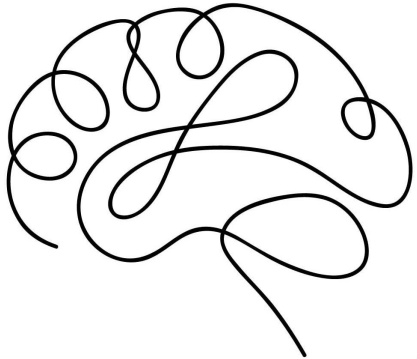
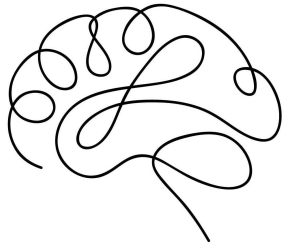
BRAIN HEALTH AND EDUCATION



WMS Community Workshop
March 11, 2021

Biography

- BA, *Biological Basis of Behavior*, UPenn
- EdM, *Mind, Brain, and Education*, Harvard
- Program design at Scholastic, Pearson, HMS
- Co-founder of Gweela, an ed-tech startup
- Second year parent at WMS




Jenny
Daniel
Eleanor

Agenda

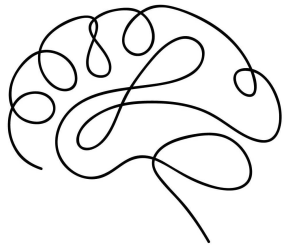
Brain Basics

Common Myths

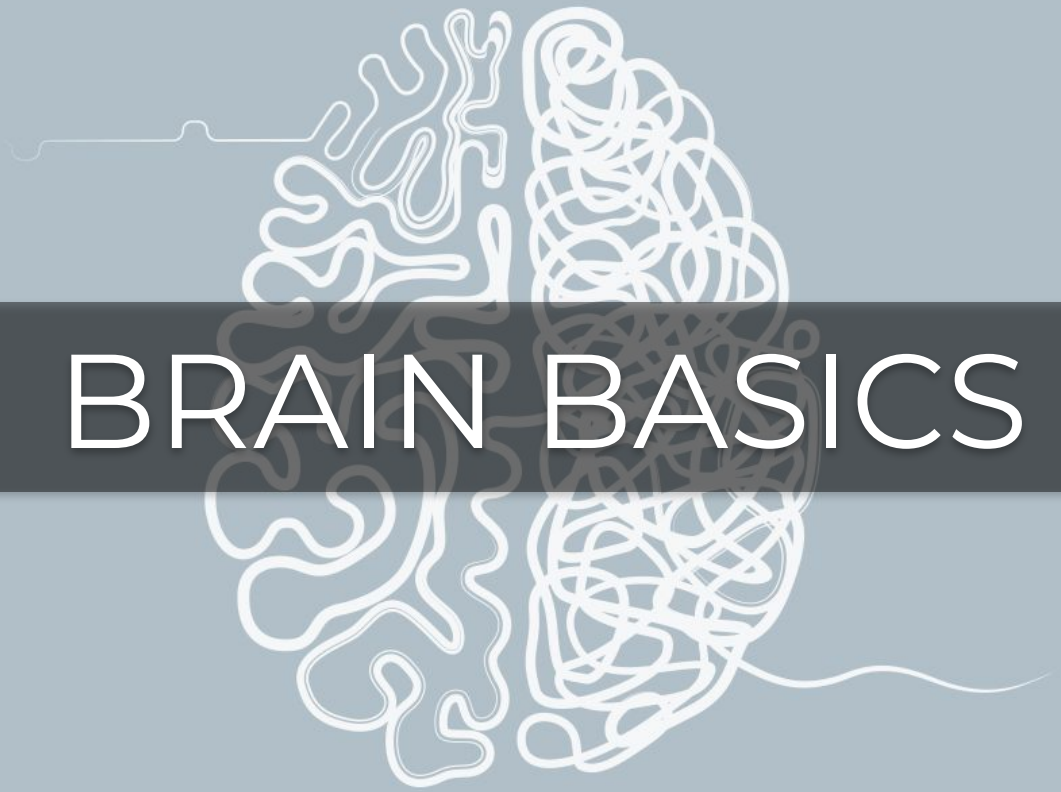
How We Learn

Healthy Brains

Q&A



BRAIN BASICS



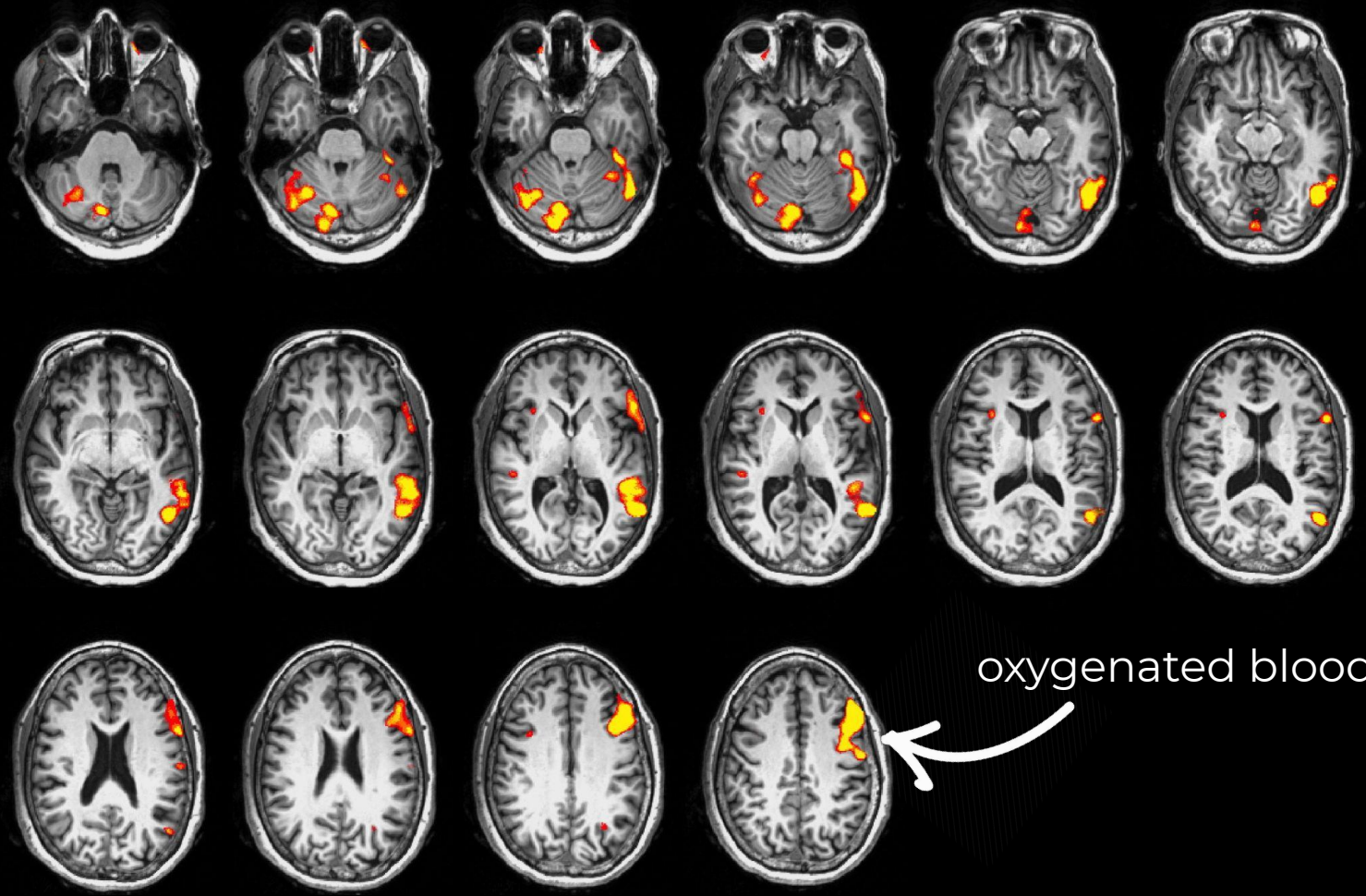
A Mystery, Still

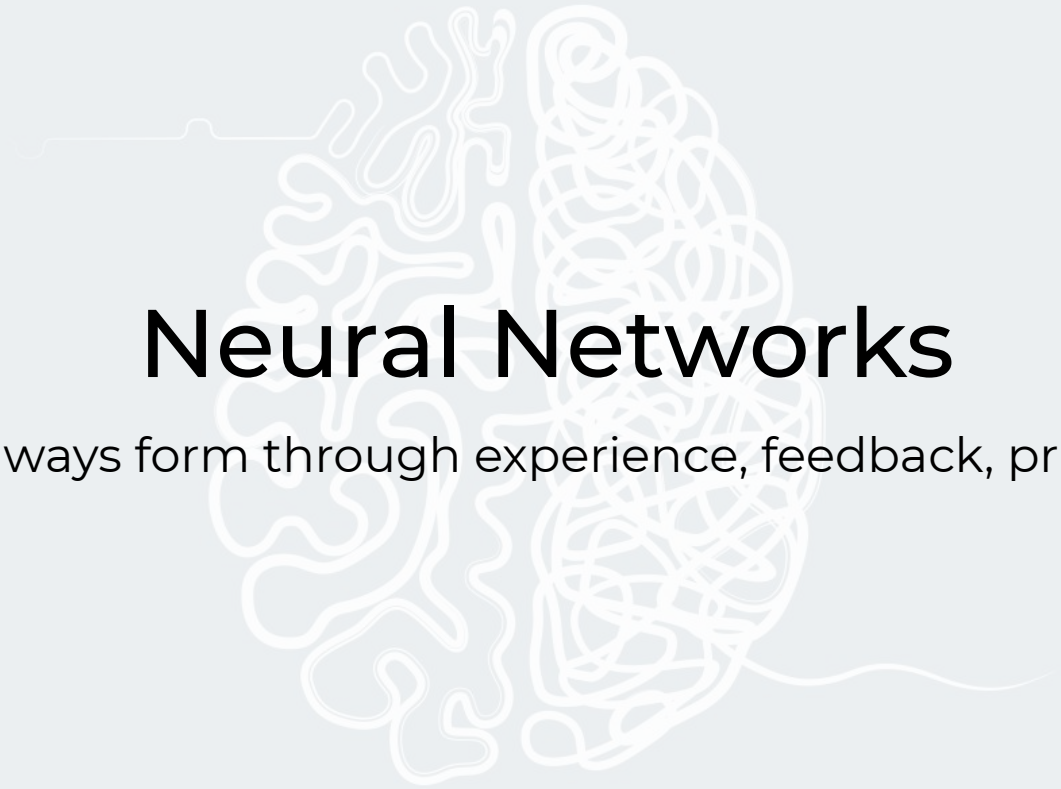
Despite tremendous advancement, there’s still a lot we don’t know

