

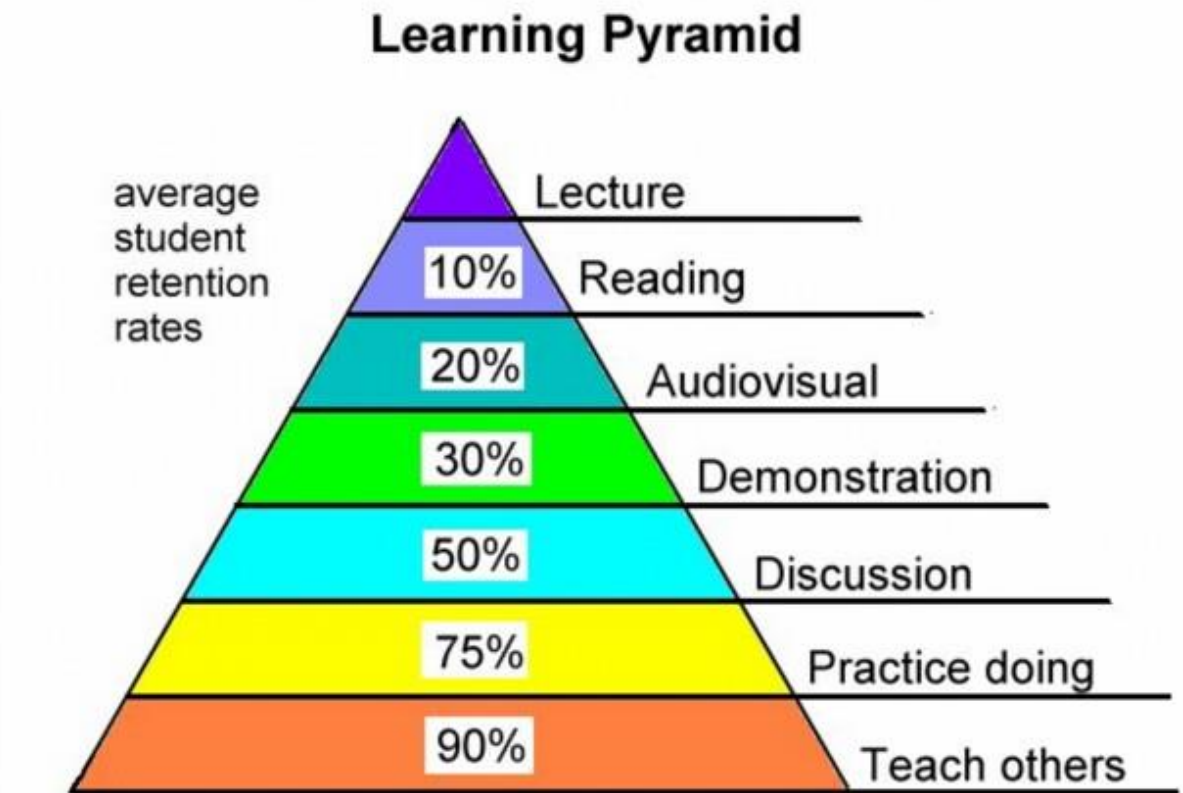
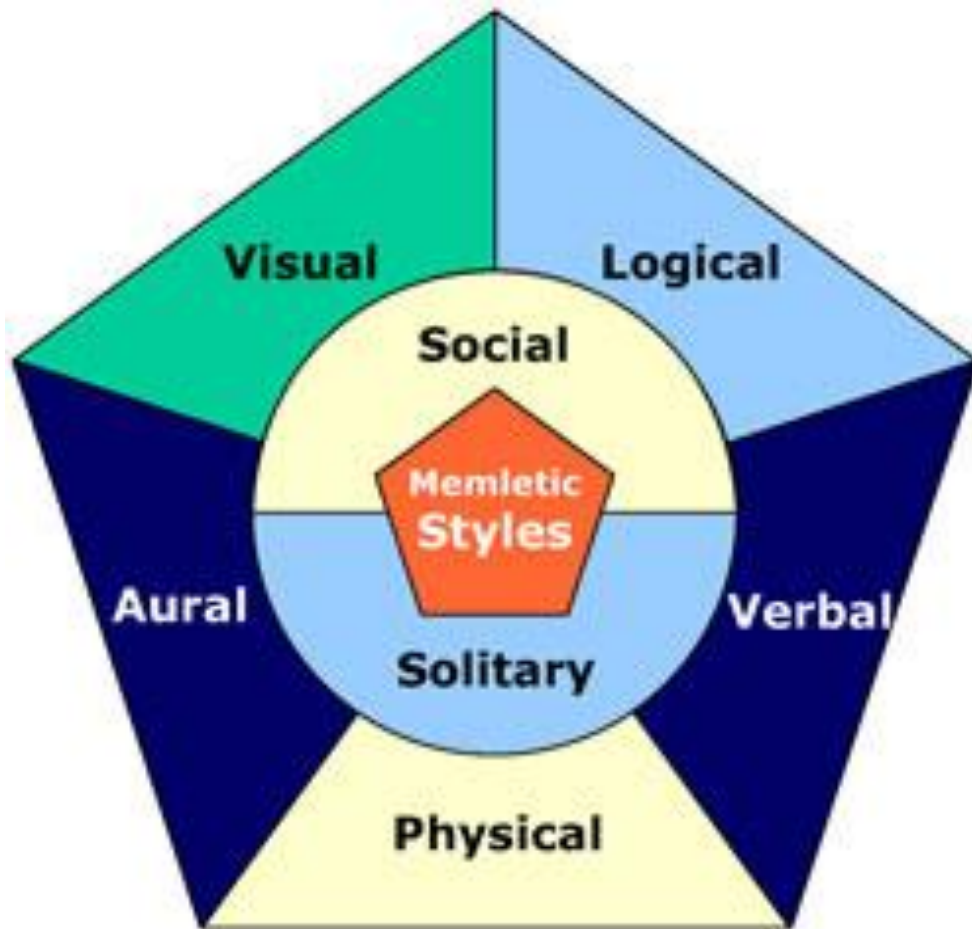


