



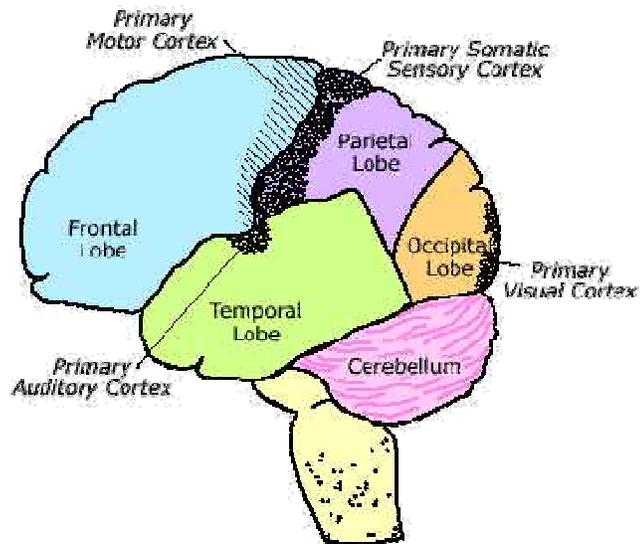
Lifelong Learning & The Aging Brain

August, 2007

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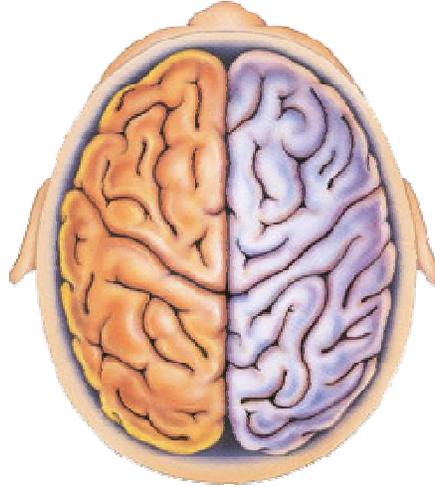
Active Minds®

