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Staying Sharp: The Cutting Edge Of Research On Cognition And Aging

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Staying Sharp: The Cutting Edge of Research on Cognition and Aging

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The presenter, Regi Robnett, DOES NOT have an interest in selling a technology, program, product, and/or service to CME/CE professionals.
Objectives

Following this presentation participants will:

1) Describe typical and atypical cognitive changes with age (MCI, memory, learning, thinking)

2) Describe evidence-based interventions related to cognitive functioning especially for older adults with MCI

3) Employ tactics to enhance cognitive functioning for yourself and/or clients in the realms of physical, activity-based, cognitive, emotional, and social (PACES)
Staying “Sharp”
The Aspects

- “Having clear form and detail…
- Clearly and distinctly set forth….
- Intellectually penetrating; astute…
- Marked by keenness and accuracy of perception….
- Vigilant; alert….
- Sudden and brilliant or dazzling…..”

http://www.thefreedictionary.com/sharp
The Brain

- 3 pounds of mass; 86 billion neurons; many unknowns
- Exciting maze of complexity
- We know the lobes and general functions

http://www.youtube.com/watch?v=Vy8EvyQoQIE

- The aging brain
  - Slight declines
  - Neurogenesis—yes!
  - Learning occurs throughout life
  - Dementia—is it normal and expected or just expected?
Overview of Learning & Memory

- Starts with capacity
- Prior knowledge can help or hinder
- Differing styles
- Motivation counts
- Context matters

- Usually starts with attention
- Differing skill levels
- 5-7 items (± 2) is typical (Miller’s research)
- Memory decreases with age
- Little correlation between self-assessment and reality

Adapted from Carnegie Mellon
http://www.cmu.edu/teaching/principles/learning.html
Changes in Learning and Memory with Age

- LEARNING
- MEMORY
Changes in Learning and Memory with Age

- **LEARNING--Acquisition of knowledge and/or skills**
  - Not many hard core facts
  - Takes longer
  - Does occur
  - More dependent on past learning
  - Impacted by context
  - Impacted by disease (e.g. MCI, dementia, mental health problems)

- **MEMORY--Expression of that which have you have learned**
  - Various types, tend to get thrown all together
    - STM (decreases)
    - LTM (not so much)
    - Prospective (older people do well—Baddeley, 2004)
    - Procedural--maintained
  - Types impacted variably by age
  - Intricately connected to learning
  - Impacted by level of attention
  - Capitalize on strengths
Capitalize on memory strengths

- STM
- LTM
- Prospective
- Working
- Procedural
- Semantic
- Episodic

Sharp memory
Need to capitalize on memory strengths

- STM -- No
- LTM -- Yes
- Prospective -- Yes with compensation
- Working -- No
- Procedural -- Yes, but with caution
- Semantic -- Yes
- Episodic -- No, but one has options...
Cognitive conditions related to aging

- Mild Cognitive Impairment (MCI)
- Potential precursor to dementia—gray area
- Risk factors, mostly modifiable (Norton et al., 2014)
  - Low educational attainment (worldwide)
  - Inactivity (USA)
  - DM
  - Mid-life HTN
  - Obesity
  - Depression
  - Smoking
We’ll focus on MCI

WHY?
More common (6-7% of those 70-90)
More hopeful (Sachdey et al., 2013; Gao et al., 2014)
More serious cognitive conditions need even more sharpening, polishing, and/or hard work

Need to keep the sparkle!

Need to keep the edge!

You just need the tools
MCI

  - New onset of cognitive decline
  - Four subtypes
    - Amnestic (decreases in memory) aMCI
      - Single or multiple domain
      - Prodromal to AD
    - Non-amnestic (decreases in thinking) naMCI
      - Single or multiple domain
      - May precede DLB
      - Problems with judgment, decision making, language, sequencing, perception

- Functional aspects
  - Problems with orientation (navigation), and money management

- Psychosocial aspects—imagine what it is like....
Imagine

- Getting lost in a familiar area
- No longer being able to understand the electric bill that just arrived
- Forgetting important appointments (and you never forgot before!)
If MCI represents weeds in the brain, the best time to get rid of these is early in the process. The need to weed! Use sharp tools.
We can help each other, our clients, and ourselves.....
Tools for Cognitive Health

- Medications?
- Run through the PACES
  - Physical
  - Active
  - Cognitive
  - Emotional health
  - Social (and sleep)
Medications

- No medications have been proven effective for MCI (Langa & Levine, 2014).
- Systematic review including 8 RCTs (Tricco et al., 2013) of medications used for MCI.
  - Donepezil (Aricept), rivastigmine (Exelon), galantamine (Razadyne) and memantine (Namenda).
  - No significant improvements; no prevention of decline.

