BRAIN FRIENDLY EDUCATION

NORWALK PUBLIC SCHOOLS
TITLE I
TONY DITRIO

What is Brain-Based Teaching?

It's <u>E-S-P!</u>

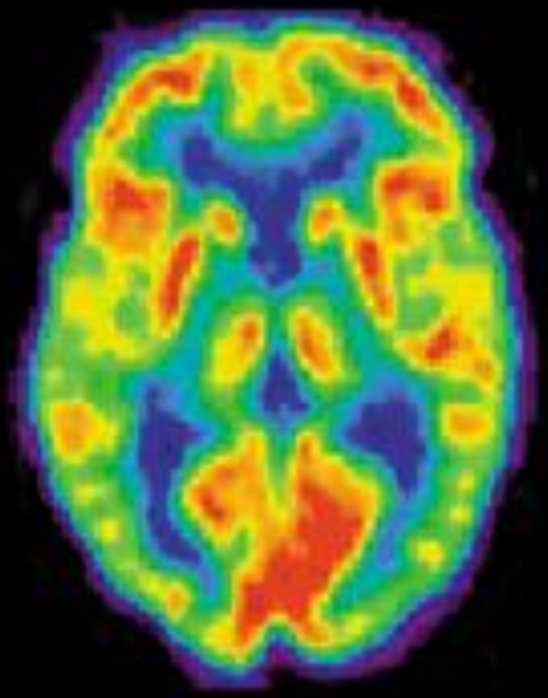
the Purposeful
Engagement

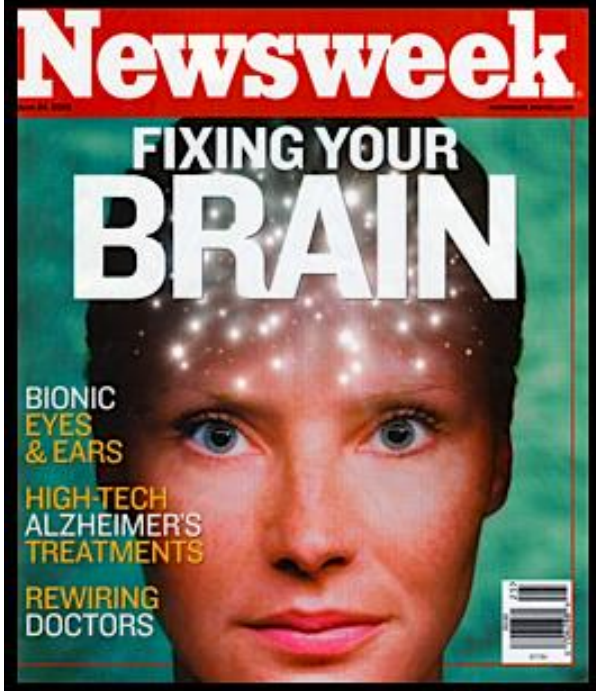
of effective
Strategies

derived from
Principles *of cognitive neuroscience*

- We've learned more about the brain in the last 10 years than in the previous 100 years!
- Over 255 brain journals now published!
- 37,000 scientists from 62 countries produce countless studies daily.
- Have you noticed the news?

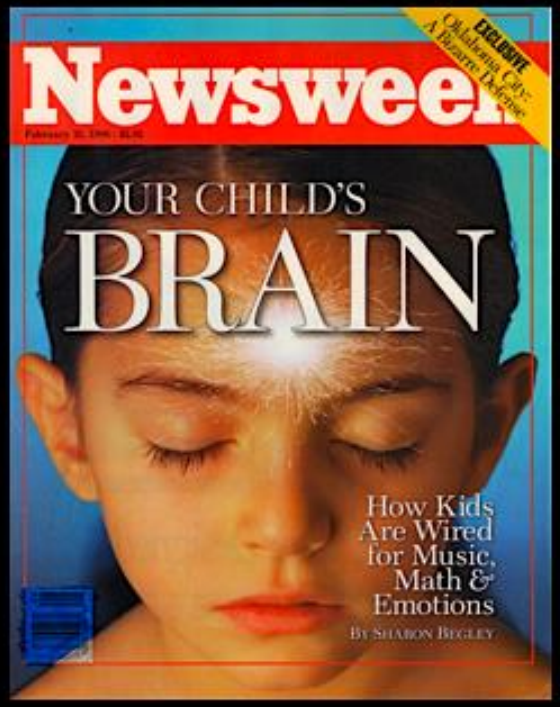
Neuroscience is Exploding!

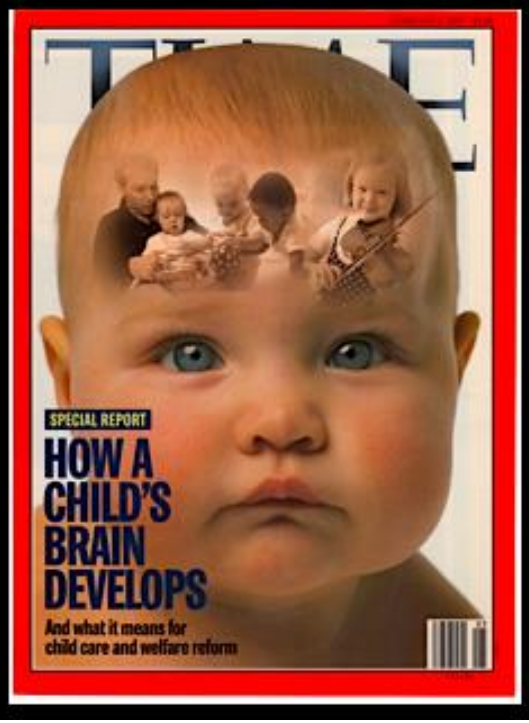



Newsweek
FIXING YOUR
BRAIN
BIONIC
EYES
& EARS
HIGH-TECH
ALZHEIMER'S
TREATMENTS
REWIRING
DOCTORS

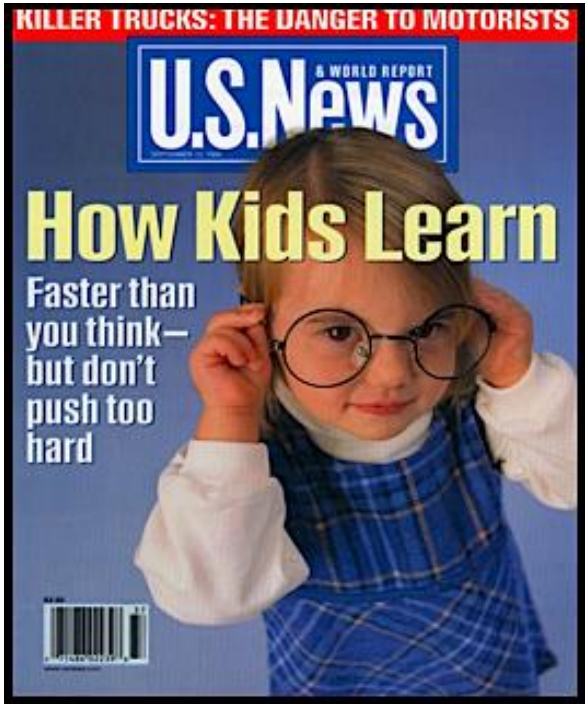

Newsweek
Playing the Gender Card
Affirmative Action
THE NEW SCIENCE OF THE
BRAIN
Why
Men and
Women
Think
Differently

