

Measuring What Matters

Capturing Montessori Outcomes



NATIONAL CENTER for
MONTESSORI in the PUBLIC SECTOR

What we'll Discuss

1. What's Going on with Testing and Montessori?

- ✱ Measuring what Counts — at least currently

2. What are Montessori Students Actually Learning?

- ✱ Executive Functions

- ✱ Deep Literacy

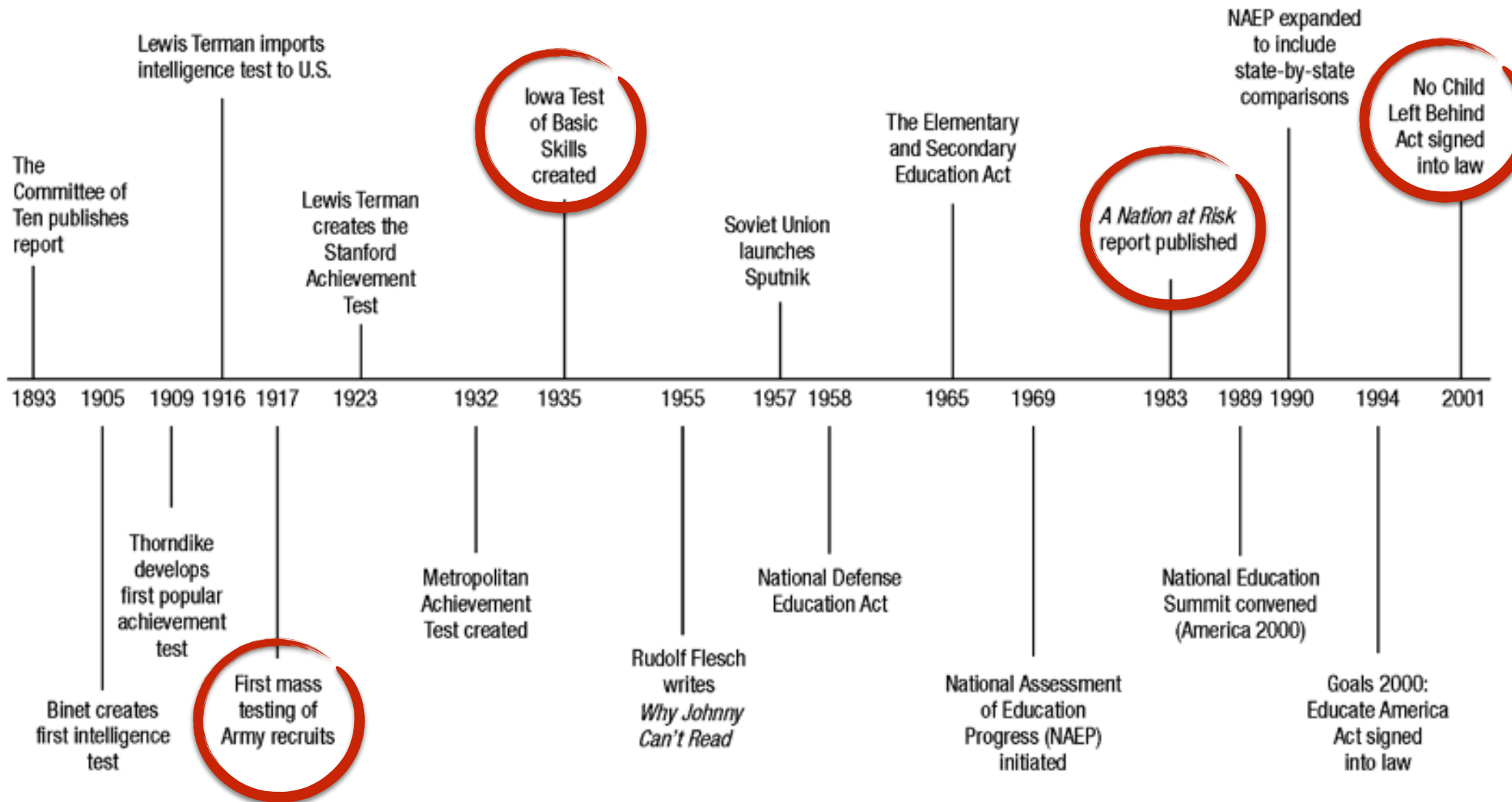
- ✱ Social Fluency and Emotional Flexibility

3. How do we Measure What Matters?

Outcomes that Count

- Performance on Standardized Tests
 - Reading, Math, Writing, *and sometimes* Science
- Attendance and Retention
- School Matriculation after Montessori

How did we get Here?



