilitation

- Cognitive rehabilitation attempts to enhance functioning and independence in patients with cognitive impairments as a result of brain damage or disease….
- Cognitive rehabilitation may include interventions that aim to *lessen impairments*, or interventions that aim to *lessen the disabling impact* of those impairments.
- Interventions are applied through technology and other compensatory strategies that may allow the individual…to accomplish important life activities and more fully participate in society

Institute Of Medicine, 2011

Different Kinds of Cognitive Rehabilitation

- Restorative *vs.*
  - Aimed at improving specific impaired cognitive functions
- Modular *vs.*
  - Focused on single impairment (e.g., memory, aphasia)

Contextual *vs.*

- Treatment intended focused on real-world application (e.g., improving attention during complex IADL like cooking)

- Compensatory
  - Focused on developing alternative strategies for carrying out activities
- Comprehensive
  - Mix of skill training, self-awareness training, coping with deficits and social consequences
- Decontextual
  - Target specific processes using artificial tasks allowing more pure manipulation of a single dimension (e.g., improving attention through computer vigilance training – key pressing with stimuli.

Institute Of Medicine, 2011

Cognitive Rehab – the great debate

Restorative

- Pros
  - Good internal validity
  - Targets impairment
  - Treatment is focused
- Cons
  - Poor generalization to real world functioning
  - Spend 20 hours teaching people to play xbox in the end they will be better at……xbox

Compensatory

- Pros
  - Good external validity
  - Teaches skills that improve activity and participation
- Cons
  - Doesn't treat the impairment

Cognitive Rehab for MS

Cochrane Review, 2014

Neuropsychological rehabilitation for multiple sclerosis (Review)

Rosti-Otajärvi EM, Hämäläinen PI

THE COCHRANE COLLABORATION®

- Twenty relevant studies (N=986)
- Low-level evidence was found that neuropsychological rehabilitation reduces cognitive symptoms in MS.
- When analyzed individually, 18 out of the 20 studies showed positive effects.
- Cognitive training was found to improve memory span and working memory.
- Cognitive training combined with other neuropsychological rehabilitation methods was found to improve attention, immediate verbal memory and delayed memory.

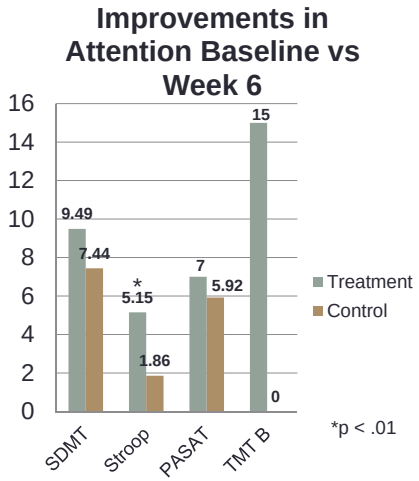
Examples of Cognitive Rehabilitation

Computer Assisted Training

- Computer-based tasks
  - Target specific skills:
    - Attention
    - Concentration
- Can be repeated over time to 'practice' a skill
- May have adaptive equipment interface to accommodate limitations
- May adapt difficulty real time to performance

Computer Assisted Cognitive Remediation

- 26 individuals with RR MS
- Had deficits in:
  - Attention
  - Information Processing
  - Working Memory/Exec Functioning
- No global cognitive impairment
- Intervention (6 weeks)
  - Computer 'training'
  - 1 hour sessions 2x/week
  - Simulated driving
  - Visual matching
  - Conveyor belt, comparing objects



Cerasa et al., *Neurorehabil Neural Repair*, 2012

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Story Memory Technique

- Intervention

- Inefficiencies in encoding can be improved with active learning strategies like the story memory technique:
  - Practicing imagery with learning (visualizing a story)
  - Practicing building context with memory (building a story around words)