Re=Thinking Teaching & Learning Through Cognitive Science

Kevin Yee

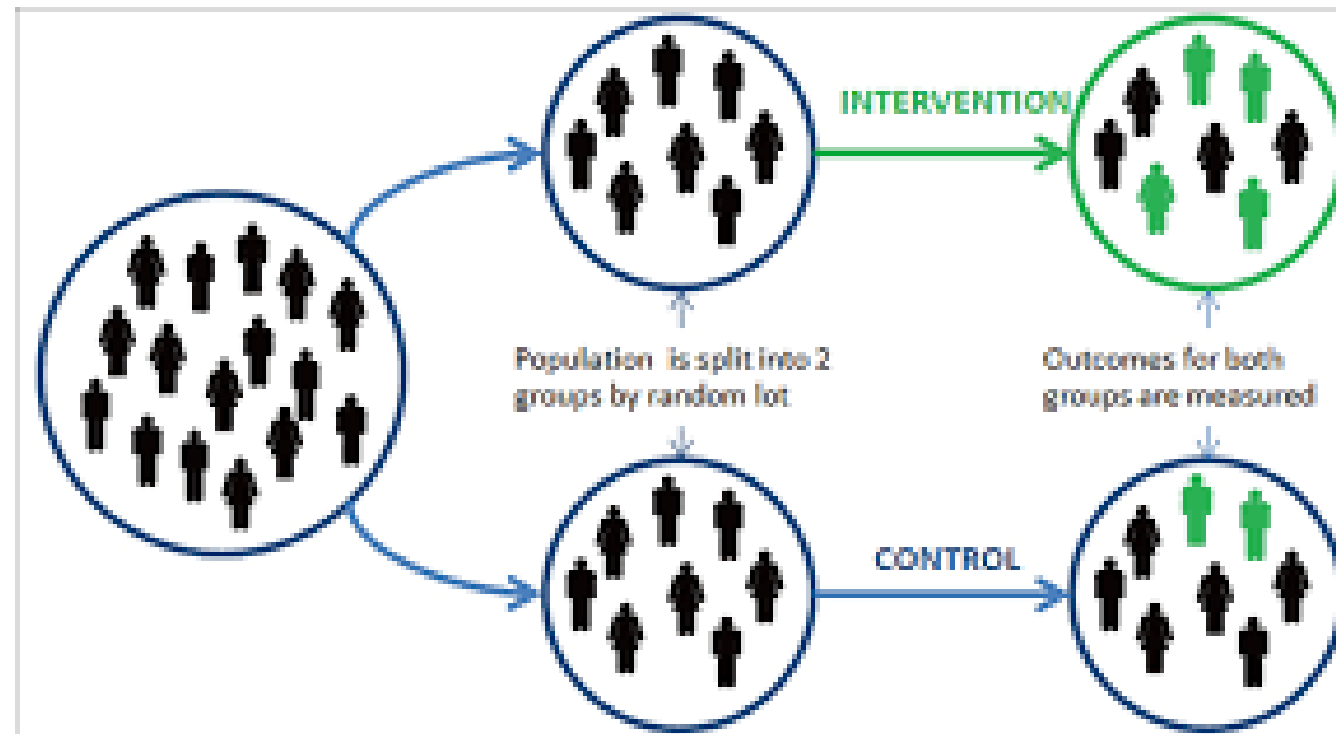
University of South Florida

Learning Styles? Learning Pyramid?



Source: National Training Laboratories, Bethel, Maine

Random Controlled Trials



Guess!

- distributed practice
- elaborative interrogation
- highlighting (or underlining)
- imagery use for text learning
- interleaved practice
- keyword mnemonic
- rereading
- practice testing
- self-explanation
- summarization



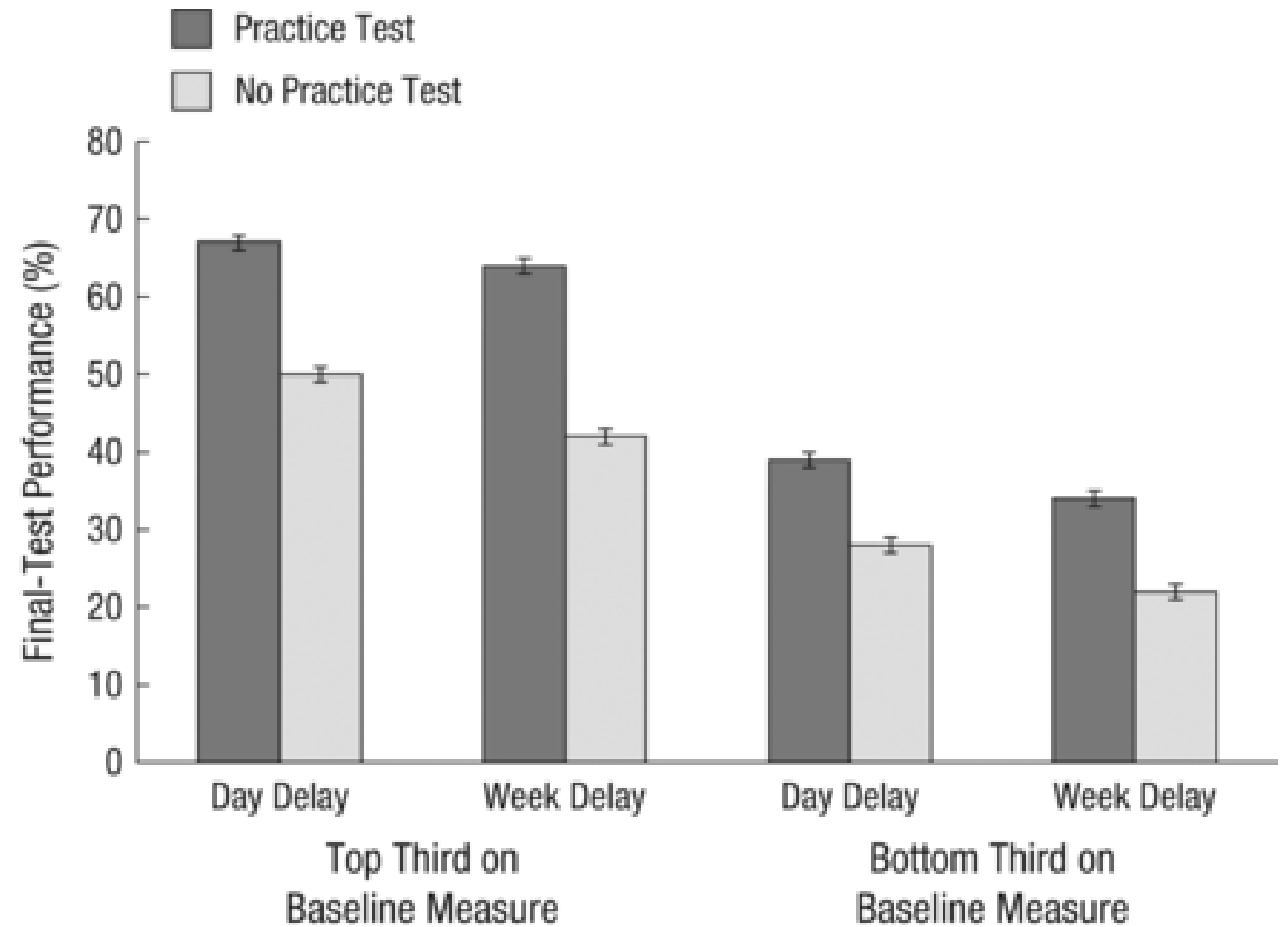
Technique	Utility
Elaborative interrogation	Moderate
Self-explanation	Moderate
Summarization	Low
Highlighting	Low
The keyword mnemonic	Low
Imagery use for text learning	Low
Rereading	Low
Practice testing	High
Distributed practice	High
Interleaved practice	Moderate

Improving Students' Learning With Effective
Learning Techniques: Promising Directions From
Cognitive and Educational Psychology