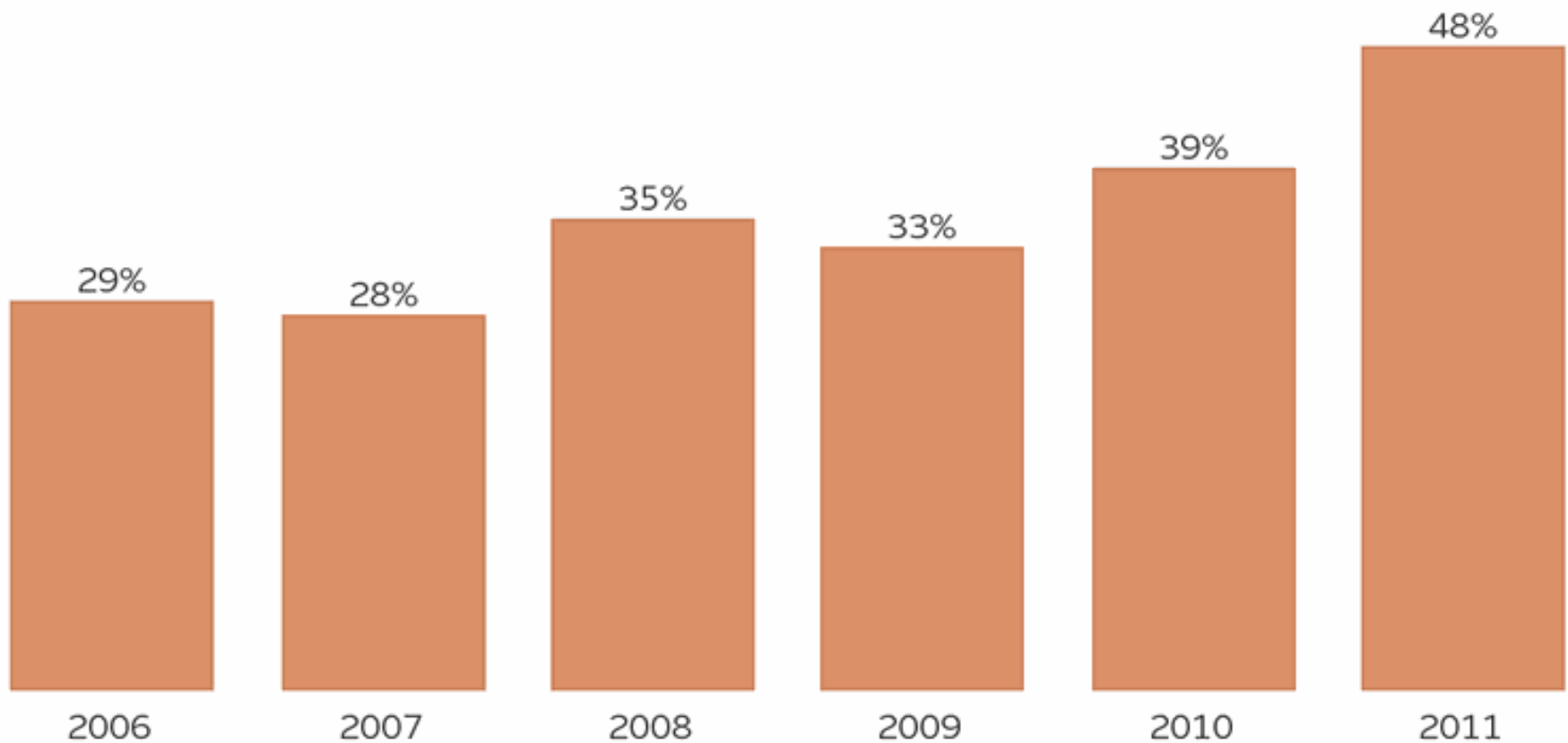
What's Going on with the **Test**?

Who has mastered it?

Who has not?

What can we do to move the latter group into
the former?