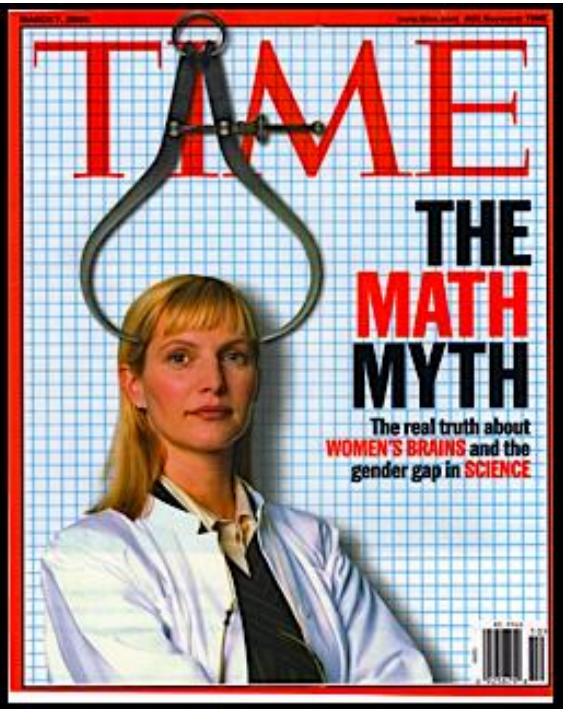

U.S.News
& WORLD REPORT
Clinton's New Troubles
Monica's Second Start
BABY
TALK
New research
shows the amazing
ways children
master language—
and how it wires
their brains

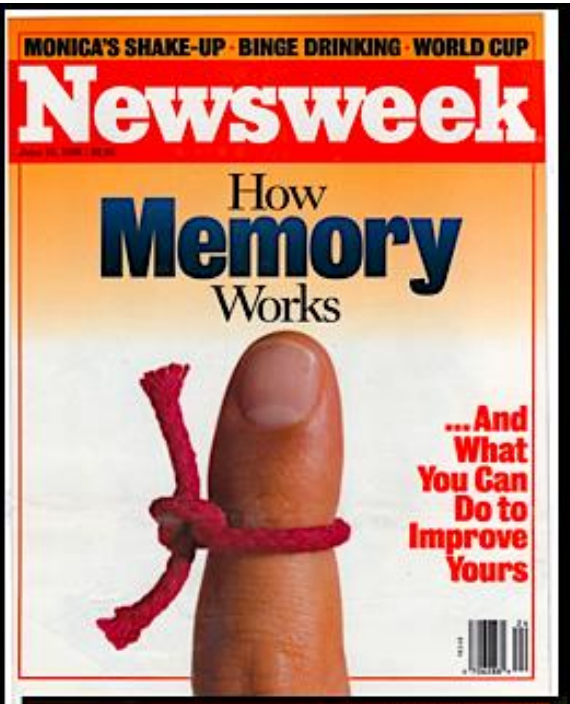

Newsweek
EXCLUSIVE
Oklahoma City:
A Bizarre Defense
YOUR CHILD'S
BRAIN
How Kids
Are Wired
for Music,
Math &
Emotions
By Sharon Begley

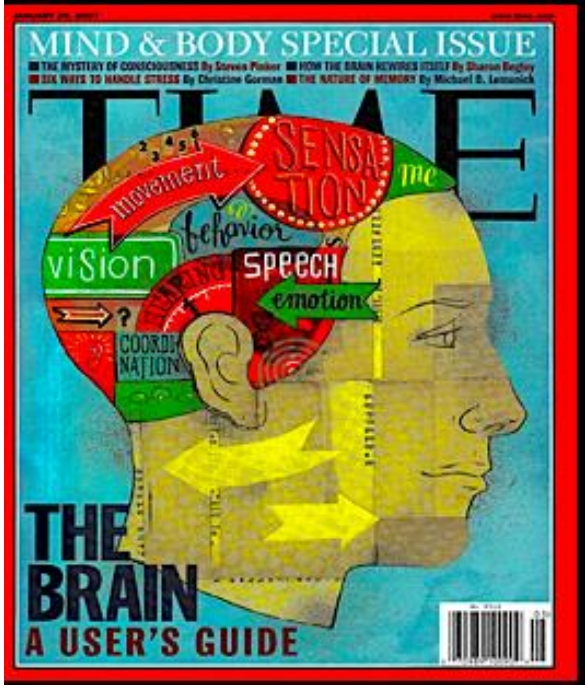

SPECIAL REPORT
HOW A
CHILD'S
BRAIN
DEVELOPS
And what it means for
child care and welfare reform

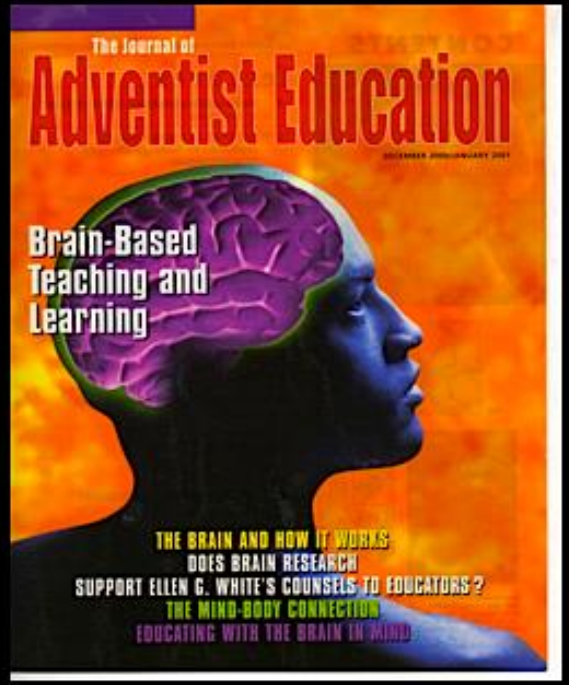

TIME
TROY:
THE MAKING
OF AN EPIC
SECRETS
OF
THE
TEEN
BRAIN
Research is revolutionizing our
view of the adolescent mind—and
explaining its mystifying ways