Research and Imaging

We learn about the brain through evolving research methods


functional
magnetic
resonance
imaging
(fMRI)


oxygenated blood flow



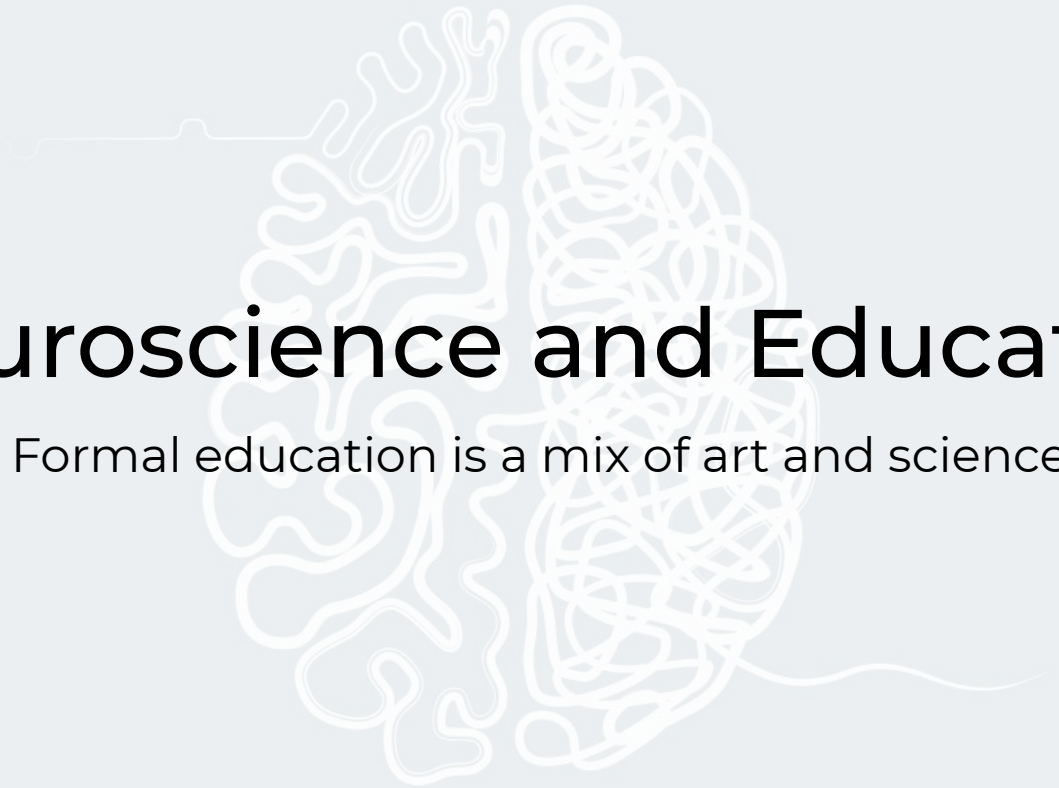
Neural Networks

Pathways form through experience, feedback, pruning


reinforced pathway
novel pathway

Child Development

Neuroplasticity is especially dynamic in early childhood



Neuroscience and Education

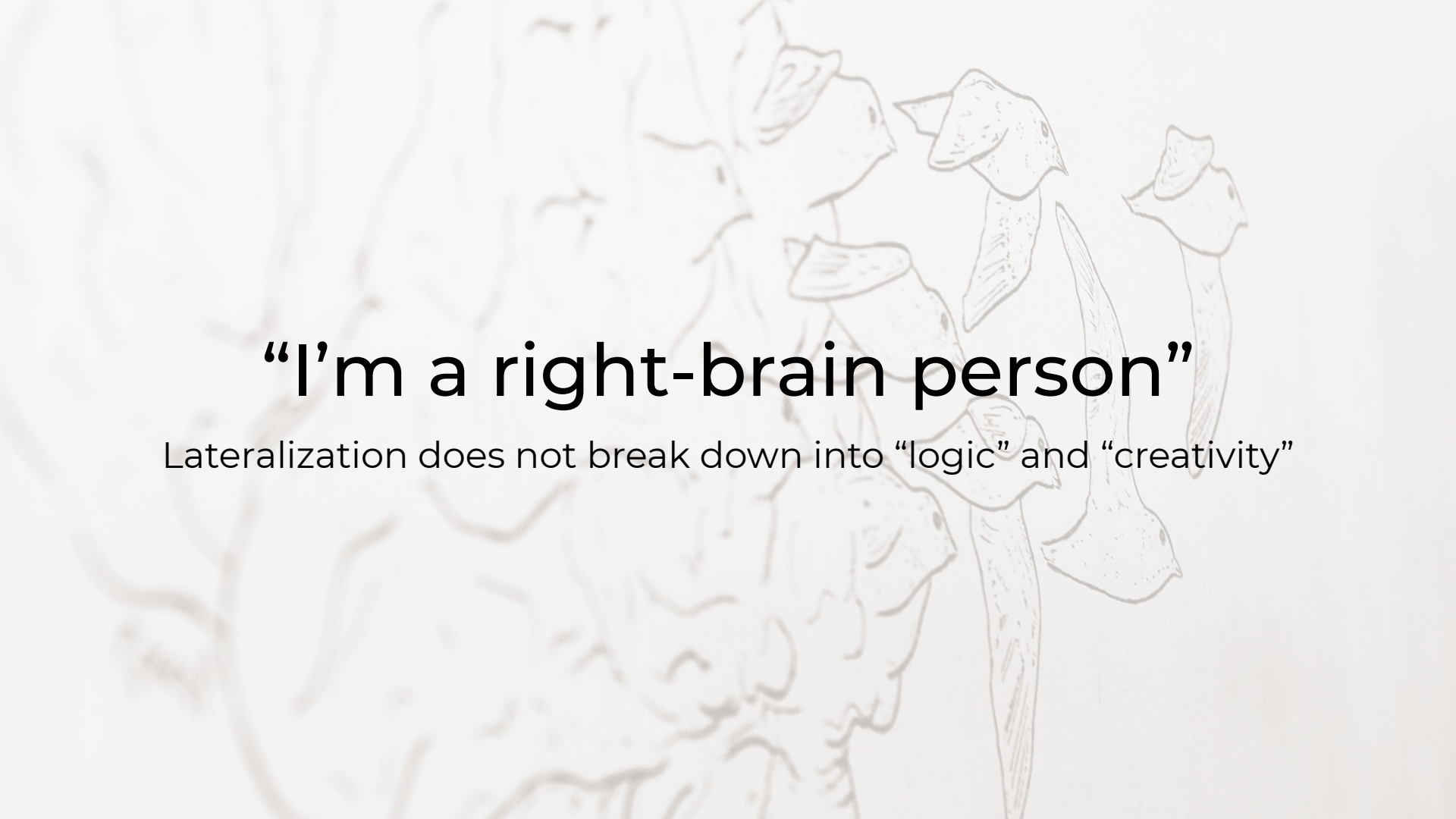
Formal education is a mix of art and science