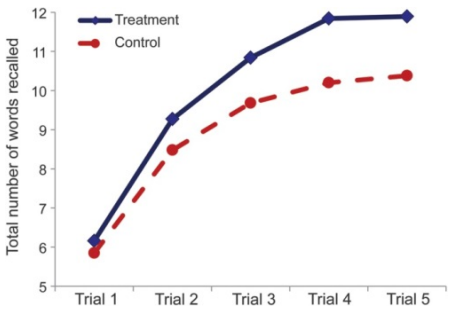
- Study Design

- 86 Individuals with MS
- Had deficits in Memory
- 5 week double blind RCT
- Intervention
  - 2x week for 5 weeks
  - 8 sessions practicing story memory technique 45-60 minutes
  - 2 sessions applying to real-world settings
- Control matched for professional contact time

Chiaravalloti et al., *Neurology*, 2013

Story Memory Technique

CVLT Learning Slope Post Treatment



From Pre to Post Treatment Informants reported:

- Greater improvements in apathy in treatment condition
- Greater improvements in executive function in treatment condition

Chiaravalloti et al., *Neurology*, 2013

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Cognitive Rehabilitation

Combined Compensatory Strategies and Computer Training

- Intervention

- Group sessions
  - Identifying cognitive problems
  - Learning compensatory strategies for attention, processing speed, language, exec. functioning
  - Practice of strategies in class
- Home-based computer-assisted cognitive training program
  - Gradual exposure to tasks: (e.g., reaction time, matching colors, retracing trails, sequencing blocks , recalling spatial locations

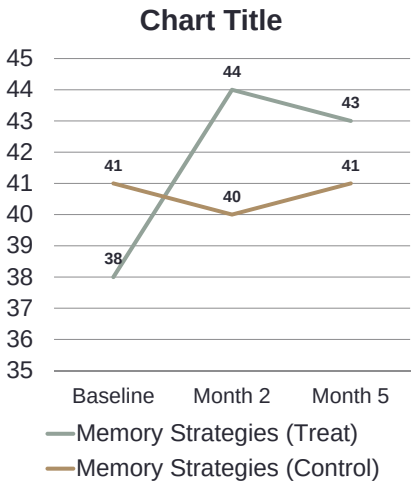
- Study Design

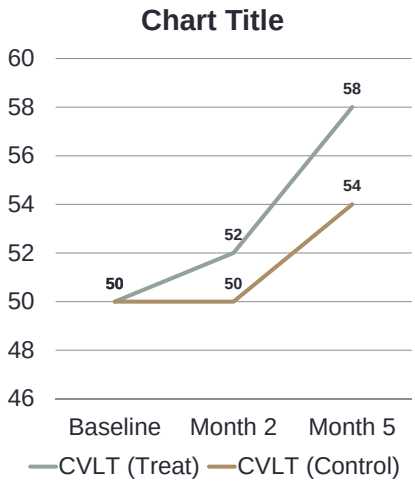
- 61 Individuals with MS
- Self-reported 5 or more frequent cognitive problems
- 5 month Single-blind RCT
- Intervention
  - 8 Weekly 2-hour group sessions
  - Home-based cognitive training (at least 45 min 3x/week)
- Control
  - Waitlist

Stuifbergen, *Clin Rehabil,* 2012

Cognitive Rehabilitation

Combined Compensatory Strategies and Computer Training





General Cognitive Compensatory Strategies

- <u>Cognitive Strategies</u>
  - Identifying difficulties
  - Minimizing cognitive load with routines
  - Memory notebook/voice recorder
  - Prioritizing tasks and to do lists
  - Calendar
  - Organizing space and tasks
    - Pill containers, white boards for communication, pre-made grocery lists, minimize clutter/distractions
  - Building reminders
    - Visual cues, alarms
  - Problem solving – stop, think, act

- <u>Behaviors</u>
  - Avoiding alcohol
  - Manage medical problems
  - Good nutrition
  - Sleep hygiene
  - Stress management
  - Energy conservation/ cognitive breaks

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