The Brain’s Use of Emotion, Movement to Enhance Learning & Memory:
Tools for Experiential Education

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The rule that human beings seems to follow is to engage the brain only when also else fails---usually not even then.

--David Hull, 2001
Why do we need to know the brain?

• “It is important to understand not just how we attend to, remember or reason, but also why we attend to, remember or reason about some things rather than others” J. LeDoux 2002

• Knowing how and why the brain/mind works allows us to more effectively design instruction
Brain drawing/photo of lobes

Reasoning, impulse & emotional control
Personality

What & Where

Memory starts, sound, emotional tags

Vision

Heart, respiration & sex drive (automatic processes)

Balance
SPECT SCANS

NORMAL

ADHD
Sex Differences In Intelligence:
Same Problem To Solve

[Images of brain scans comparing men and women for gray and white matter]
The Brain is Plastic

- To learn, it must change.
- Learning physically changes the brain

- The brain grows in cycles
- The brain reorganizes information into natural categories
As the brain learns
it literally grows connections
Cycles in Cognitive Development

Single Abstractions
- Age in Years
- Skill Level
  - 8
  - 12
  - 16
  - 20
  - 24
  - 28

Multiple Abstractions
- Linked into systems
- Direct teacher support
- Independent or little support

Kurt Fischer 2008
Myth & Facts about your Brain

**Neuro Facts**
- Neither sex is superior
- Brain automatically organizes information*
- Memory is spread out*
- You CAN teach an old dog new tricks
- Memories are emotionally encoded*
- Emotions & Memories are chemically based

**Neuro Myths**
- You use only 10%
- Right vs. Left Brain
- Physical Education, Music (the Arts) don’t help—THEY DO!
RECENT FINDINGS

- Movement Helps Memory
- All the brain is used ALL the time
- Over-riding impulsive reactions is harder in teens because frontal lobe isn’t fully functional

- Act of asking a question *changes* the memory
- Recalled information is reconstructed from pieces
- Personal activities with real consequences are better remembered
To Reach the brain, Teach to the Whole Body

- Be alert to the need for significant movement every 15-20 minutes
- Routinely use activities that elevate heart and respiratory rate
- sexes learn and pay attention differently
We process information to find Patterns.
Patterns

- Some have Emotional Significance
- Certain Patterns Change our Attention
Amygdala: Fear Response

Information is sorted into: dangerous to me? (Pay attention!)

Not dangerous? (Ignore... Yawn! )
Clueless
When it comes to patterns many can’t see them.

Help them recognize the patterns

Experience what the pattern means
Adolescence:
(not yet fully adult brain)

Age 10-11 years increased to 25/30 years

• Have difficulty recognizing patterns
• Less impulse control
• Less planning/anticipating consequences
• Less emotional control
Emotions Affect Learning

If it’s emotionally important, the brain pays attention
Emotions

- Powerful learning tool
- Experiences are emotion laden
- Rarely forgotten when there are personal consequences
Emotions

- Enhance Learning
- Hinder Learning
• Create situations that reinforce their belief that effort can make a positive difference.

• Tasks should be just above their current level of ability, or “Just Right”….  

The Goldilocks Test

• Then their emotion link becomes even stronger.
Their Perception Is Their Reality

Perception of threat affects the ability to THINK & LEARN
Their Perception is their reality, that affects emotion & memory

- body language/tone of voice communicates more than words
- Kids remember how they felt more than what was said
Summary of Emotions

- All personal experiences have emotional tags
- Emotionally significant memories easy to retrieve
- Tasks should be just above their level of ability
- Their perception is their reality
- Emotions Motivate
In effect, all animals are under stringent selection pressure to be as stupid as they can get away with.


The default state in solving a problem is to do as little as possible.
Brain in default state
Emotion + Attention + Movement = More Learning (stronger memory)
Brain focuses on a **single** item at time, not several—No “Multi-tasking”

It can rapidly switch to other items
Movement with a personal, consequence = a stronger memory
Movement & Attention

- Movement affects attention

- If the Movement has a personal, almost immediate consequence & you attend to it more.
Personally involved means:

- Their attention system is involved
- They are emotionally involved (emotional memories)
- They are creating personal memories (Episodic memories)
- Learning How to do something (Procedural memories)
Experiential Ed

Long-Term Memory

Declarative or Explicit Memory
- Repeated Events or Semantic Memory, facts, knowledge, language
- Single Event Memory or Episodic Personal Experiences, events with specific time and place

Non-Declarative or Implicit Memory
- Procedural skills, how to do something
- Perceptual
“I’m Not inattentive,-----you’re just boring.”

Thom Hartmann
The Brain **SEEKS** stimulation

- If you don’t provide it, the students will find it for themselves
- Movement provides stimulation
Your Movement Challenge:

• This is personal
• You have instant feedback
• You can compare yourself with others
• It will exercise your brain
• There is some emotion (not likely to forget this)
• Take off your shoes & socks....
Emotion & Movement (& Attention) = Memory
Decision Making:
Combining
Movement, Emotion & Attention + Memory
Movement, + Attention + Emotions

Working Memory
What you are Focused on Right Now (1 item only)

Long-Term Memory
Decision Making
With Climbing:
Hug the rock or stand straighter?

New Information

Working Memory

Compared to LTM

Info. Inconsistent w/LTM info.

Information Rejected or Inhibited

Info. Consistent w/LTM

Information Accepted
Don’t Hug the Rock

New Information

Working Memory

Compared to LTM

Info. Inconsistent w/LTM info.

Information Rejected or Inhibited

Info. Consistent w/LTM

Information Accepted

Don’t Hug the Rock
Personal Events
with emotionally significant movements/actions:

Can be remembered with only a *Single* trial
Movement + Exercise Helps Memory

Must elevate heart & respiratory rate to create brain changes
Exercise
Prepares the Brain to Learn

BDNF = Brain Derived NeuroFactor enhances neuronal growth
USE it or LOSE it
• (Neurons that fire together wire together.)
Use It or Lose It
You Are Your Memory

And your Memory is in the Synapses
Summary: Movement & Memory

- Movement with personal consequences focuses attention
- Personally involved = emotionally involved
- Memory can be created with a single, emotional, physically experienced event
- Vigorous movement increases brain derived neurofactor—preparing brain growth
- Elevated heart & respiratory rate
- Use the brain or lose the connections!
Personally experienced

Emotions + Movements = Memory (Learning)
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