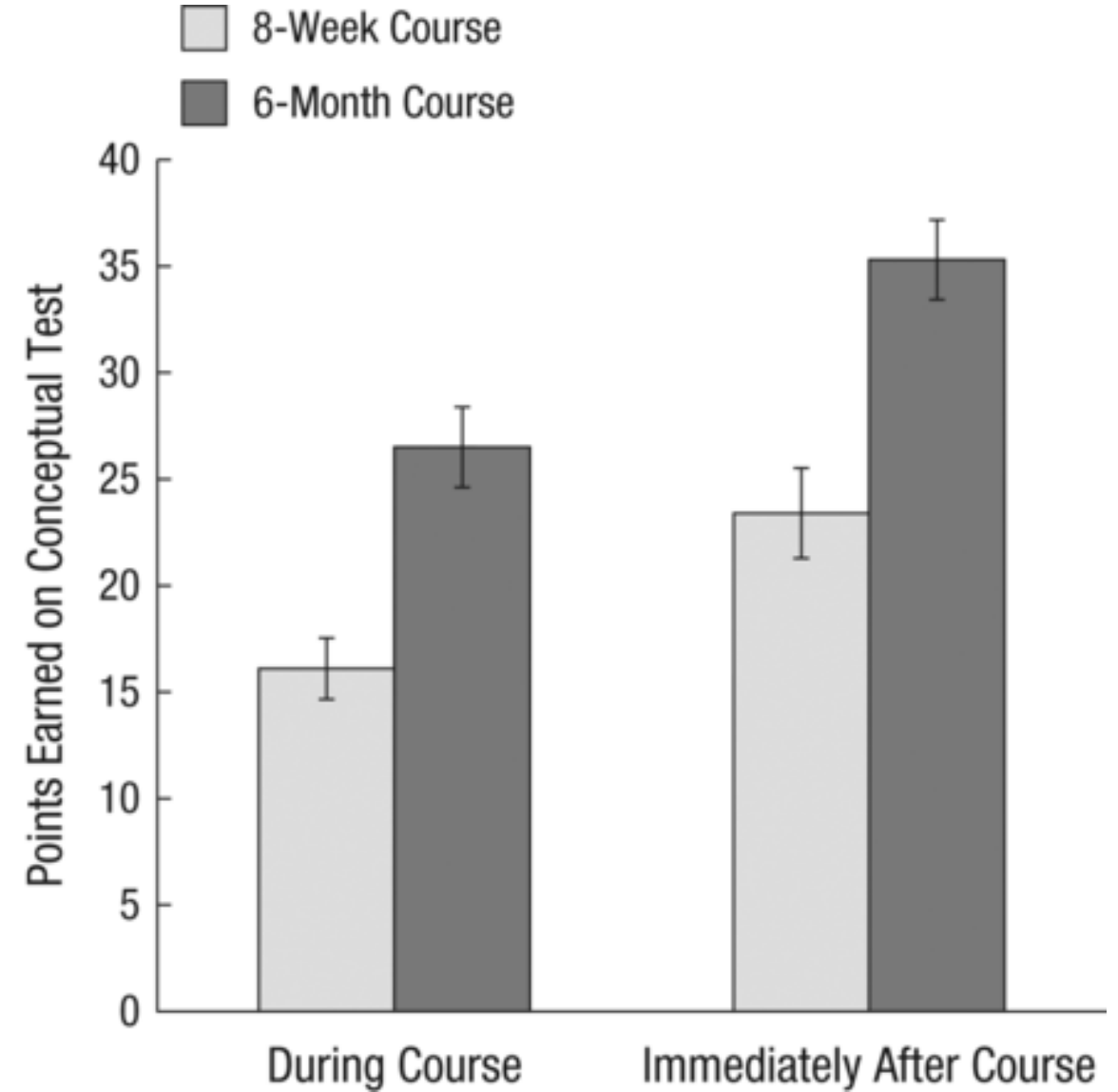
John Dunlosky, Katherine A. Rawson, Elizabeth J.
Marsh, Mitchell J. Nathan, and Daniel T. Willingham

Psychological Science in the Public Interest
January 2013 vol. 14 no. 1 4-58

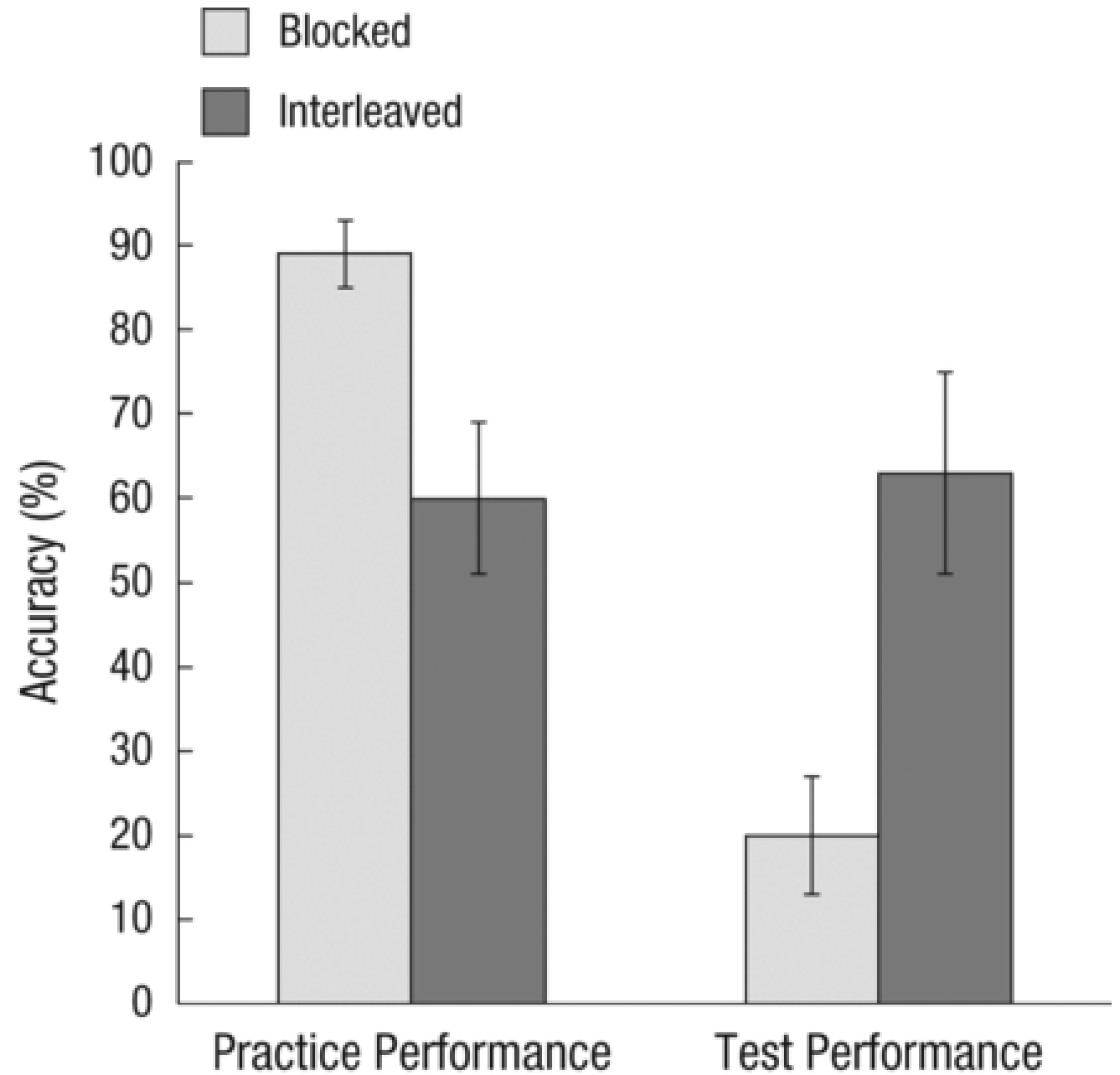
Practice Testing



Distributed Practice



Interleaving



“Brain Based” Publications

- Todd Zakrajsec, *The New Science of Learning*
- David A. Sousa, *How the Brain Learns*
- Daniel Willingham, *Why Don't Students Like School?*
- Peter Brown, *Make it Stick: The Science of Successful Learning*
- Benedict Carey: *How We Learn*

Principles – Guess Them!