KILLER TRUCKS: THE DANGER TO MOTORISTS
U.S.News & WORLD REPORT
How Kids Learn
Faster than you think— but don't push too hard


TIME
THE MATH MYTH
The real truth about WOMEN'S BRAINS and the gender gap in SCIENCE


MONICA'S SHAKE-UP · BINGE DRINKING · WORLD CUP
Newsweek
How Memory Works
...And What You Can Do to Improve Yours


MIND & BODY SPECIAL ISSUE
TIME
THE BRAIN
A USER'S GUIDE


The Journal of
Adventist Education
Brain-Based Teaching and Learning
THE BRAIN AND HOW IT WORKS
DOES BRAIN RESEARCH SUPPORT ELLEN G. WHITE'S COUNSELS TO EDUCATORS?
THE MIND-BODY CONNECTION
EDUCATING WITH THE BRAIN IN MIND


WWII'S FORGOTTEN FRONT · THE STONES OPEN UP
Newsweek
Your Baby's Brain
NEW RESEARCH
From Jealousy To Joy: How Science Is Unlocking the Inner Lives Of Infants

Student Achievement *(this is how our success is measured)*

1

Understanding Effect Sizes

Effect size is a standardized measure of the *relative size of the gain (or loss)* of an intervention.

0.00 or less = Negative effect
0.00 – 0.20 = Negligible, unclear effects
0.20 – 0.40 = Small-moderate effects
0.40 – 0.60 = Strong effects
0.60 – 2.00 = Extreme positive effects

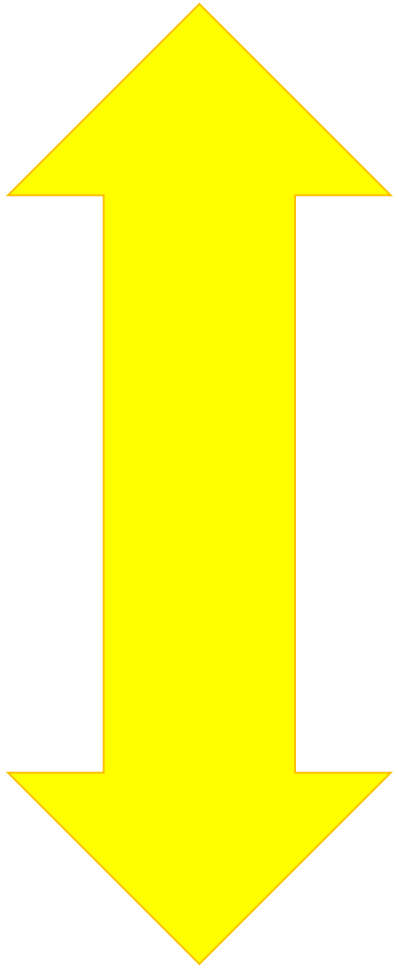
These are just one way of understanding the value of educational/classroom factors. There are others.

Our Criteria for Quick Gains in Student Achievement: 5 Factors

- ✓Effect size of (0.50 or greater)
- ✓ Peer-reviewed scientific research
- ✓ In the top 15 of multiple meta-studies
- ✓ School-based implementation evidence
- ✓ Cost effective: cheap/free to implement quickly, with low-mod. skill set needed.

Rank these: the Highest to the Lowest Impact on S _____ _____t

1. Student self-assessment
2. Ongoing formative evaluations
3. Reciprocal teaching
4. Classroom climate
5. Teacher clarity
6. Feedback (in both directions)
7. Teacher-student relationships
8. Spaced vs. massed content
9. Cognitive skill building
10. Not labelling students
11. Socioeconomic status
12. Parental involvement



Hattie, J.A C. (2011) Visible Learning for Teachers. Routlege Press. pgs 297-299.

Know What Matters Most

- Student prediction of their grades (1.44 - 1)
- Instructional climate (.80 – 6)
- Teacher clarity (.75 – 8)
- Reciprocal/peer teaching (.74 – 9)
- Feedback (to students & teachers) (.73 –10)
- Student-teacher relationships (.72 –11)
- Teach meta-cognitive strategies (.69 –13)
- Socioeconomic status of student (.57 – 32)
- Class size (.21 –106)
- Ability grouping of your students (.12 –121)
- Teacher subject matter knowledge (.09 –125)

Hattie, JA (2009) Visible Teaching

Visible Achievement Factors in Every Class

1. Student engagement
2. Hope and growth mindset
3. Feedback (plus formative & summative assessment)
4. Relationships (multi-level)
5. Cognitive skill-building

"High Return" Achievement Factor: **Student Engagement**

Student engagement is a "top 15" factor in nearly every comprehensive study.

•Appleton, J. J., Christenson, S. L. and Furlong, M. J. (2008), Student engagement with school: Critical conceptual and methodological issues of the construct. Psychology in the Schools, 45: 369–386.

•Ladd, Gary and Dinella, Lisa (2009) Continuity and Change in Early School Engagement: Predictive of Children's Achievement Trajectories From First to Eighth Grade? Journal of Educational Psychology Volume 101, Issue 1, Pages 190-206.

•Marks, H. (2000) Student Engagement in Instructional Activity: Patterns in the Elementary, Middle, and High School Years. American Educational Research Journal, Vol. 37, No. 1, 153-184 (2000).

•Shernoff, D., Csikszentmihalyi, M., Schneider, B. and Shernoff, E.S. (2003, Summer) Student engagement in high school classrooms from the perspective of flow theory. School Psychology Quarterly, 18(2):158-76.

Effects of Engagement

- ✓ Builds Student Effort
- ✓ Supports Instructional Climate
- ✓ Helps Attentional Focus
- ✓ Boosts 3-1 Emotional Ratio
- ✓ Reduces Behavior Issues

The Seven Engagement Factors

1. Health and nutrition.
2. Vocabulary.
3. Effort and energy.
4. Mind set.
5. Cognitive capacity.
6. Relationships.
7. Stress level.

50-60%
Teacher &
School Quality

10% Misc.
Influences

30-40% Genes
(Some are
modifiable)

How
Much Do
Teachers
Matter?

What Research Tells Us About the Effects of Poverty on Student Achievement

RANGE: effects change w/ grade level (from **0.10** to **0.76**

(Howley, 1996) and Wenglinsky, H. (2002).

AVERGE: The average effect size of SES is **0.57** with a ranking of **32nd** out of **138** factors.

Hattie, JA (2009) Visible Learning

How Would Your Staff Rank the Strength of Each of these 3 Effects on Student Achievement?