Adequate Yearly Progress



Source: Center on Education Policy,



Proficiency



Growth

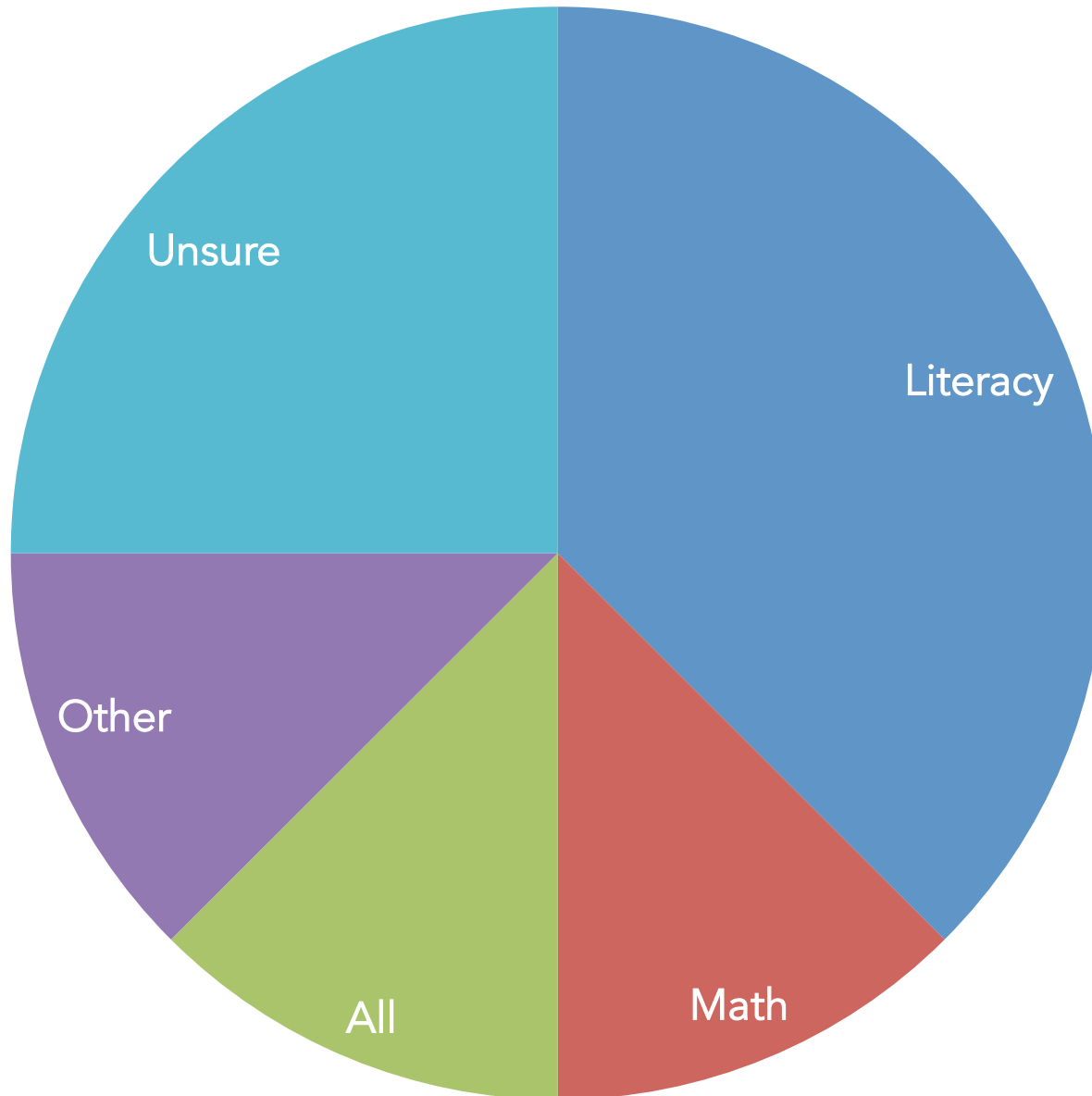
Common Assessments

NWEA MAP	DIBELS	DRA	STAR	AIMS WEB	PARCC	SBAC	STATE TESTS*	OTHER
							Canada Indiana Iowa MA Missouri SAGE (Utah) TN Ready	ACT CAASP <i>Fountas & Pinnell</i> Benchmark Fundamental Skills Assessment Reading Inventory I-Ready Math Lab MAT QCA WRAT