- A
- N
- S
- W
- E
- R

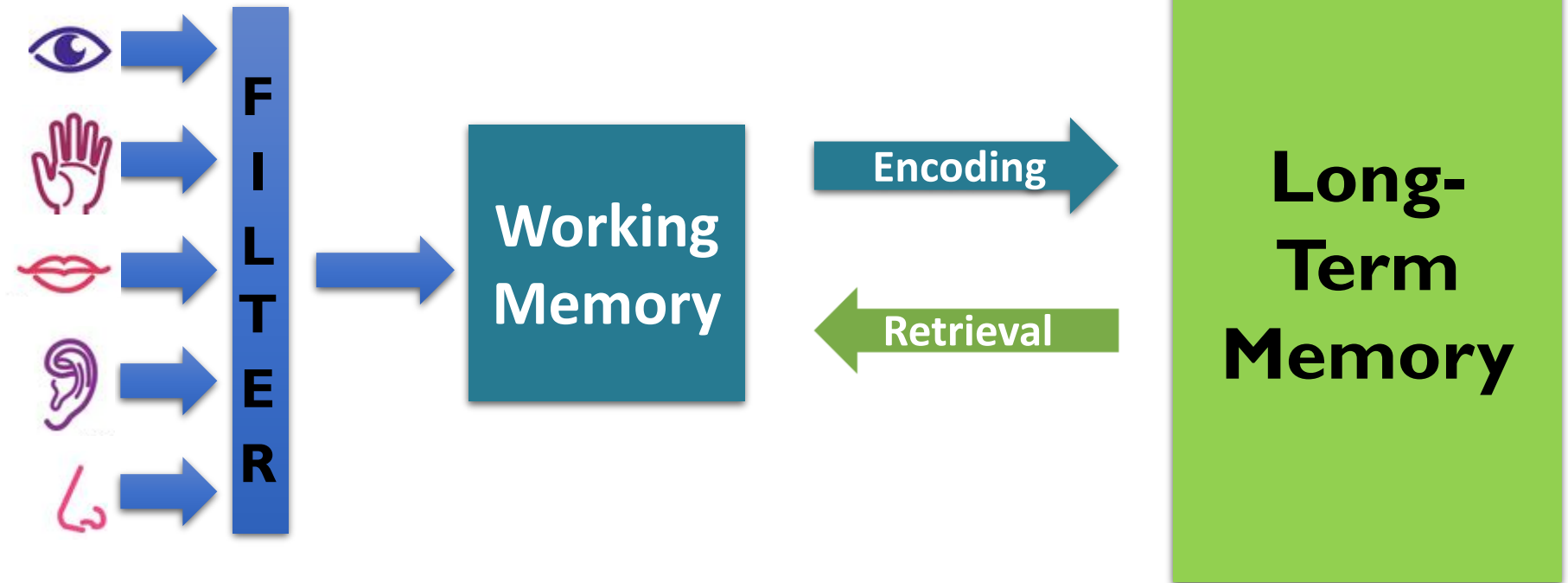


Principles

- Attention
- N
- S
- W
- E
- R

Principles

- **A**ttention
- N
- S
- W
- E
- R



Principles

- **A**ttention
- N
- S
- W
- E
- R



Multi-tasking

Principles

- Attention
- Novelty
- S
- W
- E
- R

Principles

- Attention
- Novelty
- S
- W
- E
- R



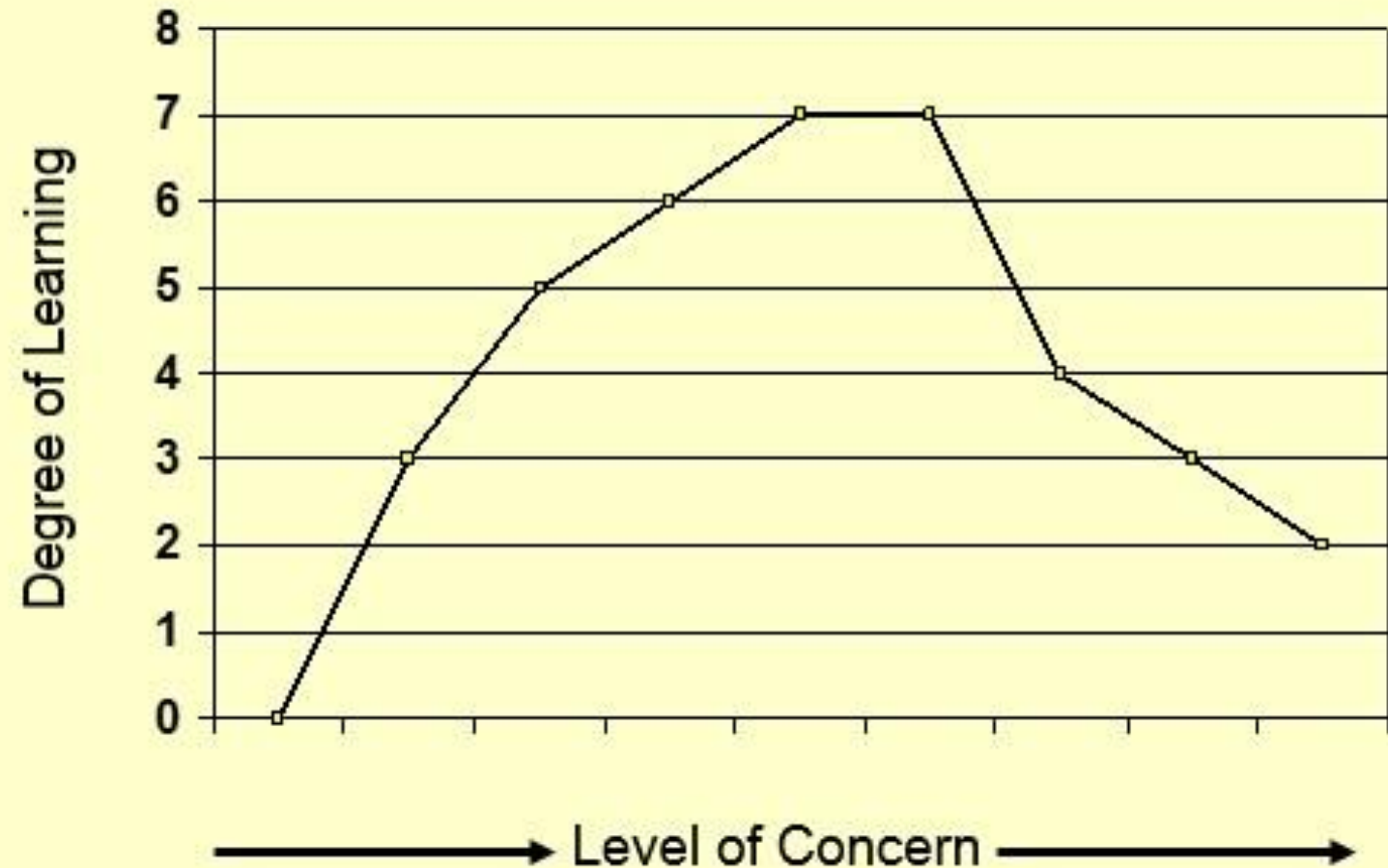
Principles

- Attention
- Novelty
- S
- W
- E
- R



Principles

- Attention
- Novelty
- S
- W
- E
- R



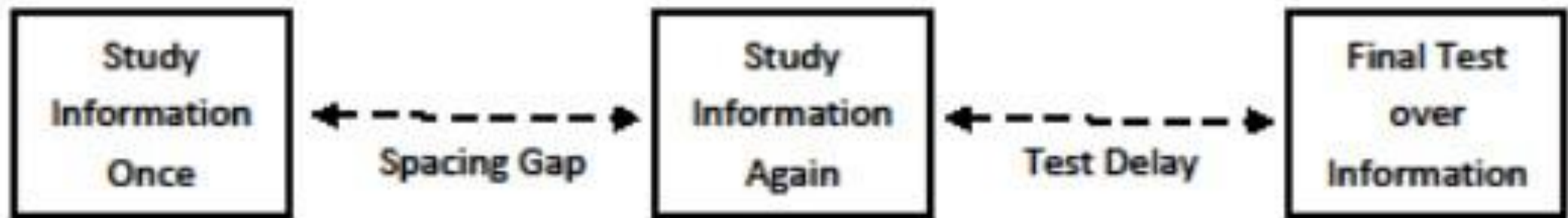
Importance of Learning Names?