KID'S HOME LIFE

TEACHER QUALITY

SCHOOL QUALITY

Build Vocabulary Every Single Day

1. Use words that: 1) are on the tests and 2) get their attention.
2. Have a "Word for the Day."
3. Student get credit for sharing their weekly word with 3 others.
4. Writing assignments w/ new words.
5. Kids say, "Caught you!" for word recognition games w/ teacher.
6. Double credit for kids speaking or writing the new word.
7. Teacher role models complex words.
8. Give examples they can use as adults in everyday life.

Formative Assessment Factors and Their Related Effect Sizes

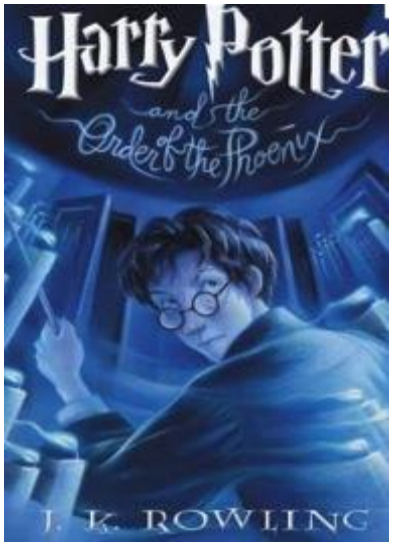
Effect sizes below .40 are considered minimal

- diagnosis feedback .52
- mastery learning (which is based on feedback) .50
- remediation and feedback .65
- corrective feedback .94
- feedback and reinforcement of learning 1.13

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81- 112.

Stick with What Works

For <u>reading</u>: 1) assess early, 2) skill-building interventions over months and years, 3) use very high-interest reading, and 4) build vocabulary constantly, and 5) build working memory.



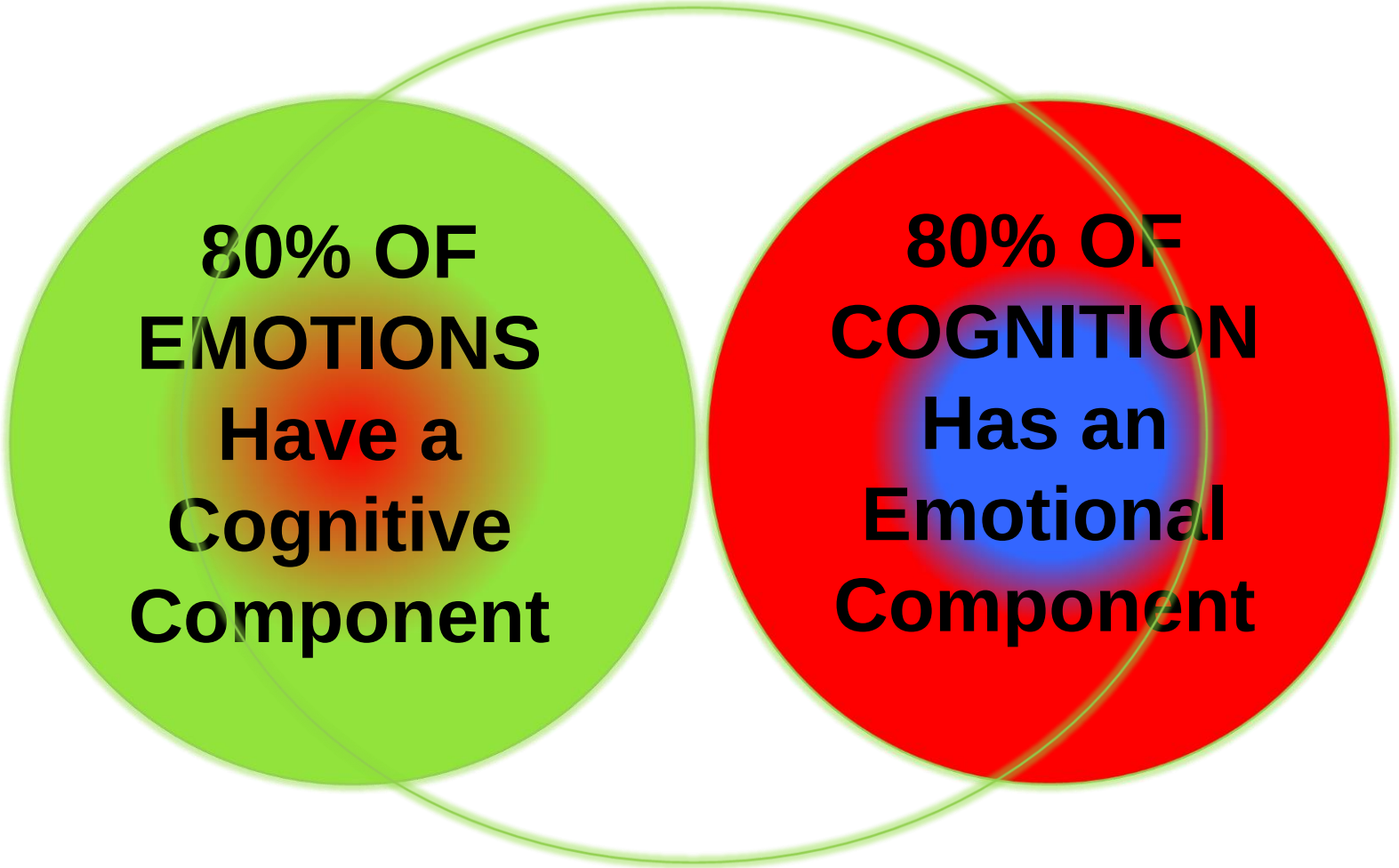
For <u>math</u>: 1) connect to real worl
2) teach estimation and numeracy
3) build working memory skills, 4) build mindset.

Value of Classroom Climate

- Student motivation = 0.48
- Well-managed classroom = 0.52
- **Growth mindset = 0.56**
- Heightened engagement = 0.62
- Situational awareness = 0.71
- Students accept feedback better 0.90
- Appropriate teacher mental set = 1.29
- Teacher "With it-ness" = 1.42

Marzano (2000), Hattie (2009), Langer, (1989) and Nye, et al. (2004) and Flores, Lemons, and McTernan, (2011)

Cognition and Emotions Overlap



Bosse T, Jonker CM, Treur J. (2008) Formalization of Damasio's theory of emotion,feeling and core consciousness. Conscious Cogn. Mar;17(1):94-113

Student Cognition and Behavior

Prefrontal Cortex is Driven by Genetic and Environmental Changes to Develop Executive Function