- Cochrane review of meds for dementia (not MCI)
  - No global review found (5/15).
  - Slight positive results for galantamine, rivastigmine, donepezil, memantine—usually moderate to severe stages for up to 1 year and more research is needed.
  - No support for procaine (anti-aging), melatonin, piracetam (for memory).
  - Inconclusive—ginkgo biloba, ginseng, lecithin, light therapy, naftidrofuryl, propentofylline, Vitamin B6.
Assessment of Cognition

- Standardized or Informal

- Specific tools for the detection of MCI
  - MoCA (Nasreddine et al., 2005)
  - SLUMS (Tariq et al., 2006)
  - BCAT (Mansbach, MacDougall, & Rosenzweig, 2012)

All more sensitive to MCI than the MMSE (Folstein et al., 2010)
Assessment of MCI

- **Clock Drawing Test**—draw a clock and indicate 10 past 11 (Nesset, Kersten, & Ulstein, 2014)
- **Trail Making Test B**
  (Ashendorf et al., 2008)
- **ASSESSMENT OF IADLs and Participation**
  - IADL questionnaires - self or informant
  - Performance-based (observation)
    - Problems with shopping and checkbook balancing in MCI group (Rodakowski et al., 2014)
- **Participation measures**
  - People may abandon challenging activities
General considerations

- **Neuroplasticity**
  - Positive (Berlucci, 2011)
  - Negative (Bryck & Fisher)
  - Neurogenesis (Eriksson et al., 1998)

- **Cognitive reserve**
  - Reserve theory—passive and active (Walley et al., 2004)
    - Neuropathology does not always manifest itself equally
    - Higher level of education is protective

Full garden may hide the weeds! (Sharp and clear—beautiful!)
Evidence-based Approaches

- Running the Paces

- Physical activity—
- The importance of aerobic exercise (McDaniel & Bugg, 2012)
Physical exercise
The 7 benefits

- Weight control
- Better health (disease/condition control)
- Better mood
- Better sleep
- More energy
- "Sparks" sex life
- Can be fun

http://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/exercise/art-20048389

- ALSO BUILDS BRAIN CELLS (Curlik & Shors, 2013)
Physical exercise increases the number of new neurons, and mental exercise helps them survive (Curlik & Shors, 2013)
PACES—Active

- Do something!
- Do something fun!
- Make something!
- Do something for someone else!
  ("It’s good to be good." Post, 2008)
- Then Relax!

“When you get to a fork in the road, take it.”
Yogi Berra
JUST WALK? (Scherder et al., 2014)

Dance? (Zolyniak et al., 2014)

never a dull moment
PACES—Cognition

- Work on improving your cognition
- Sharpen those neurons
- LEARN SOMETHING NEW!

A sharp brain craves adventure
Evidence-based Approaches

- Computer-based and remedial approaches
- Lifestyle enhancement and change
Computer-based and remedial approaches

- Systematic reviews --
  - (Reijnders et al., 2013; Martin et al., 2011; Jean et al., 2010)
  - Variable duration; variable approaches
  - Some improvements but questionable carryover
  - Lack of robust design
  - Slight improvement in memory, but…

- A few specific studies
  - Posit science
  - Brain HQ
  - Lumosity
BrainHQ

http://www.brainhq.com/?lead_id=google-search-text-home-Brand_%28US_CAN_UK_AUS_SAF_NZ%29&gclid=CL3K0v7OvMECFWNv7AOdajE8

- Lots of evidence (70 articles) at:
  http://www.brainhq.com/why-brainhq/world-class-science/peer-reviewed-research/healthy-aging-research

- ACTIVE study (Rebok et al., 2014) verbal memory training, ten years later, no memory improvement but better IADL skills.

- May need training and “booster sessions”
The case for computer/internet training

- Systematic review (Kueider et al., 2012) using computer for cognitive training comparable or better than traditional paper and pencil approaches
  - Using computers to research genealogy, record life experiences, creative writing (Shepherd & Aagard, 2011)
  - Promotes well-being in older adults (Shapira, Barak, & Gal, 2007)
- Virtual gardening....

Remedial mouse training
A click of the mouse...

Internet Use—May reduce cognitive decline in middle-aged and older adults (Xavier et al., 2014)
Memory Training

- Works best for those who are aging typically
- Does not work well with mod/severe memory impairments
- Offered as adult education (Switzerland)
- Works on techniques to remember what one wants to remember and forget what one wants to forget (easier said than done)
- Common in some countries
Forgetting Training

- Once seen as bad; portending mental decline
- However, the ability to let things go supports a sharp mind (Chant, 2013)
- Gets rid of piled up memories; let go of irrelevant info (memory control)
- How many of us ruminate?
- We can practice holding back thoughts; not thought substitution
One technique worth considering

- **Method of Loci**—mental repository takes time to develop the loci (locations)
- Ancient method
- Involves visual imagery (Legge et al., 2012)
- Try it—develop up to ten landmarks (in home, yard, work setting, town, or combination)
- You have to memorize these
- A new way of remembering to keep your memory sharp
Method of Loci

Once you have your personal loci they are yours for life—use them to remember anything you need to remember.