Principles

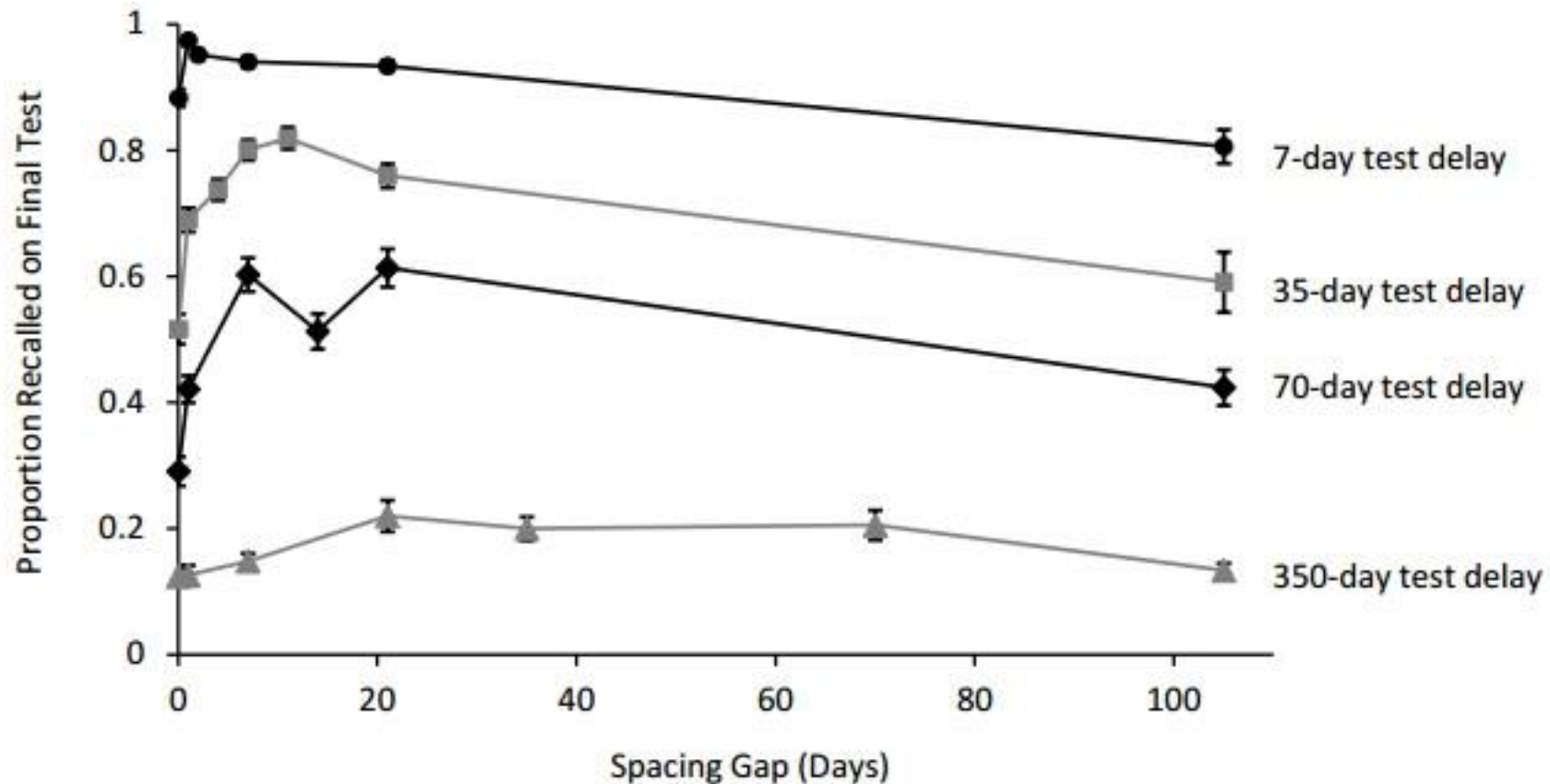
- Attention
- Novelty
- Spacing
- W
- E
- R