Introduction
Brain Regions



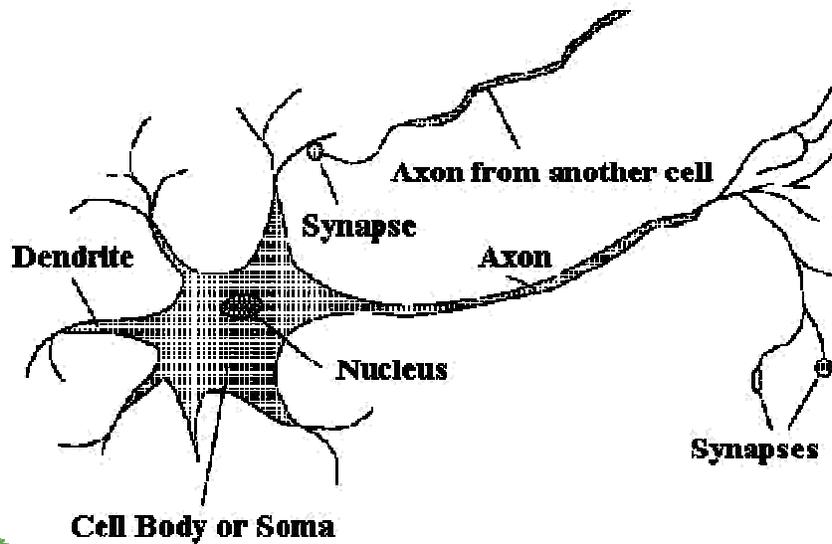
Left Brain

- Analytic thought
- Logic
- Language
- Math & science



Right Brain

- Holistic thought
- Intuition
- Creativity
- Art & music



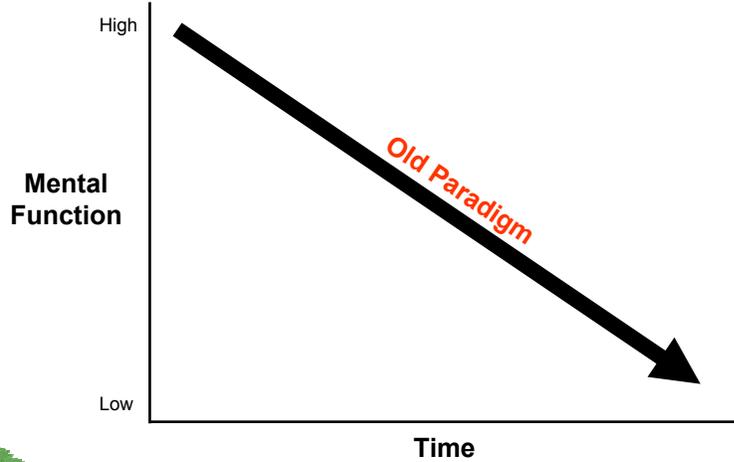
Our scientific understanding of the aging brain can be described as a shift from the “old paradigm” to a new one

The Old Paradigm: “You Get What You Get”

- Brain as fixed and finite
- Localization is absolute
- Treatment must be by medical intervention
- Once brain matures, it’s all downhill



Starting in young adulthood, the old paradigm looks like this



The new paradigm acknowledges that the old paradigm had some things right

- Brain regions do tend to specialize
- Older brains do process information more slowly
- Decisions, judgments, and assimilation harder/slower
- Harder to switch tasks



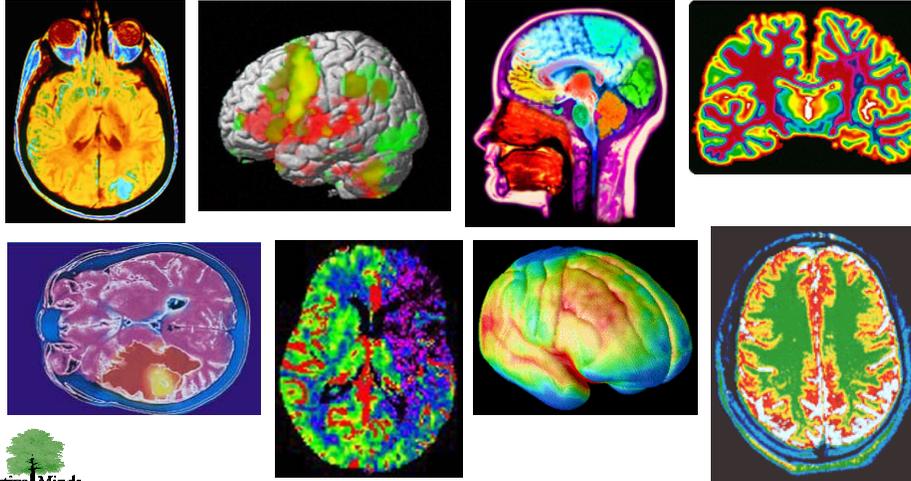
The new paradigm is still evolving, but it is characterized by far more optimism than the old paradigm

The New Paradigm: “The Gettin’ is Gettin’ Better!”

- The brain grows new neurons
- Localization is not absolute
- Older brains can work just as well as younger ones
- Older brains are more flexible, adaptable and integrated
- We can have an impact on how our brain ages



Advances in brain imagery technology have been key in the development of the new paradigm



The strength of the older brain has been underestimated on a number of dimensions.

- Bi-lateral (or multi-region) activation
- Expert knowledge
- Managing information
- Extracting meaning
- Focus/attention
- Vocabulary



The brain also seems to mature emotionally with age, resulting in increased calm and serenity

Less:

- Impulsiveness
- Fear
- Impatience
- Anger
- Frustration
- Irritability
- Hatred

More:

- Empathy
- Comfort with ambiguity
- Sense of peace
- Ability to judge character



Recently, scientists have concluded that the brain has a remarkable capability to rewire and remake itself.