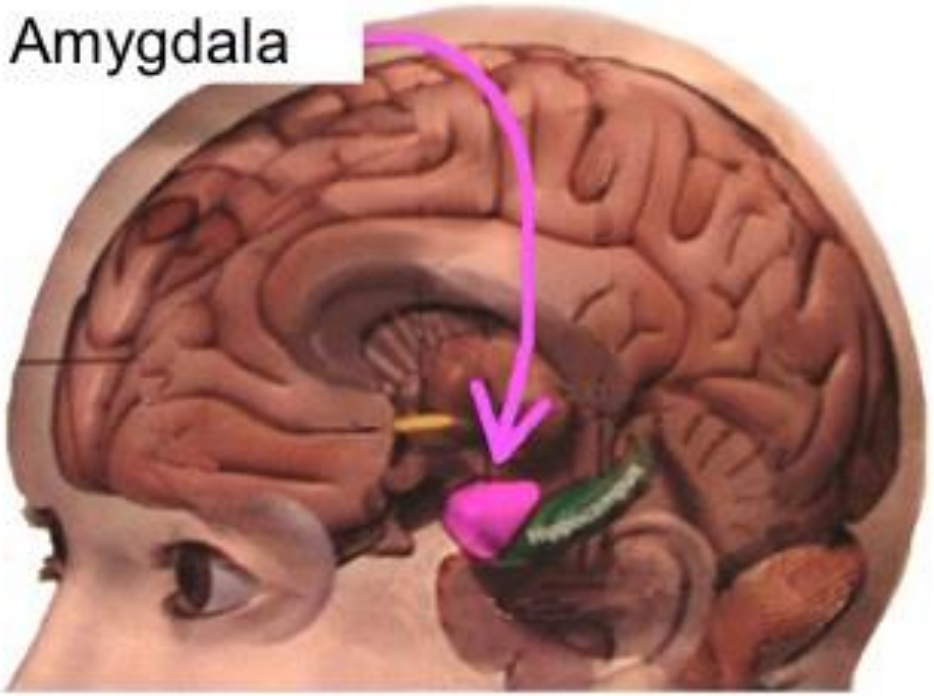
Inhibition
Flexibility
Self-Control
Initiation

Organize
Reasoning
Planning
Judgment

Self-Monitoring
Delayed Gratification
Risk analysis
Reflection

Fight, Flight or Freeze?

Once the amygdala is activated in class, it takes *at least 30 – 90 minutes* to calm down for quality learning.



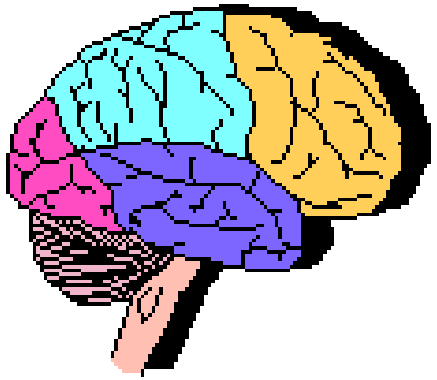
Threats, insults, put-downs and sarcasm activate the amygdala

How Important are "Gaudy Goals" for Your Student's Achievement?

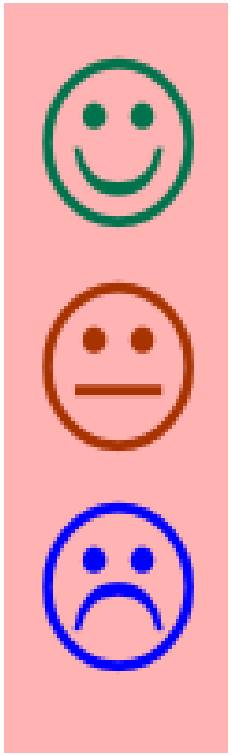
Student expectations are MASSIVE **1.44.** Teacher expectations of student success are a staggering **1.03** effect size. *Raise the bar until you gasp for air!* Stop being afraid to fail. Your staff can feel your fear!

Coe, R. (2002). It's the effect size, stupid: What effect size is and why it is important. Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England.