Example—location is BED.

Put your item/person on the bed.

Can you make the vision unusual or outlandish? (the crazier the better)

Then when you remember your “location” you will see the image and recall what you need to do.

Gets better with practice. PRACTICE. PRACTICE. PRACTICE.
The odder, the better!
NEW LEARNING—What helps and what does NOT

Most effective
- Self-direction
- Quizzing and practice testing self
- Spread out sessions
- Ask why
- Multi modal
- Engaging

Least effective
- Directed by others
- Self
- Rereading
- Underlining
- Cramming
- Multitasking
- Mnemonics
Intervention planning: What helps and what does not

**Most effective**
- Teach back method
- Spread out sessions
- “Just right challenge”
- Multi modal
- Increase intensity – engage with the material
- Increase motivation/interest (why important to them?)

(Dunlosky et al., 2013)

**Least effective**
- Quizzing*
- Stress
- Educating instead of “doing”
- Too much at once, too fast
- Jargon, lack of plain language
- Not taking the time to build rapport

*Can put folks on the defensive

(Dunlosky et al., 2013)
Running through the PACES

E stands for engagement in and enjoyment of LIFE

- What do you want to engage in? (Roles, occupations)

Cognitive engagement promotes health and function (Metz & Robnett, 2011)

- Need to challenge the brain (novel exercise for the brain—enrichment)
- Enriched environment and training regimens—opportunities for problem solving, novel exploration, socialization, and physical activity (Nussbaum, 2003)
- Lifelong learning, maintaining roles—“Learning promotes learning”

DOING promotes brain health.
Cognitive engagement promotes health
Challenges are EVERYWHERE if we just look……

Use each digit 0-9 once
From Scientific American Mind
May/June 2013

Cryptoquips available everyday

Cryptograms—every letter replaced by another. (Hints include word length, punctuation and repetitions:

TRVMBBTQMR$M TX VKM
LDTBTVF VG
LZLYV VG SKLRQM
XVMYKMR KLACTRQ

Hints: $=C and author is famous professor of Mathematics Mind, Mood & Memory
MGH, MM-BG-1113, Nov 2013

Sudoku

Crossword Puzzles

Logic problems

Bilingualism (Bak et al., 2014)
Try Duolingo app

Other????????
Running through the PACES

- **Emotional Health**
- Depression related to subjective cognitive complaints and is often treatable
- Positive outlook—may be able to be learned (Reed, Chan, & Mikels, 2014)
Go through the PACES

- Social involvement vs Isolation
  - Loneliness and isolation related to poorer cognitive function (Cacioppo & Cacioppo, 2014)

- Promoting healthy sleep habits (Fava, 2013; Desai et al., 2010; Vance et al, 2010; Norton et al., 2014)

- Sleep and aging—continuity is important (Wilckens et al., 2014)
Lifestyle or Multicomponent Interventions (Strong evidence)

- Lifestyle changes that reduce risk of disease
- Decreasing chronic stress (decreases risk of depression) (Watkins et al., 2013)
- Engaging in novel and challenging cognitive tasks
- Promoting social engagement
- Engaging in regular movement and physical activity
- Consideration of the contextual and environmental factors impacting thinking, learning and memory
- Promoting healthy sleep habits (Fava, 2013) (Desai et al., 2010; Vance et al, 2010; Norton et al., 2014)
Learning the Ropes for Living with MCI

- Baycrest Health Sciences, 2014
- In Ontario, affiliated with the University of Toronto
- THERE IS HELP OUT THERE
In review

- Life long learning is more than just a catchphrase
- The best time to counteract cognitive losses is now
- Interventions include:
  - Running through PACES
  - Lifestyle change
  - Taking care of the self
- The need to heed the advice of and promote science-driven, evidence-based interventions
- Get on board! Stay afloat!
- STAY SHARP!

It’s never too late (or too early) to begin aging well.
Work on being more optimistic
Self care—take care of YOU
Spirituality
Creativity
Foster + Relationships
Education & More education
Physical!
Novel stimuli
Other????
Develop new attitudes
Work on being more optimistic
Self care—take care of YOU
Spirituality
Creativity
HAVE WE GAINED AN OVERVIEW PERSPECTIVE?

Are you ready to sharpen yourself or help those you care about?
Available upon request

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