The brain is a black box. What we do know about how neural networks form, consolidate, and adapt, gives us some insight into how people learn; however, applications are in constant flux.

COMMON MYTHS

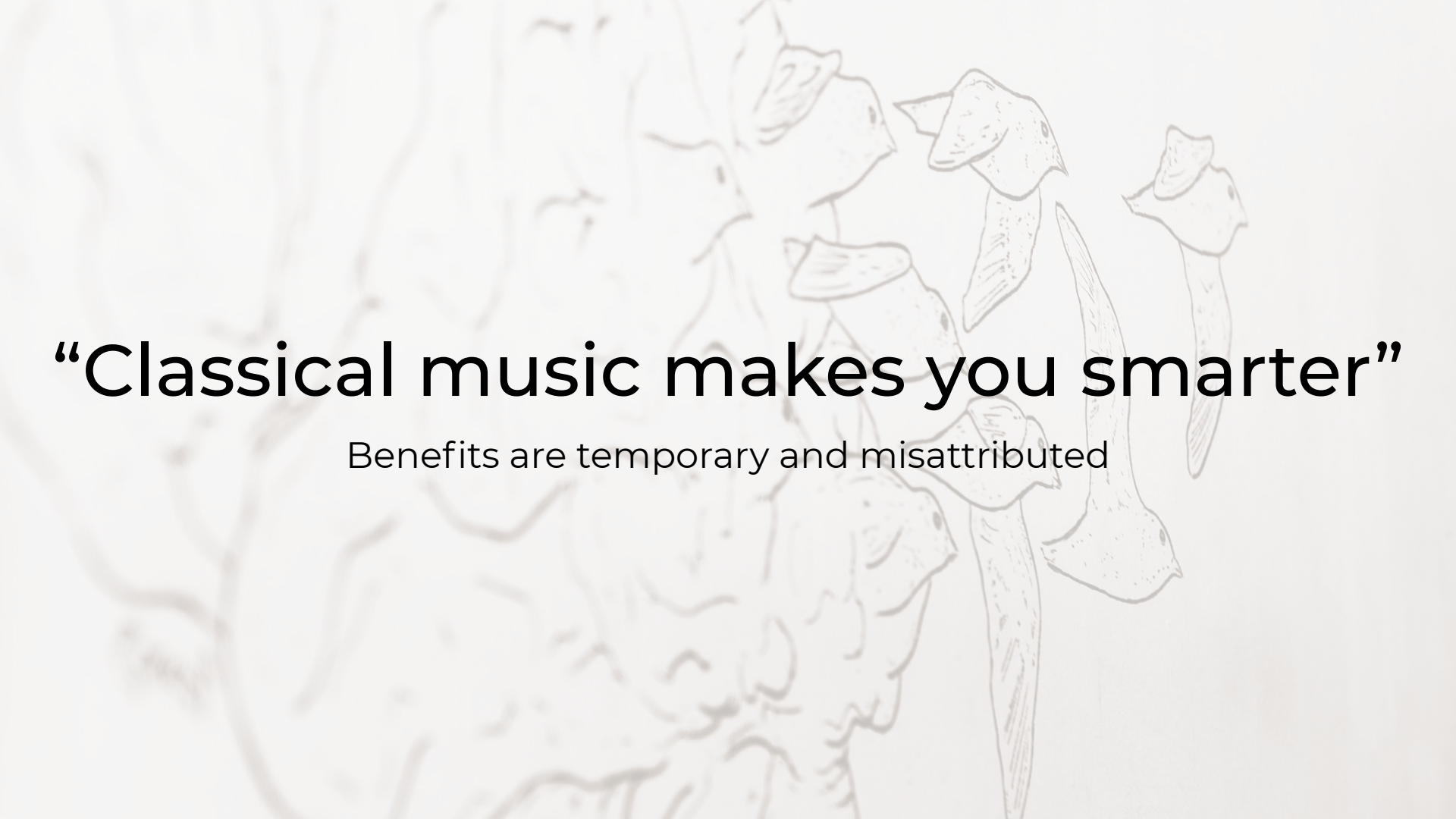
“We only use 10% of our brain”

A healthy person uses all of his/her brain, not part



“I’m a right-brain person”

Lateralization does not break down into “logic” and “creativity”

