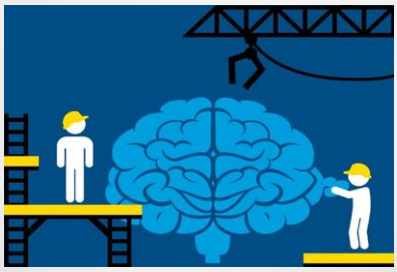


Neuroplasticity: Is it for Real?

Sandra Petersen, DNP, APRN, FNP/GNP-BC, PMHNP-BE, FAANP

Neuroplasticity Research

- You can wire and re-wire your brain!
- Our brain is a dynamic system that has the capability of significant growth.

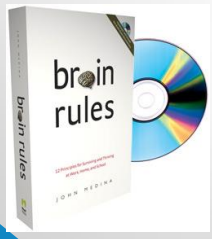
Rudraprosad Chakraborty, M.D.
J Indian Med Assoc 2007;105(9)

Neuroplasticity Research

Neuroplasticity research has established, beyond doubt, that instead of being a static cell mass, our brain is actually a dynamic system of neural networks that has the capability of significant growth under favorable circumstances.

Rudraprosad Chakraborty, M.D.
J Indian Med Assoc 2007;105(9)

12 Brain Rules – John Medina Ph.D.



The brain is an amazing thing. Most of us have no idea what's really going on inside our heads. Yet brain scientists have uncovered details everyone should know!
Dr. John Medina- Developmental Molecular Biologist

12 Brain Rules

1. Exercise boosts brain power
2. Memories are created by connection
3. Every brain is wired differently
4. We don't pay attention to boring things
5. Repeat to remember
6. Remember to repeat

12 Brain Rules

7. Sleep well, think well
8. Stressed brains don't learn the same way
9. Stimulate more of the senses
10. VISION trumps all other senses
    WE SEE WITH OUR BRAINS
11. Male and female brains are different
12. We are powerful natural explorers

Neuroplasticity and Preserving Cognition

- Building cognitive reserve delays the onset of memory loss.
- Research suggests that novel and complex brain activities can delay cognitive decline and extend lifespan.
- Physical exercise helps maintain joint and muscle function. Mental exercise builds cognitive reserve by exercising the temporal lobes. Emotional connections help wire new memories to old.

Barriers to Memory

- Filter #1: RAS (FEAR VS BOREDOM VS MOTIVATION)
- Filter #2: Amygdala

EMOTION+ACTIVITY+NEW INFORMATION

Brain Research

- Create an environment **opposed** to what the brain is good at
  - **Classroom are terrible for learning!**
- Create a business environment opposed to what the brain is good at doing
  - **Cubicle are terrible for focus!**
- Want to change things?
  - **Start over! Environments must be alive and stimulate physically & emotionally.**

Intelligence Is Biology
Richard Haier, PhD

Smart brains work in different way Women and men with same IQ show different underlying brain architectures

Individual's pattern of gray and white matter might underlie his specific cognitive strengths & weaknesses

Mindset – Robert Brooks

- Assumptions & Expectations we have about self and others guide our behavior
- Strategies are worthless unless you believe in them & practice them yourself

Mindset – Robert Brooks

- With memory problems, need to change their mindsets by changing the environment.
- Motivating environment:
  - People being cooperative
  - Willing to learn from each other
  - Willing to take risks because they feel safe & secure
  - All parties feel a sense of ownership

How to create memory

Helping build memory

Memory =

RAS + Amygdala + Dopamine

How a memory is created

RAS – Reticular activating system-Filter #1

- Located at brain stem (lower back of brain)
- Receives input from nerves from arms, legs, trunk, neck, face, internal organs
- Sets the state of arousal alerts brain to change & gets it primed

How to create a memory

- Selects for intake the sensory input (info) it "values" for survival or pleasure
- RAS responsive to novelty, surprise, color, music, curious events
- Lectures, drills & worksheets are NOT novel or engaging- don't power info thru RAS brain filter

How to create a memory

Amygdala – next filter

- Sensory data passes through brain's emotional core, limbic system (amygdala & hippocampus)
- Emotional significance is linked to info
  - Kennedy

How to Protect and Build Memory

- Everything we learn comes to the brain through our senses
- Brain can't process billions of bits of info every sec.
- Equipped with filters to protect from overload & focus on the data most critical for survival.

How to create a memory

- When stress is high, amygdala diverts info to the reflex automatic system, non-thinking reactions (flight/fight)
- When amygdala is in a safe state and emotions are positive, info is passed on to the memory-making and thinking networks in the brain

How to create a memory

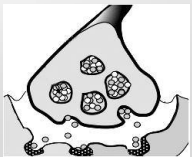
- Stress, boredom, frustration or confusion block the flow of info through amygdala to the thinking brain
- When learning is associated with pleasure, the amygdala "stamps" that info with increased memory impact

How to create a memory

Dopamine – Neurotransmitter

Carry info across synapses

- Released when experience is pleasurable



How to create a memory

Dopamine – **Neurotransmitter**

- Elicited through humor, friends, achievement
- Increases focus, attention and executive function in the frontal lobes

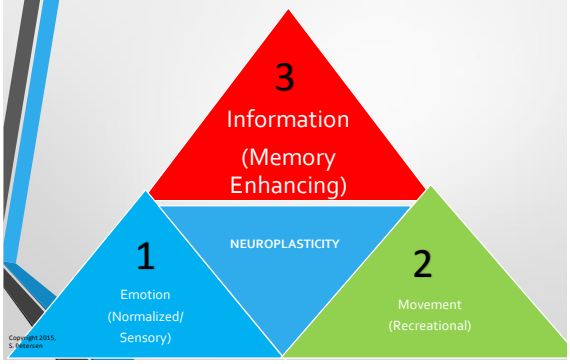
Neuroplasticity

When the action is repeated, the more dendrites sprout to connect new memories to old ones, stronger the connections become, the more efficient the brain becomes at retrieving that memory or action

Social History

- Knowing who our residents were, shapes and preserves who they are.
- Connecting with old memories helps us build new ones.

Neuroplasticity – The Model




Social History & Old Memories
+
Information,
Physical Movement,
Emotional Engagement
=
New Memories & Quality of Life