Everyday Cognition and Memory Interventions

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Introduction

• Associate Professor of Psychology NCSU
• Cognitive Aging
  – Everyday cognition
  – Mild cognitive impairment
  – Cognitive interventions
  – Day to day fluctuations
• Brightleaf consultant
  – Marketing and business development for the senior living industry
  – Wellness program evaluation and development
A quick primer on cognitive change

- Fluid ability vs crystallized abilities
- General start of age related change is over 65
- Most abilities start to decline surprisingly early
Changes across the lifespan

- Perceptual Speed
- Spatial Ability
- Reasoning
- Memory
- Knowledge

Changes in abilities from 20's to 80's.
Everyday Cognition

• Assess the real-world manifestation of cognitive functioning
  – testing older adults’ ability to solve cognitively complex everyday problems
• Application of mental abilities and domain specific knowledge to solving problems that are integrated within instrumental domains of everyday functioning (Allaire & Marsiske, 1999; Willis, 1996)
Assessing Everyday Cognition

• The Everyday Cognition Battery (Allaire & Marsiske, 1999, 2002; Allaire et al., 2010)

• Three tests
  – Reasoning
  – Memory
  – Knowledge

• Three domains
  – Medication
  – Financial Management
  – Food preparation/nutrition
(12) If she selects **Brand B**, which categories will she get more of?

(1) fat
(2) calories
(3) sodium
(4) sugar
Everyday Cognition gets Worse as we get Older

• Thornton & Dumke (2005) meta-analysis
  – 33 age comparative studies
  – Older adults performed significantly worse than middle-aged and younger adults
  – Age differences greater for instrumental problems vs. social problems
Outcomes of Everyday Cognition

• Everyday problem solving should assess the skills older adults need to adapt to their everyday context

• If everyday cognition assess cognition in the real-world, then it ought to be strongly related to real-world outcomes
Outcomes of Everyday Cognition

• Everyday cognition was significantly associated with self-reported medication (Gelb et al., 2010)
• Everyday Cognition closely related to self-reported difficulties performing tasks of daily living (Allaire & Marsiske, 2002)
Mortality

• Participants who died since testing performed significantly worse than did still-living participants on the EPT and ECB (Allaire & Willis, 2006; Weatherbee & Allaire, 2008).
  – Everyday knowledge was a significant and unique predictor of death (Weatherbee & Allaire, 2008)

• The ability to solve problems in domains such as medication use, financial management, and nutrition should have significant and unique implications for survival
Mild Cognitive Impairment (MCI)

- Transitional period between normal aging and dementia
  - Impaired on one or more cognitive ability
  - Maintenance of competency to perform tasks of daily living (ADLS)

- The prevalence of MCI ranges from 3% to 25% of older adults over 65
  - Often goes undiagnosed
MCI and Everyday Cognition

F(3, 507) = 21.88, p < .05, η² = .12

Allaire et al. (2009). JAGS.
## MCI and Everyday Cognition

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<th>Step1</th>
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<td>β</td>
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<td>ECB Medication Use</td>
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<td>ECB Nut./Food Prep.</td>
<td>-.03</td>
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<td>ECB Finance Management</td>
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<td>Executive Functioning</td>
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Allaire et al. (2009). *JAGS.*
MCI and Everyday Cognition

EPT was also a unique predictor of MCI status

MCI and Everyday Cognition

Everyday Cognition: Important Implications

• As people get older they have more difficulty solving cognitively challenging everyday instrumental tasks

• The ability to perform these tasks have clinically meaningful real-world implications
  – Mortality
  – MCI/Dementia
Everyday Cognition: Important Implications

- Older adults with even mild cognitive impairment (*perhaps undiagnosed*) may be having significant troubles
  - Taking medication
  - Handling financial issues
  - Food preparation
  - Proper nutrition
Cognitive Interventions

• Over 30 years of cognitive intervention research
• Primary focus is the development use of skills for a single task
• Memory Example:
  – A list of numbers or words
  – Teach mnemonic techniques (chunking, categorizing, etc)
  – Give a list again and see if they improve
Cognitive Interventions

• Largest intervention in NIH history found (Jobe et al., 2002)
  – Training in a specific ability produces significant gains for that target ability
  – Little to no evidence that improving an ability actually translates to improvements in real-life
  – No transfer
Non-scientific Interventions

- Brain Training Websites
  - Luminosity
  - Play With your Mind
  - Happy Neuron
  - CogFit
- All these sites use Flash games that are based on the principles of traditional interventions
- Brain Age™ and Brain Age 2: More Training in Minutes a Day!
Non-traditional Interventions

• National Institute on Aging (NIA) has called for non-traditional approaches to interventions
  – Quilting
  – Exercise
  – Acting class
  – Volunteering (mentoring)
  – Commercial Video games
Commercial Video games

• Reaction time – Super Tetris
  – Goldstein, et al., 1997

• Increased field of view – action video game (Grand Theft Auto, Half-life, Counter-Strike, Marvel versus Capcom, Rogue Speare, and Super Mario Kart)
  – Green & Bavelier, 2006a, 2006b, 2007

• Spatial ability - Medal of Honor: Pacific Assault
  – Feng, Spence, & Pratt, 2007

• Mental rotation – puzzle game
  – De Lisi & Wolford, 2002

• Problem solving and inductive reasoning – in-house games
  – Greenfield, et al., 1994; Rosas et al., 2003
Wii Study

• National Science Foundation
  – #0905127, Division of Information & Intelligent Systems
• Dr. Anne McLaughlin, PI

Graduate students -
  – Laura Whitlock
  – Taryn Patterson
  – Amanda Trujillo
Design of Study

• Groups:
  – Attentional demand
    • Lower
    • Higher
    • Control (no game)
  – Social interaction
    • Alone
    • In a group

• Measures:
  – Pre and post test performance on cognitive tests
  – Performance on transfer tests and tests of everyday cognition
• Game
  – Boom Blox and Boom Blox Bash Party
Training Effects

**Stroop**

Impact_condition
- Control
- Low impact
- High impact

**Reaction Time**

Impact_condition
- Control
- Low impact
- High impact
Training Effects
Additional Work

• Reminisce is a powerful tool for increased long-term memory, increased well-being, and life satisfaction

• FamPhotory
  – Durham based older adult owned small business
    • Digital archiving of photos
    • Recorded reminiscence alongside photos
Conclusions

• Increasing performance on a test is not the same as increasing the ability the test assesses
• Increasing an ability is not the same as increasing the ability’s use in the real world
• Easy interventions
  – Keep environment mental stimulating
  – Encourage social interaction