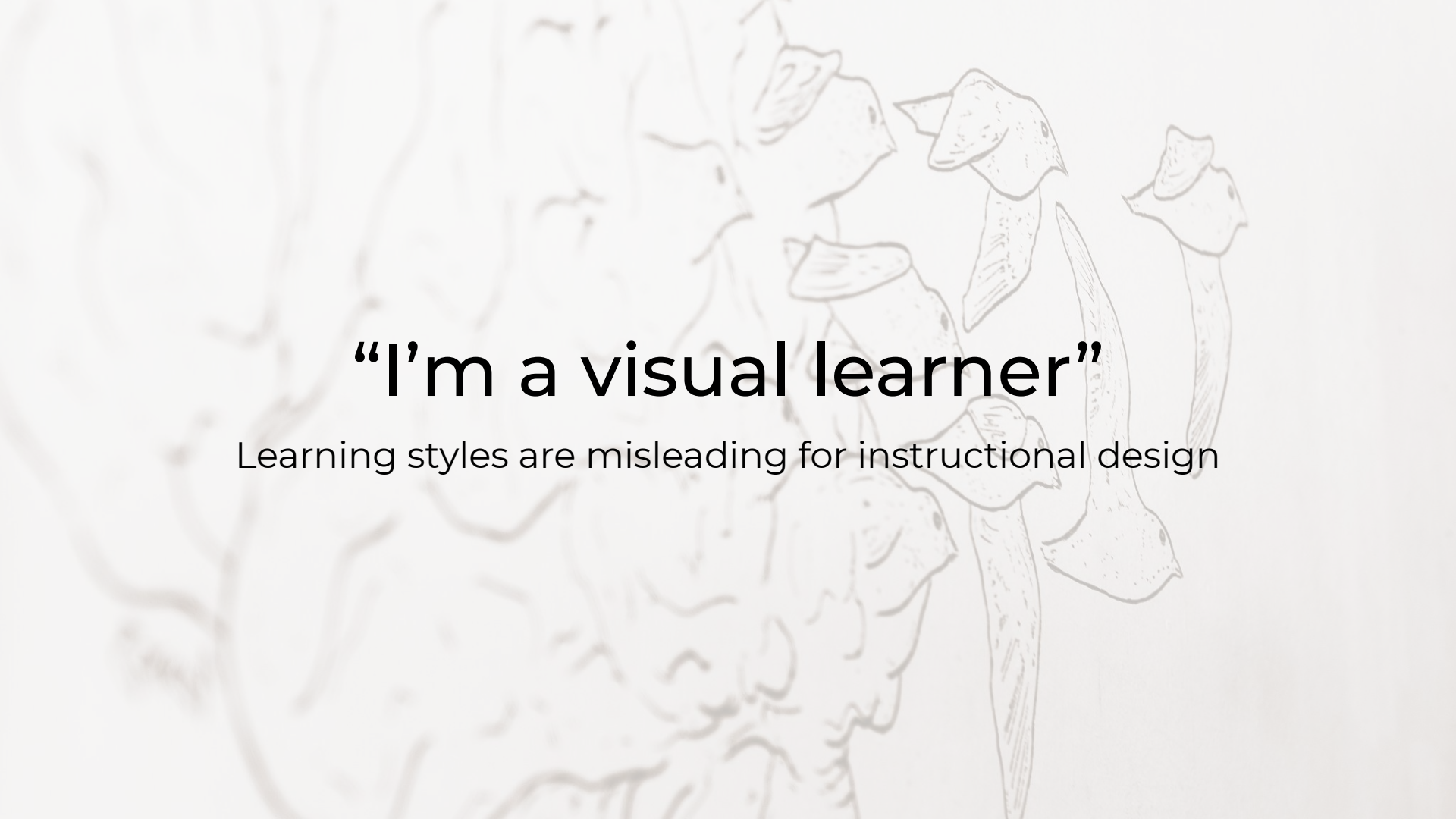


“Classical music makes you smarter”

Benefits are temporary and misattributed

“Languages have to be learned early”

Neuroplasticity is ongoing and expansive



“I’m a visual learner”

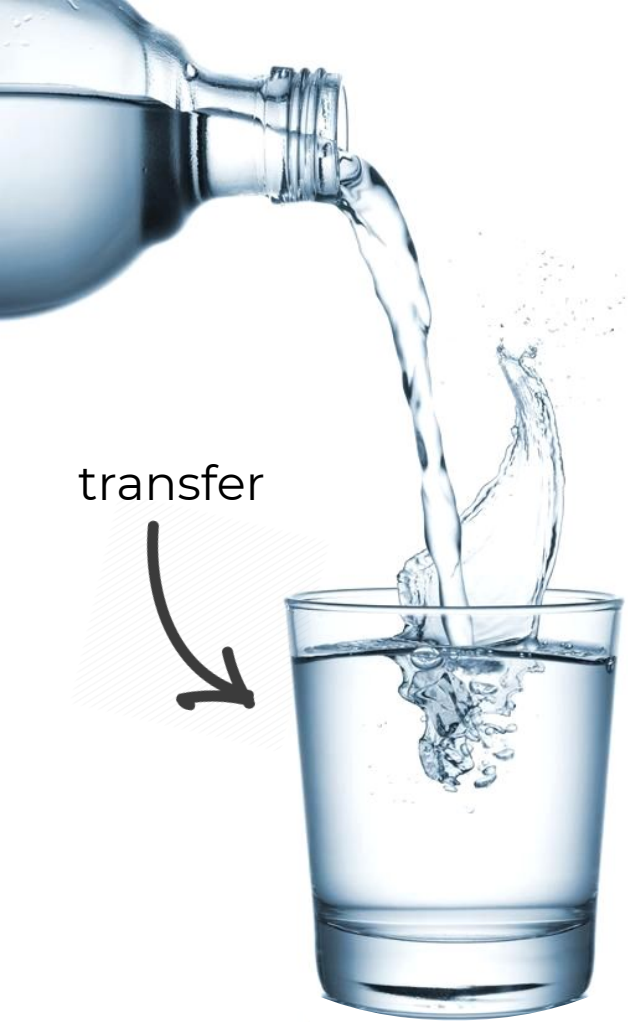
Learning styles are misleading for instructional design

Myths about the brain come from overgeneralizations and misapplications of neuroscience research. They are mostly harmless but also unreliable for parenting and instructional design decisions.