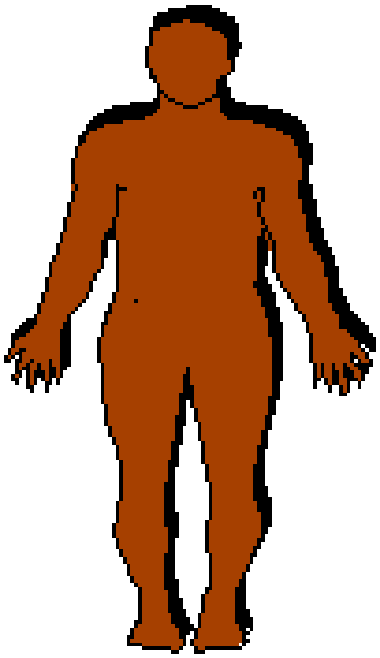
Cognition



Emotions

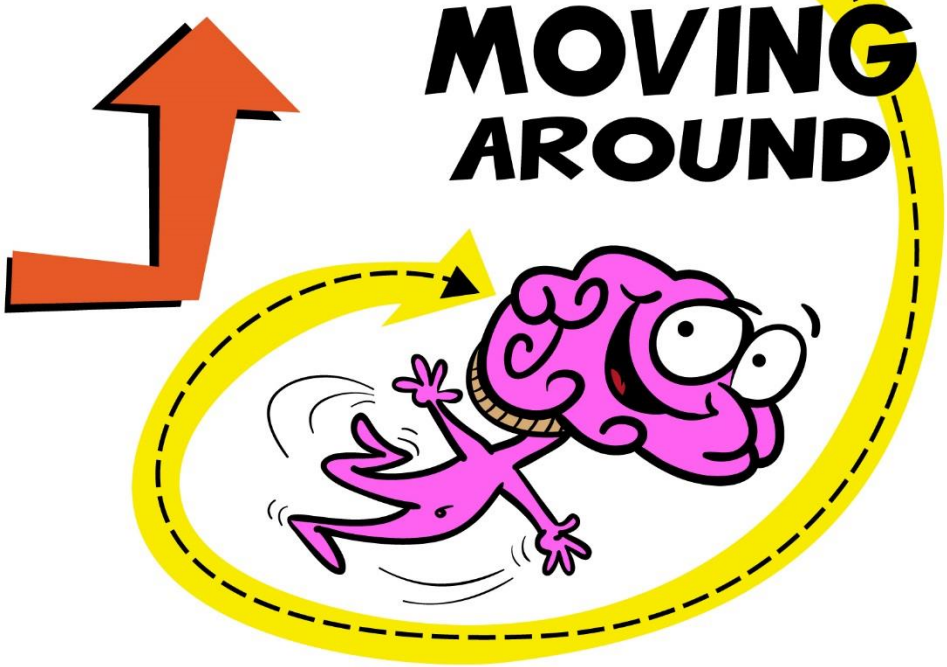


Movement



The separation model is NOT supported by recent brain research

MOVING & MOVING UP MOVING AROUND

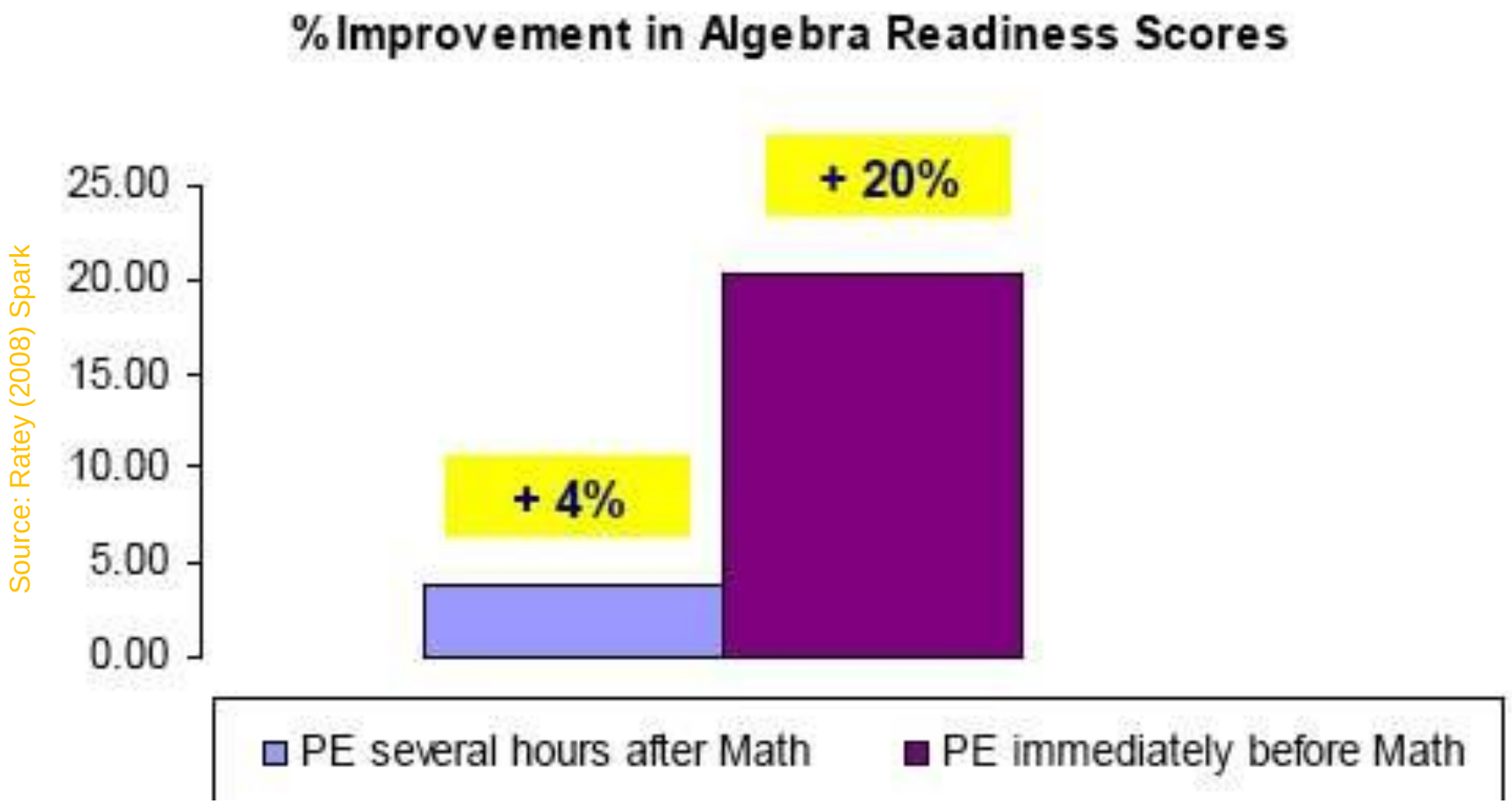


KEEPS THE BRAIN & BODY SOUND

www.jensenlearning.com

Many educators are unaware that early physical activity supports later academic activity.

Maths Scores up after PE Class



Source: Ratey (2008) Spark

How Does Exercise Influence the Student's Brain?

- It triggers BDNF, growth factors (Kesslak et al., 1998)
- Increases brain cell production (van Praag, et al. 1999)
- Upregulates serotonin (mood, attention, memory and neurogenesis) (Chaouloff, 1989)
- Raises heart rate (Krock et al., 1992)
- Increase catecholamines (Gillberg et al., 1986).
- Builds cortical mass (Anderson et al., 2002)
- Enhances cognitive arousal (Saklofske, et al. 1992)

Music as a Tool of Engagement

- Students can be in charge of class music as long as they have your boundaries for it.
- Higher beats per minute increases good stress and energy levels.
- Familiar pop songs can spur memories of being active and having fun.

COGNITIVE SKILL BUILDING

- Cognitive skill building is a way of increasing a students capacity to learn.
- Cognitive skills provide the critical tools necessary for learning.
- Many cognitive skill can be taught but we usually do not address them.
- We can teach processing, attentional focus, self control, working memory, prioritization, ordering/sequencing and deferred gratification.
- Good executive functioning skill are essential to learning and they also can be taught.
- We can do this with teacher directed activities and with computer assisted instruction.
- We have identified programs for all grades that can be used to increase these skills.

Which Factor, (When Tested at Age 5) is a *Far Greater Predictor* of Student Success at Age 11 than IQ?

Alloway, T.P. & Alloway, R. G. (2010)

a) reading scores
b) motivation level
c) math scores
d) attitude
e) working memory

Working Memory is Free, Easy to Build and It's a Teachable Skill

If You Don't Teach It, Don't Punish Kids for Not Being Good At It.