- Monkeys and violinists
- Blind, deaf
- Learning disabilities
- Stroke victims
- Psychiatric disease (e.g., OCD, depression)
- Pain

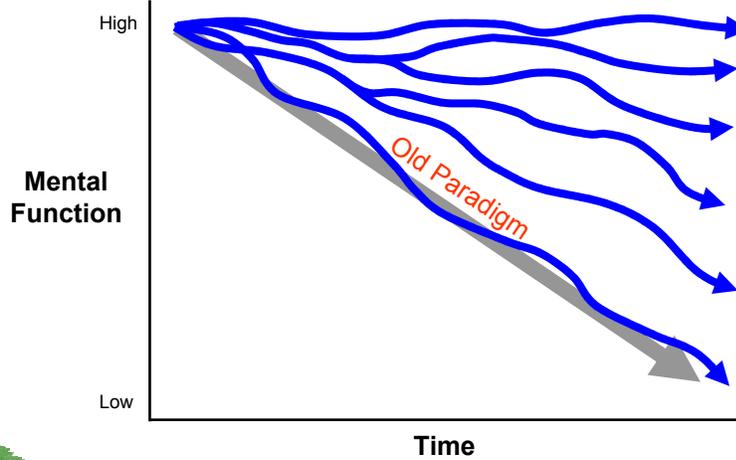


Recently, scientists have concluded that the brain has a remarkable capability to rewire and remake itself.

- Mirror neurons
- Identical twins
- Rigidity
- Developments to watch:
 - Alternative inputs
 - Alternative outputs
 - Emotional transformation



The new paradigm allows for many more paths as the brain ages



The thinking on adult education is also changing toward a new paradigm

The Old Paradigm:

- Adult education is for job training and the intellectually curious.

The New Paradigm:

- Lifelong learning is a key part of healthy aging.



A variety of recent studies have shown a positive correlation between pursuing mental activities and brain health

These show up in a number of areas, including:

- Global cognition
- Working memory
- Perceptual speed
- Likelihood of Alzheimer's disease
- Likelihood of Dementia
- Psychological/emotional health
- Physical health/mortality rates



We can have a lasting impact on how our brain ages, both on a functional and a physical level.



What kind of exercise is best for the brain?

The key element is **newness**. That which is new, stretches your brain.

Recommended activities include:

- Attending lectures and seminars
- Doing crossword puzzles
- Participating in discussion groups
- Reading a book or the newspaper
- Learning a foreign language
- Playing a musical instrument
- Learn to dance the tango
- Travel

An important component is **social stimulation**. Declining social interaction predicts declining cognitive function and higher mortality rates.



This is just one piece of the puzzle. Physical exercise, nutrition, sleep, and other factors are also important to brain health.

The baby boomers make it a whole new ball game...

- Boomers are more educated than any generation in history.
- They spend over \$3 trillion per year.
- They are an unprecedented group in size.
- Colorado adults over 60 will more than double in twenty years.



The number one fear of boomers as they age is loss of mental function.



Organizations are already responding to this coming trend

- Residential communities and Universities
- Senior Centers
- The Alzheimer's Association
- The AARP
- Insurance companies
- Active Minds®



- Software programs to exercise your brain are proliferating:
 - *Brain Age* (Nintendo)
 - *BrainBuilder* (Advanced Brain Technologies LLC)
 - *Brain Fitness Program 2.0* (Posit Science Corp.)
 - *Happy Neuron* (Quixit Inc.)
 - *MindFit* (CogniFit Ltd.)
 - *MyBrainTrainer* (MyBrainTrainer LLC)
 - *Advanced Brain Trainer* (Palm Pilot)
 - *Exercise Your Brain DVD* (SharpBrains)
 - *[M]power Cognitive Fitness System* (Dakim Inc.)



Thank You!

If you mostly paid attention to this talk, you achieved a brain exercise workout equivalent to:

- Singing the national anthem backwards
- Figuring out how to make your VCR stop blinking “12:00”
- Explaining why the sky is blue to a six year old
- Balancing your spouse’s checkbook
- Explaining Medicare Part D to anyone!



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Handouts/info on web site: click [Resource Center](#), then [Healthy Brains](#)

Speaker Bio:

Zane Robertson is the President of Active Minds®, a Denver based provider of educational seminars for seniors. He is a frequent speaker on lifelong learning and senior education and serves on the Denver Commission on Aging and the Denver Coalition for Seniors. Over the past 15 years, Mr. Robertson has founded four companies and led two others as President or Chairman. He is an officer in the Colorado Chapter of the Young Presidents’ Organization and sits on the board of several other organizations. Mr. Robertson holds a BA from Carleton College and an MBA from Stanford University.