HOW WE LEARN

Knowledge is Constructed

We don’t receive knowledge passively, we built it actively


transfer


construction

Here is an essential principle of education: to teach details is to bring confusion; to establish the relationship between things is to bring knowledge.

– Maria Montessori

Progress is Dynamic

Skill development is not linear; it goes up and down

Intelligence is Diverse

Everyone’s brain is different

Online Learning is Limited

Online instruction is a piece of the puzzle, not the whole thing


HEALTHY BRAINS

Action is Oxygen

Exercise and play prime us for learning and regulate stress

Struggling Is Okay

Struggling is part of learning and building something new

Boredom is Beneficial

“Mind wandering” is beneficial for executive function, creativity

Screen Time is Junk Food

They replace healthier choices; however, not all screens are the same

Socializing is a Salad

Live, real, social interactions are the ultimate brain test

The research suggests learning is constructed, not delivered.
As a result, a brain-based education should be inclusive of multiple intelligences, welcoming of resistance, gracious to wavering performance, physical and active, and free to wander and explore.

Thank You

Laureen Ng and Emily Irwin
WMS Faculty and Administration
WMS Parent Education Committee

APPENDICES

The Universal Design for Learning Guidelines

CAST | Until learning has no limits

	Provide multiple means of **Engagement**  Affective Networks The "WHY" of Learning	Provide multiple means of **Representation**  Recognition Networks The "WHAT" of Learning	Provide multiple means of **Action & Expression**  Strategic Networks The "HOW" of Learning
Access	Provide options for **Recruiting Interest** (7) • Optimize individual choice and autonomy (7.1) • Optimize relevance, value, and authenticity (7.2) • Minimize threats and distractions (7.3)	Provide options for **Perception** (1) • Offer ways of customizing the display of information (1.1) • Offer alternatives for auditory information (1.2) • Offer alternatives for visual information (1.3)	Provide options for **Physical Action** (4) • Vary the methods for response and navigation (4.1) • Optimize access to tools and assistive technologies (4.2)
Build	Provide options for **Sustaining Effort & Persistence** (8) • Heighten salience of goals and objectives (8.1) • Vary demands and resources to optimize challenge (8.2) • Foster collaboration and community (8.3) • Increase mastery-oriented feedback (8.4)	Provide options for **Language & Symbols** (2) • Clarify vocabulary and symbols (2.1) • Clarify syntax and structure (2.2) • Support decoding of text, mathematical notation, and symbols (2.3) • Promote understanding across languages (2.4) • Illustrate through multiple media (2.5)	Provide options for **Expression & Communication** (5) • Use multiple media for communication (5.1) • Use multiple tools for construction and composition (5.2) • Build fluencies with graduated levels of support for practice and performance (5.3)
Internalize	Provide options for **Self Regulation** (9) • Promote expectations and beliefs that optimize motivation (9.1) • Facilitate personal coping skills and strategies (9.2) • Develop self-assessment and reflection (9.3)	Provide options for **Comprehension** (3) • Activate or supply background knowledge (3.1) • Highlight patterns, critical features, big ideas, and relationships (3.2) • Guide information processing and visualization (3.3) • Maximize transfer and generalization (3.4)	Provide options for **Executive Functions** (6) • Guide appropriate goal-setting (6.1) • Support planning and strategy development (6.2) • Facilitate managing information and resources (6.3) • Enhance capacity for monitoring progress (6.4)
Goal	**Expert learners** who are...		
	Purposeful & Motivated	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

SUGGESTED SCREEN TIME USE BY AGE

18 MONTHS AND YOUNGER

Avoid use of screen media other than video-chatting.

18 - 24 MONTHS

Parents of children 18 to 24 months of age who want to introduce digital media should choose high-quality programming, and watch it with their children to help them understand what they're seeing.

2 - 5 YEARS

Limit screen use to 1 hour per day of high-quality programs. Parents should co-view media with children to help them understand what they are seeing and apply it to the world around them.