Klingberg T, Fernell E, Olesen P, Johnson M, Gustafsson P, Dahlström K, Gillberg CG, Forssberg H, Westerberg H (2005)

Consequences of Poor Executive Functions in a School Environment

Emotional Difficulties

- Aggression
- Mood Swings
- Depression & Anxiety
- Learned helplessness

Risk Taking Behavior

- Alcohol and Drug Abuse
- Aggression
- Conduct Problems
- Bullying

Compulsive Behaviors

- Alcohol and Drug Abuse
- Preoccupation with Appearance
- Self Mutilation

Inattention / Distractibility

- Poor Academic Performance
- Planning Difficulties
- Test-Taking Difficulties
- AD/HD

Cognitive Skill Building BrainWare Safari

Learning Enhancement Corporation

Cognitive Skills Developed in BrainWare Safari

BrainWare SAFARI

	Ancient Logic and Reasoning	Arrow Point Bridge	Bear Shuffle	Cave Comparisons	Crocodile Recollection	Iguana Lookout	Jumping Jaguar Flash	Jungle Labyrinth	Llama Logic	Memory Mountain	Parroting Colors	Piranha Pass	Rhythm Ribbet	Slithering Symbols	Sky Scanning	Tree Tic Tac Toe	Turtle Recall	Volcanic Patterns	Web Weaving	Whispering Waterfall	
Visual Sustained Attention		X	X		X	X	X	X		X		X	X	X	X	X	X	X	X		Attention Skills
Auditory Sustained Attention													X								
Visual Selective Attention		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X		
Auditory Selective Attention				X									X		X					X	
Divided Attention			X		X	X		X		X	X	X	X			X			X		
Flexible Attention				X	X	X				X	X	X	X		X	X			X		
Visual Discrimination				X	X	X	X			X				X	X			X			Visual Processing Skills
Visual Figure Ground															X			X			
Visual Form Consistency				X					X	X											
Directionality		X		X		X						X				X					
Visual Span		X			X		X							X							
Visual Simultaneous Processing		X		X	X		X			X			X	X				X	X		
Visual Sequential Processing	X	X	X						X				X	X	X						
Visualization		X	X	X	X	X		X		X		X		X	X	X			X	X	
Visual Processing Speed		X	X	X	X	X	X	X		X	X	X	X	X		X		X	X		
Oculomotor Skills						X		X				X			X		X				Sensory Integration
Visual-Motor Integration						X		X					X						X		
Auditory-Motor Integration		X			X					X	X		X		X			X	X	X	
Timing-Rhythm		X			X	X				X	X		X	X					X	X	
Visual-Auditory Integration													X		X						
Auditory Discrimination															X					X	

www.BrainWareforyou.com
877-BRAIN-10 (877-272-4610)

	Ancient Logic and Reasoning	Arrow Point Bridge	Bear Shuffle	Cave Comparisons	Crocodile Recollection	Iguana Lookout	Jumping Jaguar Flash	Jungle Labyrinth	Llama Logic	Memory Mountain	Parroting Colors	Piranha Pass	Rhythm Ribbet	Slithering Symbols	Sky Scanning	Tree Tic Tac Toe	Turtle Recall	Volcanic Patterns	Web Weaving	Whispering Waterfall	
Auditory Sequential Processing															X					X	Auditory Processing
Auditory Processing Speed													X		X					X	
Visual Sensory Short-Term Memory		X	X	X	X		X			X	X	X	X	X		X	X	X	X		Memory Skills
Auditory Sensory Short-Term Memory				X									X		X					X	
Visual Immediate Short-Term Memory		X	X	X	X		X			X	X	X	X	X		X	X	X	X		
Auditory Immediate Short-Term Memory				X									X		X					X	
Working Memory			X	X	X					X			X		X	X			X	X	
Visual Spatial Memory			X	X						X	X	X				X		X	X		
Long-Term Memory																	X				
Visual Sequential Memory		X	X										X	X							
Auditory Sequential Memory													X		X						
Visual Simultaneous Memory		X		X	X		X			X				X				X			
Logic	X								X			X				X					Thinking Skills
Reasoning	X								X			X				X					
Planning								X				X				X					
Problem Solving	X							X	X			X									
Strategic Thinking	X							X	X			X				X					
Visual Thinking	X			X				X	X	X		X				X					
Conceptual Thinking	X								X												
Decision Speed				X				X				X				X					

BrainWare SAFARI

Coach View

Name [redacted]
Total Levels Completed: **168**
Total Number of Days Played: **54**
Days Since Last Attempt: **55**

Date of Report: **3/27/2014 1:22:18 PM**
First Login: **10/18/2013**
Last Attempt: **1/31/2014**
Total Exercise Time*: **20** hours

(•) View Level Attempts ( ) View Level Time

- Level Attempts -

[ ] Include Practice Attempts

Attempts per level

Exercise Name	1	2	3	4	5	6	7
Arrow Point Bridge	1	1	1	1	1	1	2✶
Bear Shuffle	1	1	2	1	2	2	5✶
Cave Comparisons	4	1	3	1	2	2	1✶
Crocodile Recollection	1	2	1	1	1	1	1✶
Iguana Lookout	1	4	6	16	15	8	93✶
Jumping Jaguar Flash	1	1	1	1	7	1	5✶
Jungle Labyrinth	4	2	2	5	11	9	81✶
Memory Mountain	5	1	1	3	4	3	2✶
Parroting Colors	1	3	1	1	2	1	1✶
Piranha Pass	15	6	6	6	5	4	8✶
Rhythm Ribbet	3	1	1	4	4	1	79✶
Sky Scanning	1	1	1	1	1	1	1✶
Slithering Symbols	3	2	1	1	1	1	1✶
Tree Tic Tac Toe	1	6	2	12	1	4	1✶
Turtle Recall	4	2	10	10	2	22	11✶
Volcanic Patterns	1	1	1	1	1	1	1✶
Web Weaving	1	1	1	1	1	1	2✶
Whispering Waterfall	4	1	1	2	1	1	3✶

Attempts per level

Exercise Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Ancient Logic and Reasoning	2■	2■	1▶	2■	2■	2■	2■	2▶	1▶	1▶	1▶	2■	2▶	2■	2▶	1▶	2■	2■	2▶	2▶	2■
Llama Logic	2■	1▶	1▶	2■	2■	2■	2■	2▶	1▶	2■	2■	2■	2■	2■	2■	2▶	1▶	2■	1▶	2▶	1✶

Legend: ▶ = Level Success | ■ = Level Fail | ✶ = Exercise Complete | *Total Time includes practice attempts.