Principles

- Attention
- Novelty
- Spacing
- W
- E
- R



Longer spacing gaps yield longer retention

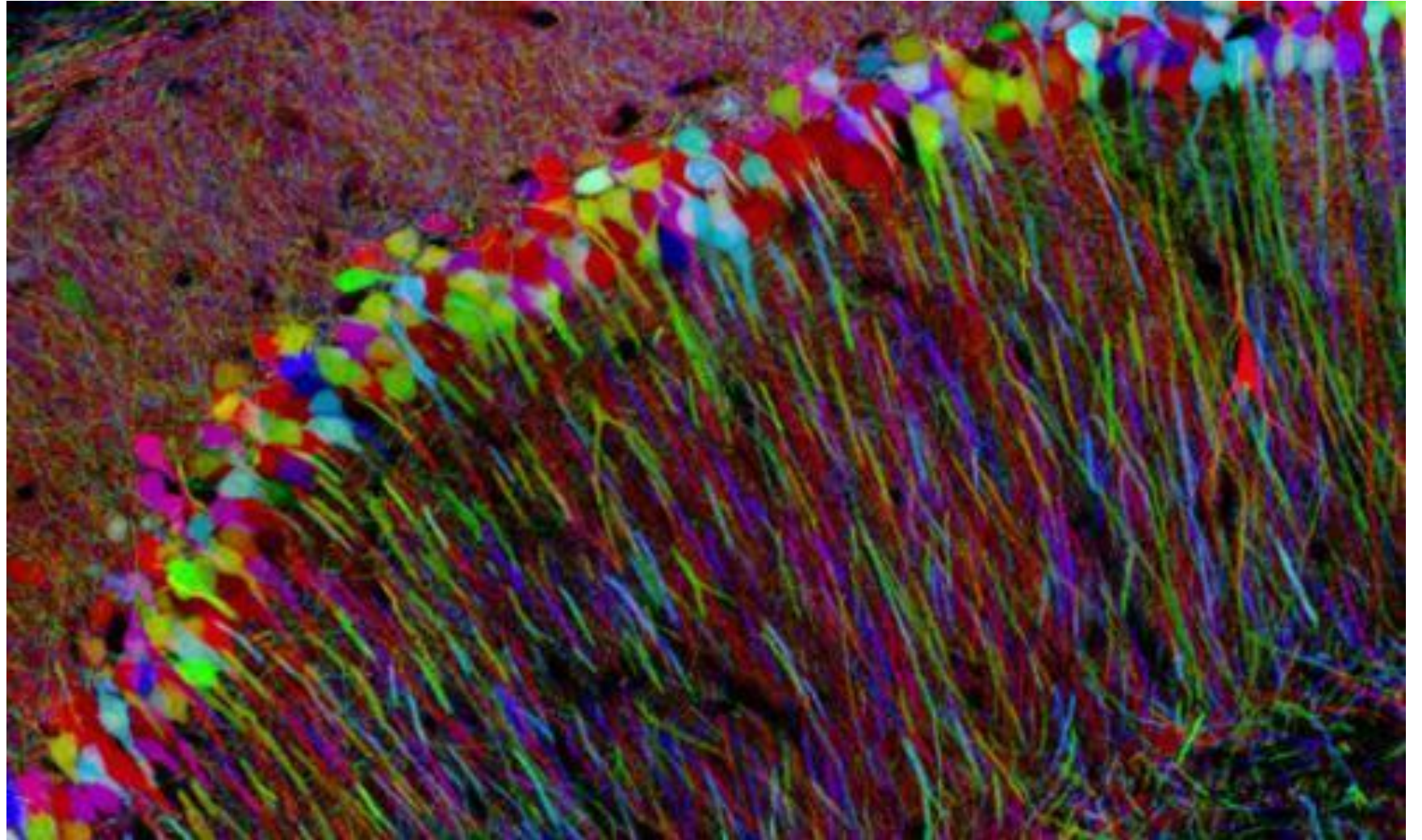


Principles

- Attention
- Novelty
- Spacing
- Why
- E
- R

Principles

- Attention
- Novelty
- Spacing
- Why
- E
- R



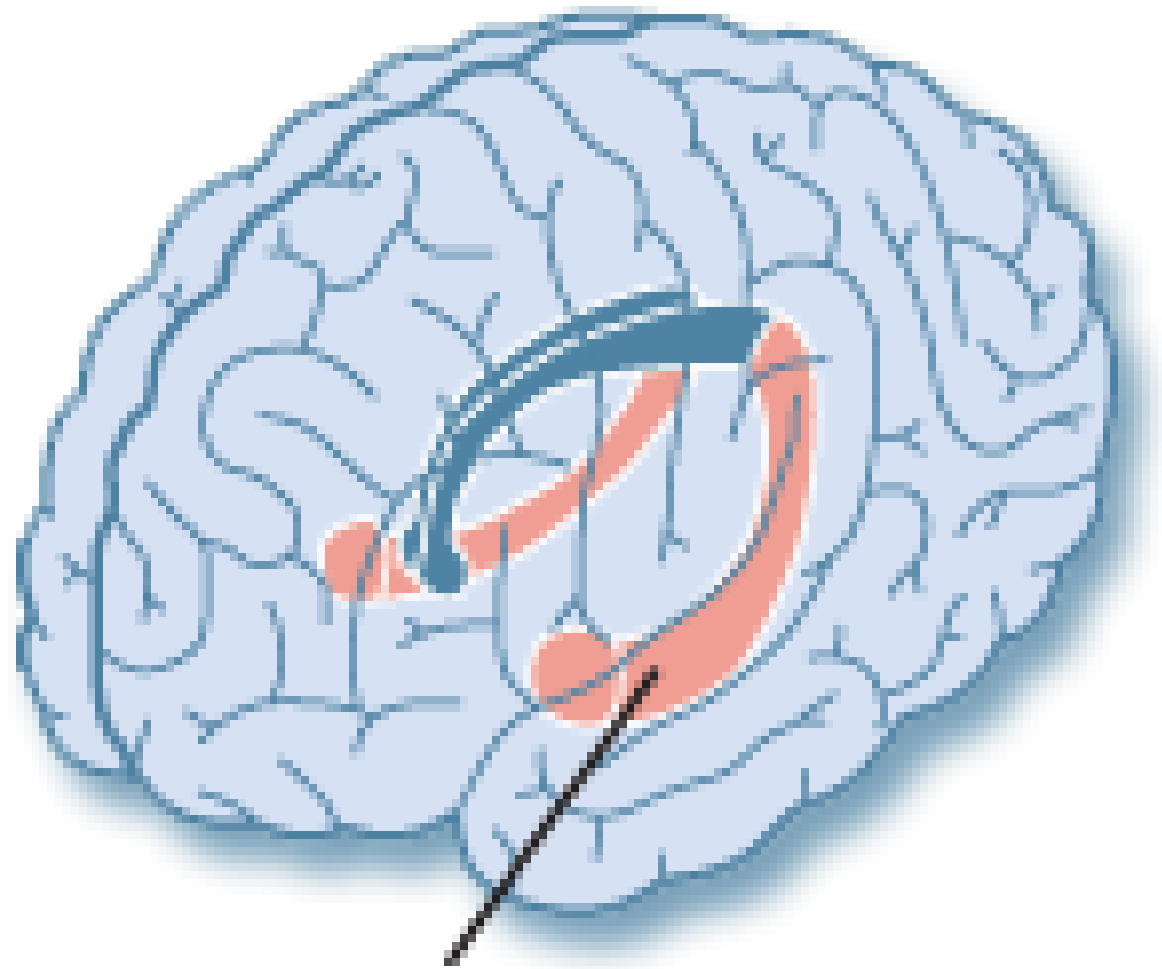
“fire together, wire together”