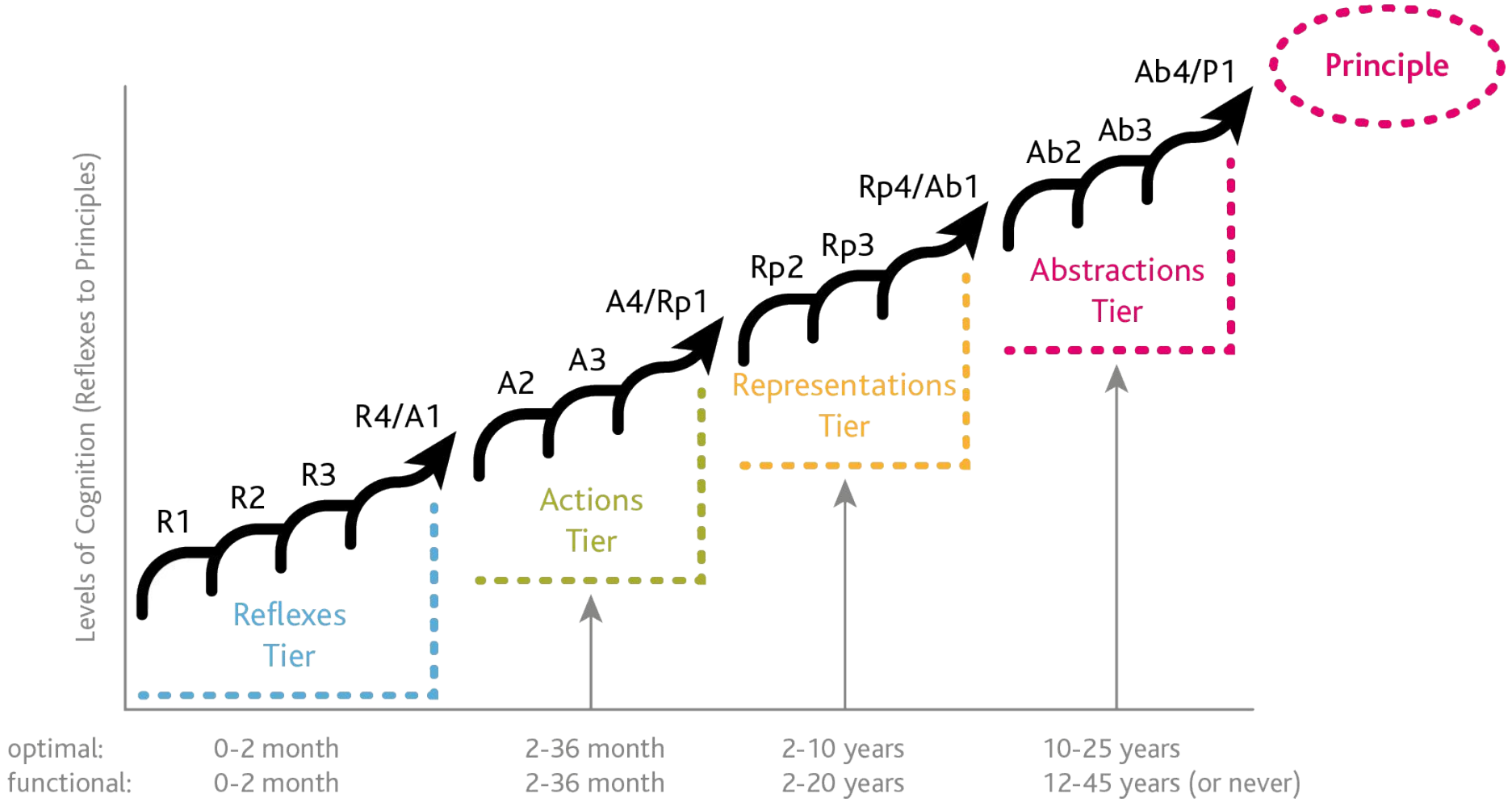
6 - 12 YEARS

Place consistent limits on the time spent using media, and the types of media, and make sure media does not take the place of adequate sleep, physical activity and other behaviors essential to health.