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History

104768

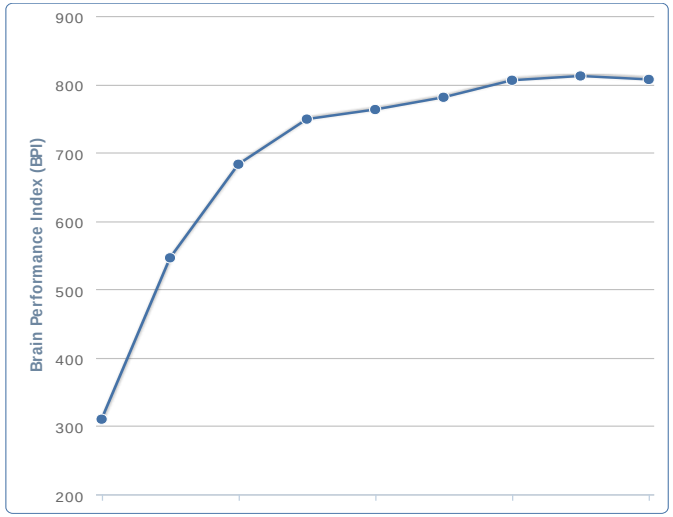
OVERALL BPI 812

LUMOSITY POINTS 0 0 5 7 3

Overall
Speed
Memory
Attention
Flexibility
Problem Solving

Your Overall BPI History

last 10 games last 50 games **weekly average**



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History

104768

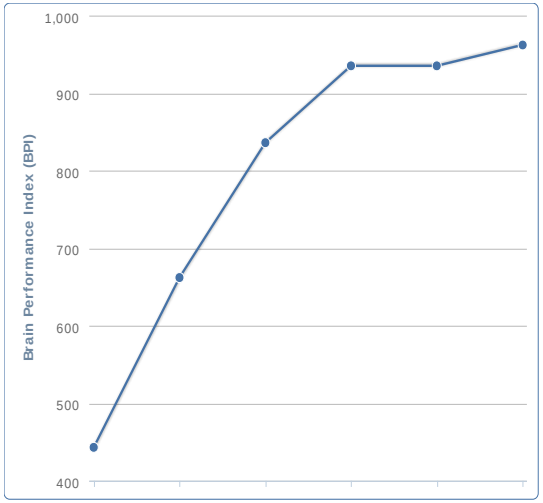
OVERALL BPI 812

LUMOSITY POINTS 0 0 5 7 3

Overall
Speed
Memory
Memory Matrix 2
Memory Matrix
Mobile: iPad
Memory Match
Monster Garden
Face Memory
Workout
Pinball Recall
Follow That Frog
Pinball Recall
Mobile: iPad
Attention
Flexibility
Problem Solving

Your Memory BPI History

last 10 games last 50 games **weekly average**



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OVERALL BPI 812

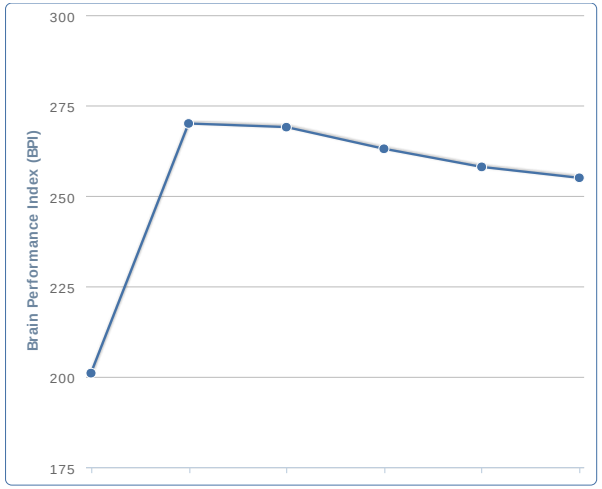
LUMOSITY POINTS 0 0 5 7 3

History

Overall
Speed
Memory
Attention
Flexibility
Problem Solving
Raindrops Mobile: iPad
Chalkboard Challenge Mobile: iPad

Your Problem Solving BPI History

last 10 games last 50 games **weekly average**



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104768

OVERALL BPI 812

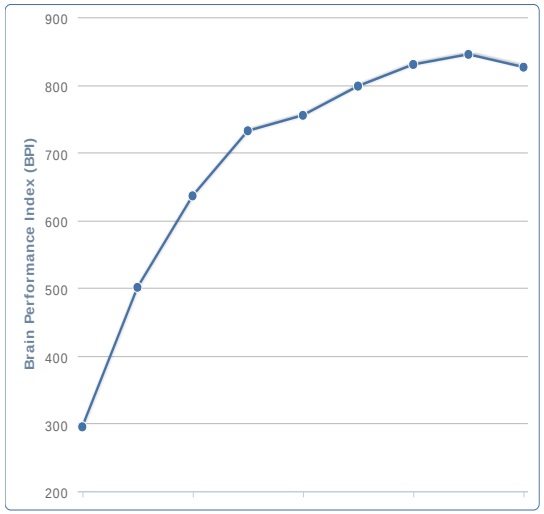
LUMOSITY POINTS 0 0 5 7 3

History

Overall
Speed
Memory
Attention
Lost in Migration 2
Lost in Migration
Mobile: iPad
Flexibility
Problem Solving

Your Attention BPI History

last 10 games last 50 games weekly average



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History

104768

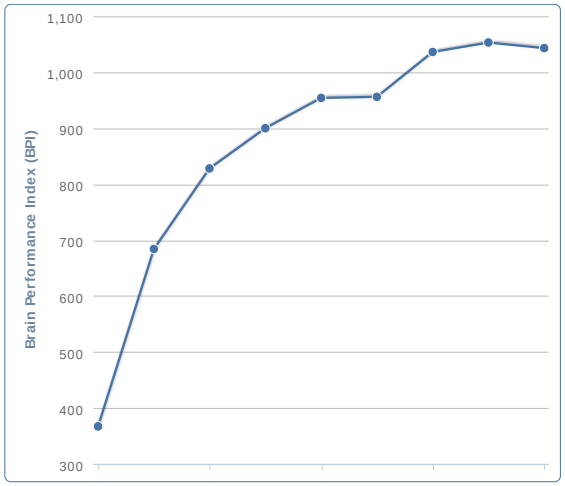
OVERALL BPI 812

LUMOSITY POINTS 0 0 5 7 3

Overall
Speed
Memory
Attention
Flexibility
Disillusion
Brain Shift 2
Ebb and Flow
Brain Shift Mobile: iPad
Color Match 2
Color Match
Mobile: iPad
Problem Solving

Your Flexibility BPI History

last 10 games last 50 games **weekly average**



"High Return" Achievement Factors

(my personal favorites)

1. Student en_____
2. Instructional Climate w/ h____ and gr___ min_____
3. Feedback (ongoing, formative and summative) w/ 3-1 ratio
4. R_____ (multi-level)
5. Cognitive Sk _____ Buil_____

- ***To succeed, our teachers need to believe…***

  1) ALL (100%) kids can learn, grow and change because…

  2) The human brain is designed to adapt from experience, and…

  3) To change kid's brains, teachers must FIRST change their teaching

Keep it Urgent!

You only get about 25 hours per week, for 36 weeks a year with kids. That means you can't afford to waste critical time with your kids bored, distressed, angry or failing. You can't afford to diminish a dream or put anyone down. At best, you'll get 900 hours (15%) per year (of their 5,800 waking hours). *You will see results if you use every minute you have!*

ERIC JENSEN

ENGAGING STUDENTS WITH poverty IN MIND

PRACTICAL STRATEGIES
FOR RAISING ACHIEVEMENT

Eric Jensen & Carole Snider

TURNAROUND TOOLS ★ FOR THE ★ TEENAGE BRAIN

Helping Underperforming Students
Become Lifelong Learners