Principles

- Attention
- Novelty
- Spacing
- Why
- Emotions
- R

Principles

- Attention
- Novelty
- Spacing
- Why
- Emotions
- R



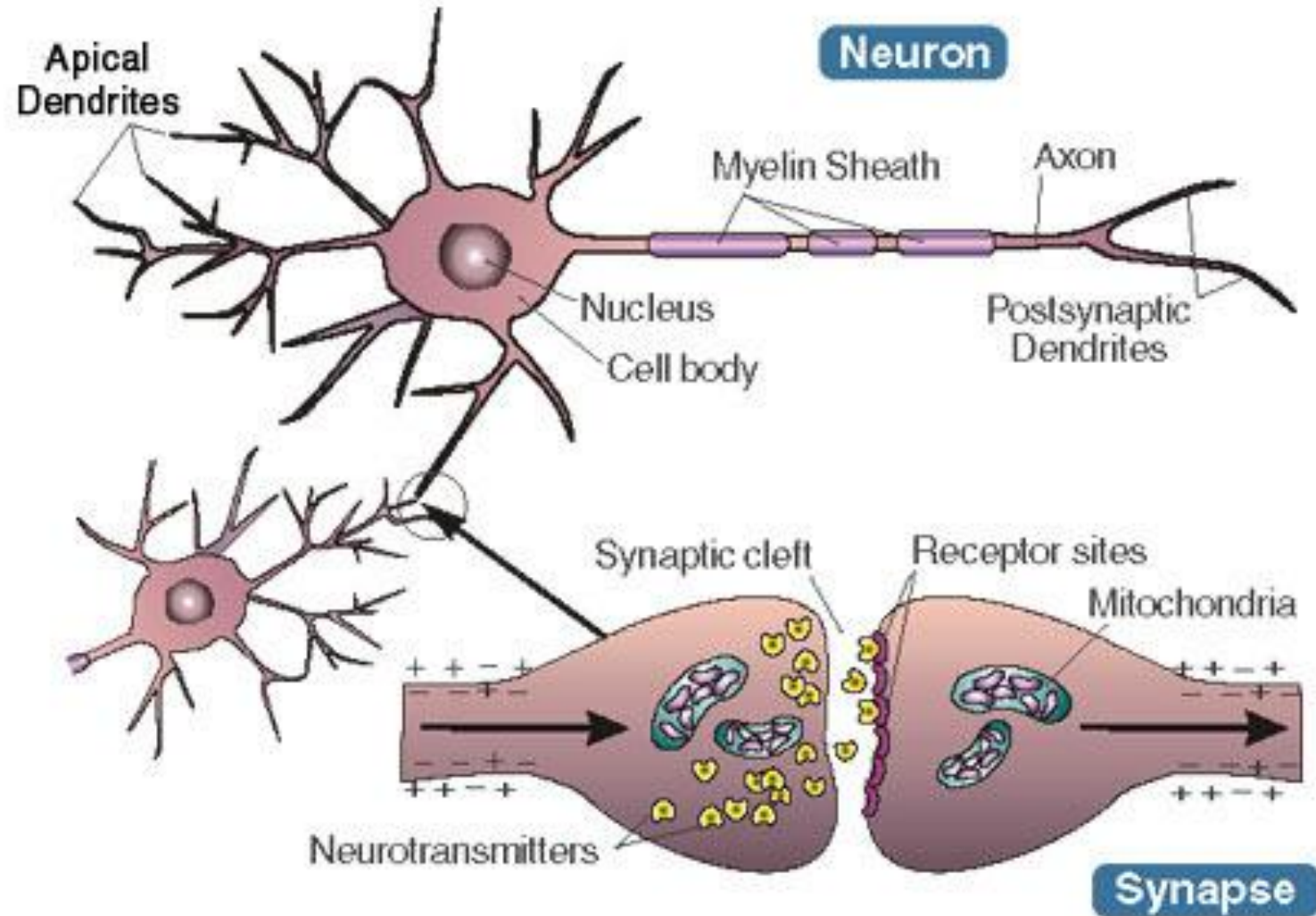
Medial Temporal Lobe

Principles

- Attention
- Novelty
- Spacing
- Why
- Emotions
- Retrieval

Principles

- Attention
- Novelty
- Spacing
- Why
- Emotions
- Retrieval



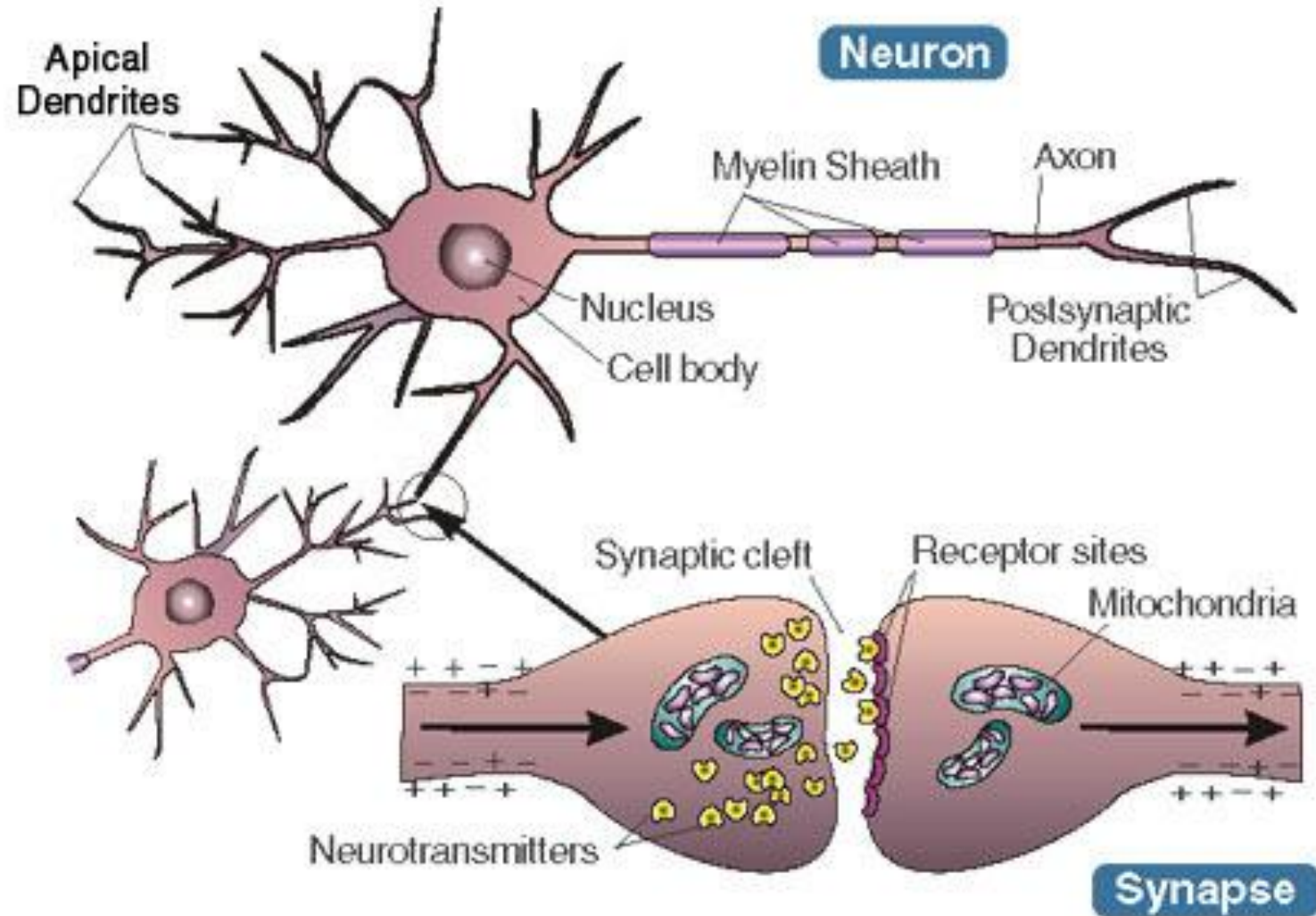
Repetition

Repetition

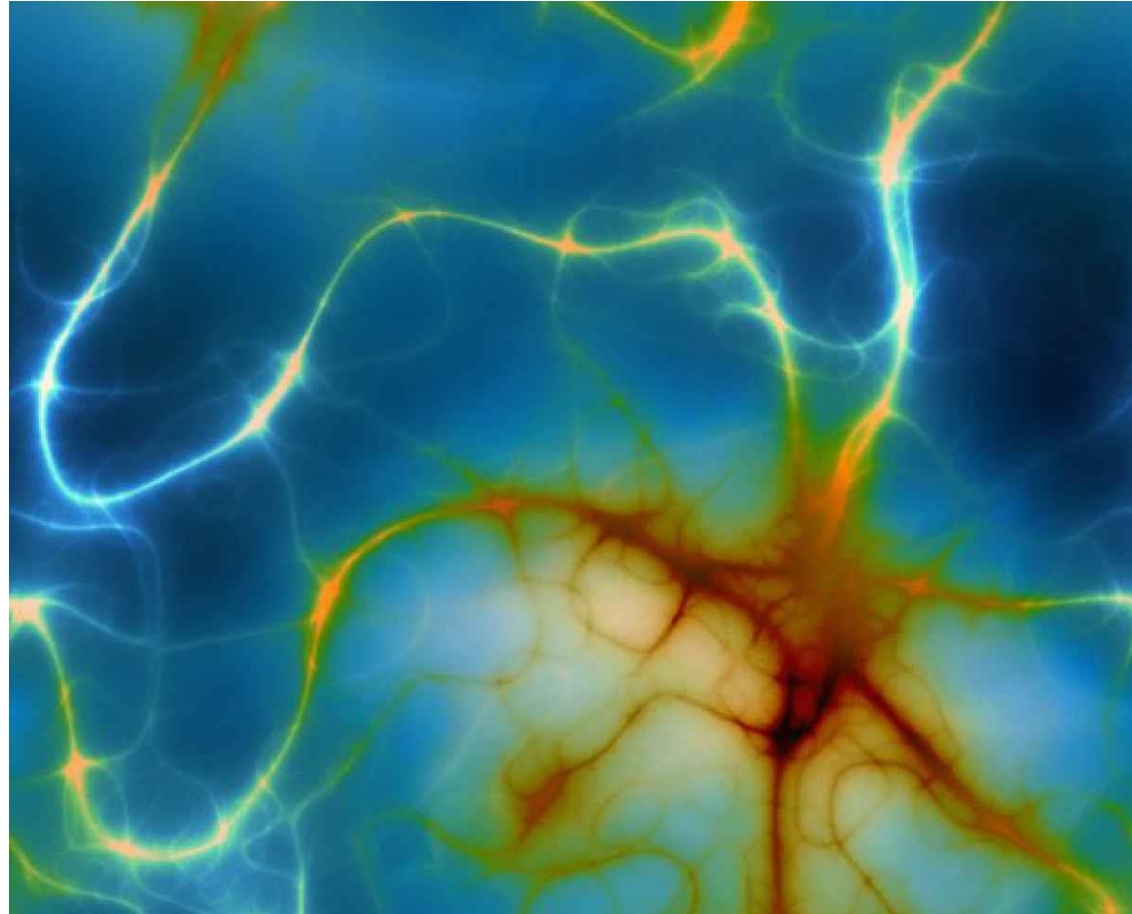
Repetition

Repetition

Repetition



Interrupting the Forgetting Process



Interrupting the Forgetting Process

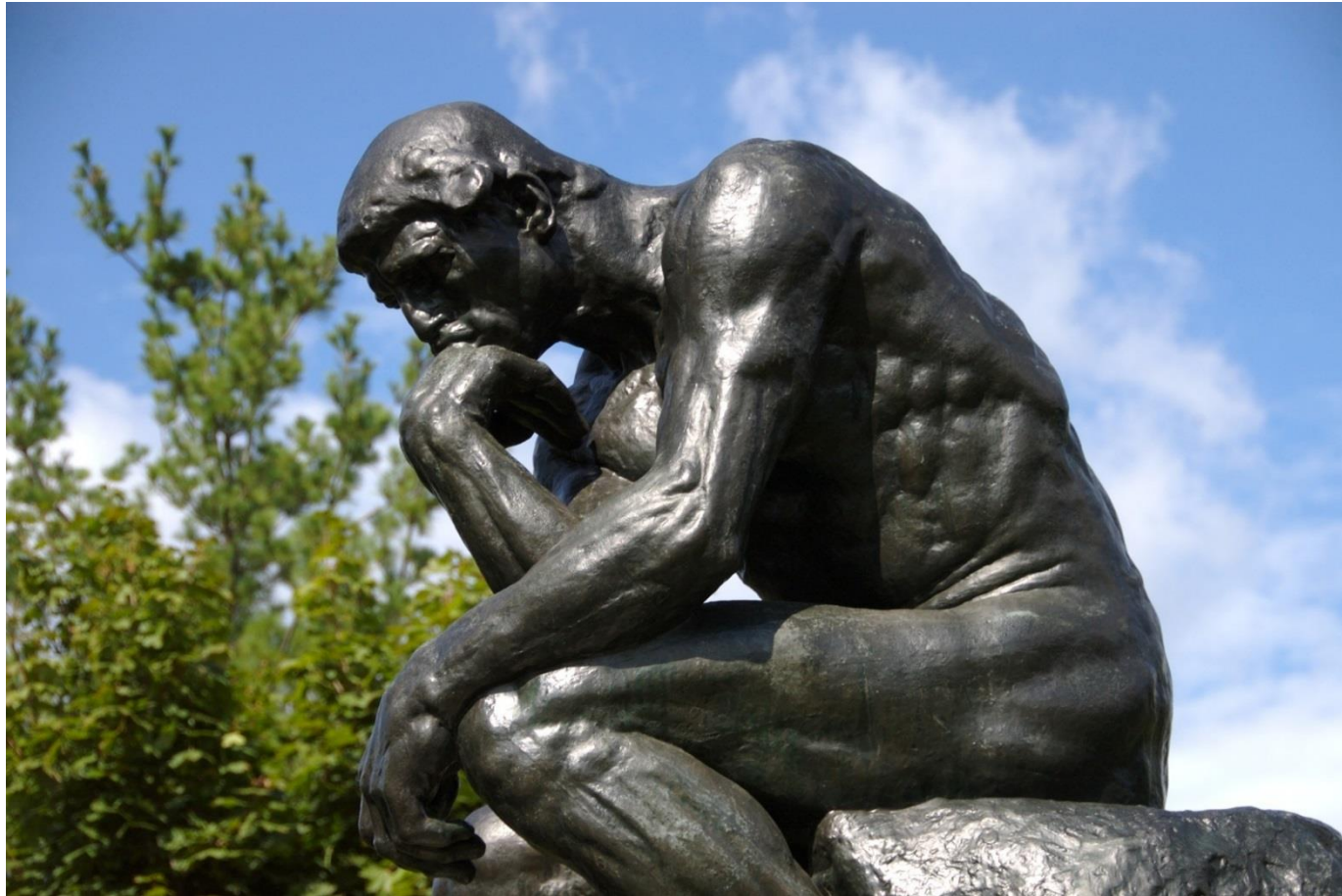


LEARNING IS EFFORTFUL!

Nicholas Carr, *The Shallows* (2011)



Your job in class?





Basic Concepts of Valuing a Going Business:

- Rules of Thumb Are Dumb!
- Only Future Benefits Create Value.
- Nobody Really Knows What a Business is Worth.
- Strategy: You Control the Process!



Basic Concepts of Valuing a Going Business:

- Rules of Thumb Are Dumb!
 - ✓ "3x net profit" means nothing if we don't know how to define "net profit."
 - ✓ "3 months gross sales" means nothing if we don't know about profitability.
 - ✓ Rules of thumb are, indeed, dumb, but we use them anyway!



Basic Concepts of Valuing a Going Business:

- Only Future Benefits Create Value.
 - ✓ ROI - Return on Investment (Down payment, debt assumed and money needed for working capital and/or capital investment)
 - ✓ ROL - Return on Labor (Buying a job)
 - ✓ Market Share Gain
 - ✓ All the Other Things that Count Besides Profits

PowerPoint Handouts?

Principles

- A
- N
- S
- W
- E
- R

Implications for Teaching

- Course Design
- Lesson Planning
- Classroom Management
- PowerPoint/Handouts
- Testing/Assessment Strategy
- Use of Quizzes
- Purpose (and Focus) of Lecture
- Interactivity and Active Engagement
- Online Teaching

Principles

- A
- N
- S
- W
- E
- R

Implications for Campus Offices



Principles

- A
- N
- S
- W
- E
- R