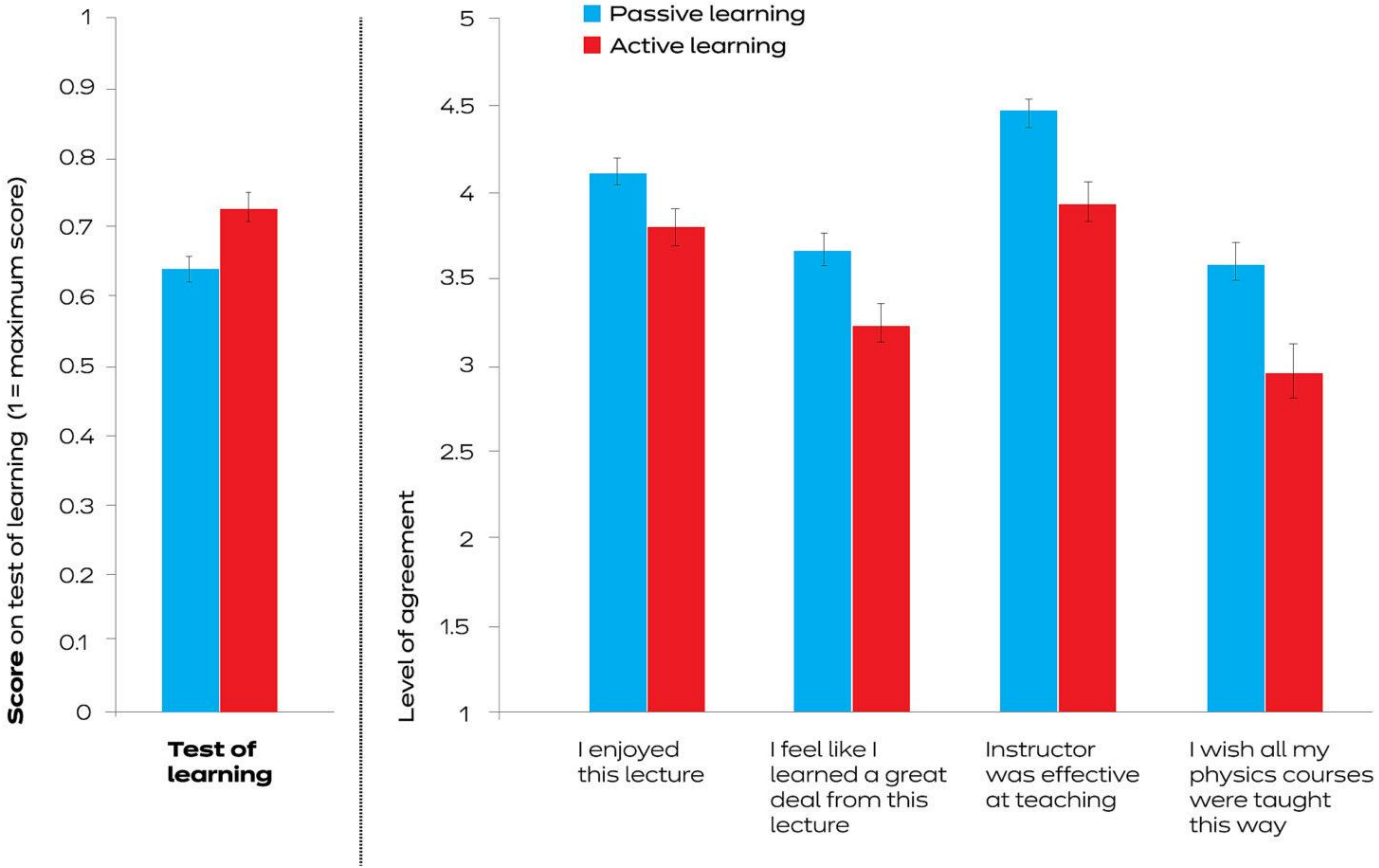
12 YEARS AND OLDER

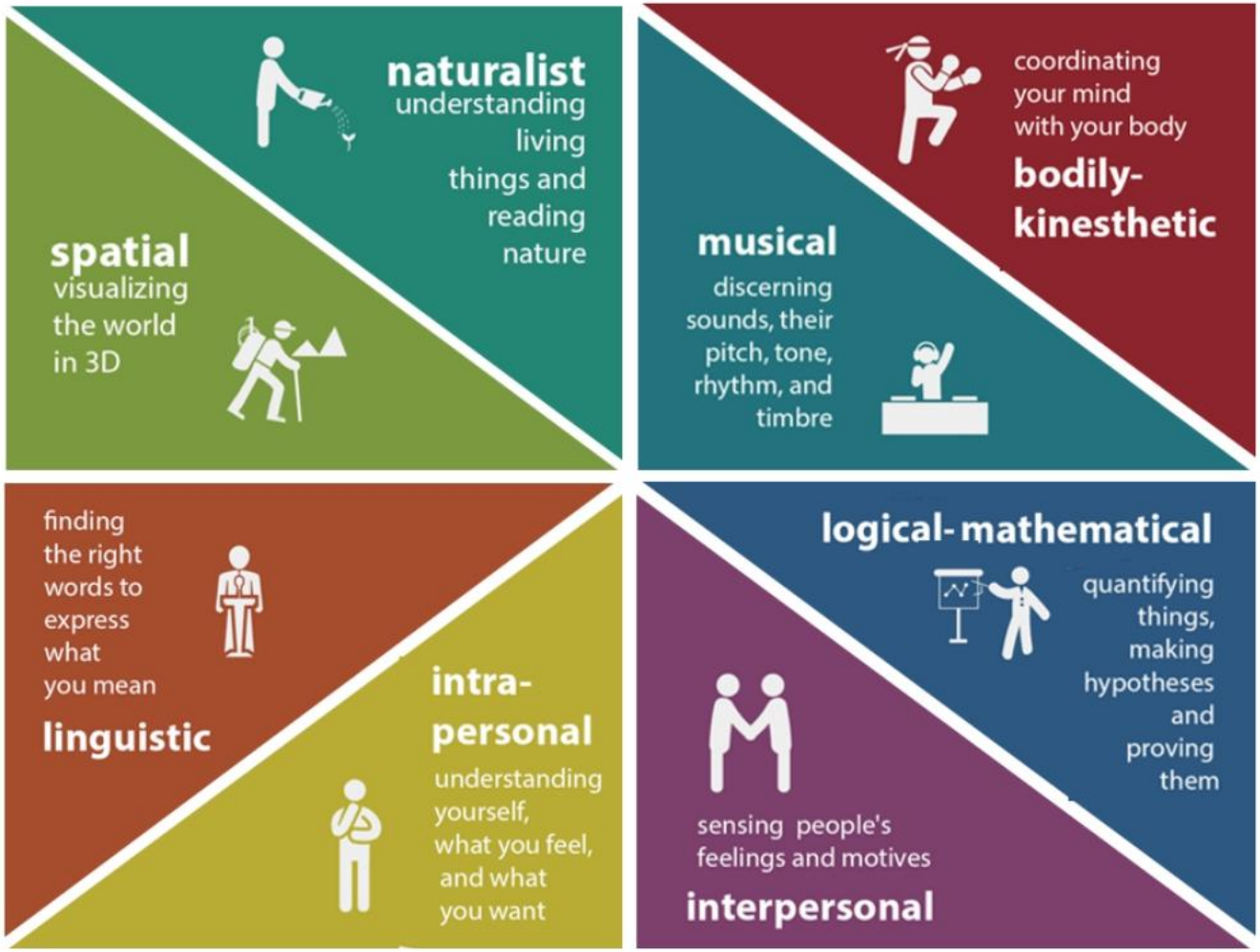
Designate media-free times together, such as dinner or driving, as well as media-free locations at home, such as bedrooms.

Source: American Academy of Pediatrics


Principle
Ab4/P1
Ab3
Ab2
Abstractions Tier
Rp4/Ab1
Rp3
Rp2
Representations Tier
A4/Rp1
A3
A2
Actions Tier
R4/A1
R3
R2
R1
Reflexes Tier
Levels of Cognition (Reflexes to Principles)
optimal: 0-2 month 2-36 month 2-10 years 10-25 years
functional: 0-2 month 2-36 month 2-20 years 12-45 years (or never)

Performance vs. perception




naturalist
understanding living things and reading nature
spatial
visualizing the world in 3D
coordinating your mind with your body
bodily-kinesthetic
musical
discerning sounds, their pitch, tone, rhythm, and timbre
finding the right words to express what you mean
linguistic
intra-personal
understanding yourself, what you feel, and what you want
logical-mathematical
quantifying things, making hypotheses and proving them
sensing people's feelings and motives
interpersonal

Brain Health and Education
Woodinville Montessori | Community Education | March 11, 2021

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