Types of Assessments

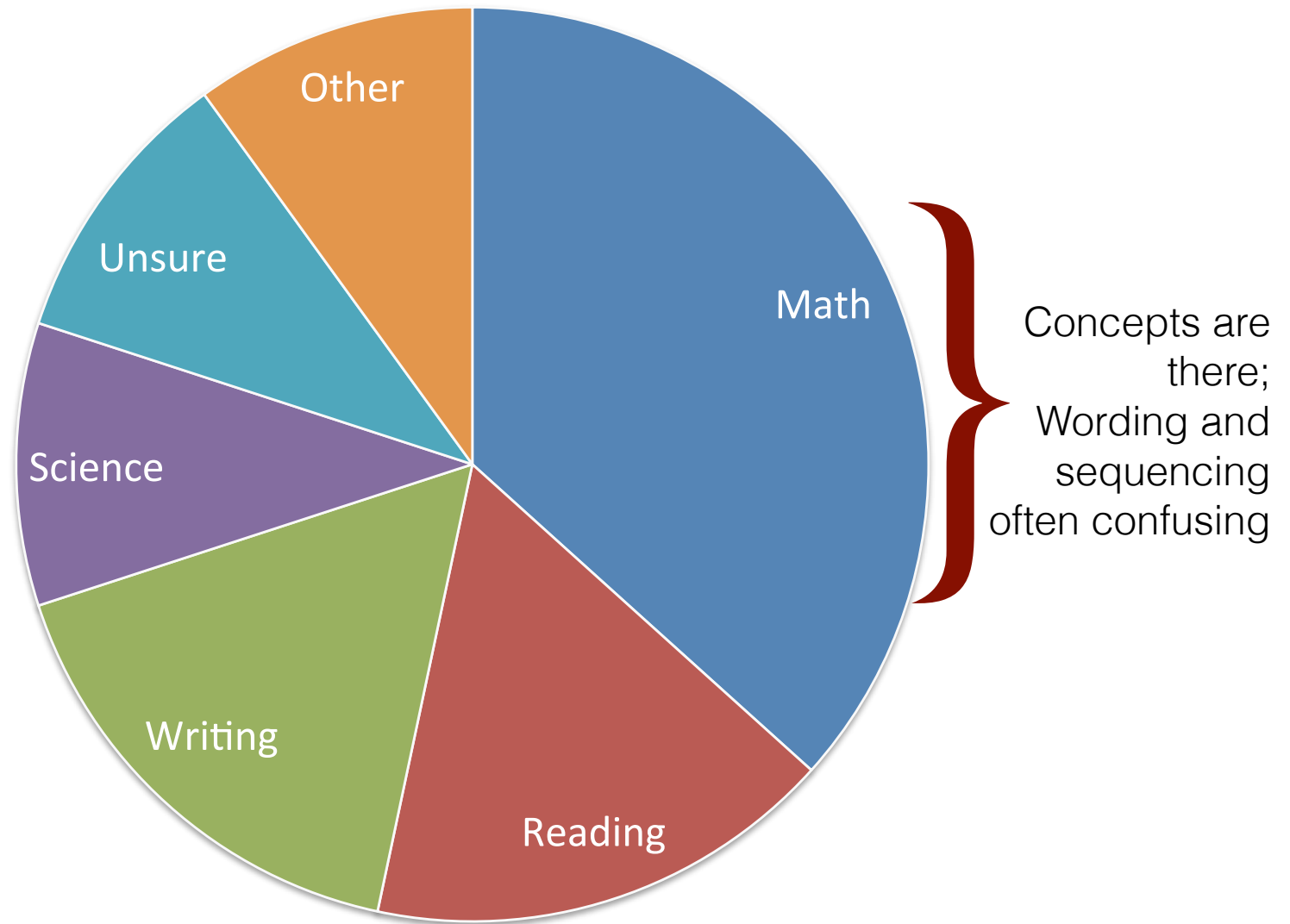
Type	Purpose	Examples	Assumptions
Universal Screens	<ul style="list-style-type: none"> Diagnostic Baseline Measurement 	<ul style="list-style-type: none"> Parent Questionnaires PPVT 	Baseline knowledge will support instruction for all
Formative/Generative	<ul style="list-style-type: none"> Diagnostic Generate knowledge to support improved subsequent performance 	<ul style="list-style-type: none"> Self-correcting materials Targeted Observation Conferences Critique/Feedback on work Progress Reports DRA/DIBELS* 	Feedback will help improve performance
Interim/Benchmark	Predict performance on Summative Assessment	<ul style="list-style-type: none"> MAP, Star District Benchmarks 	Identified learning “gaps” can be filled
Summative	Determine proficiency levels	<ul style="list-style-type: none"> PARCC, SBAC, State Final Exams/ Presentations 	Documenting performance is necessary for accountability

Best Performance



Other includes: Social & Emotional Learning. Science, Social Studies

Worst Performance



Other includes: Social Studies, All

Outcomes that Matter

Conversation

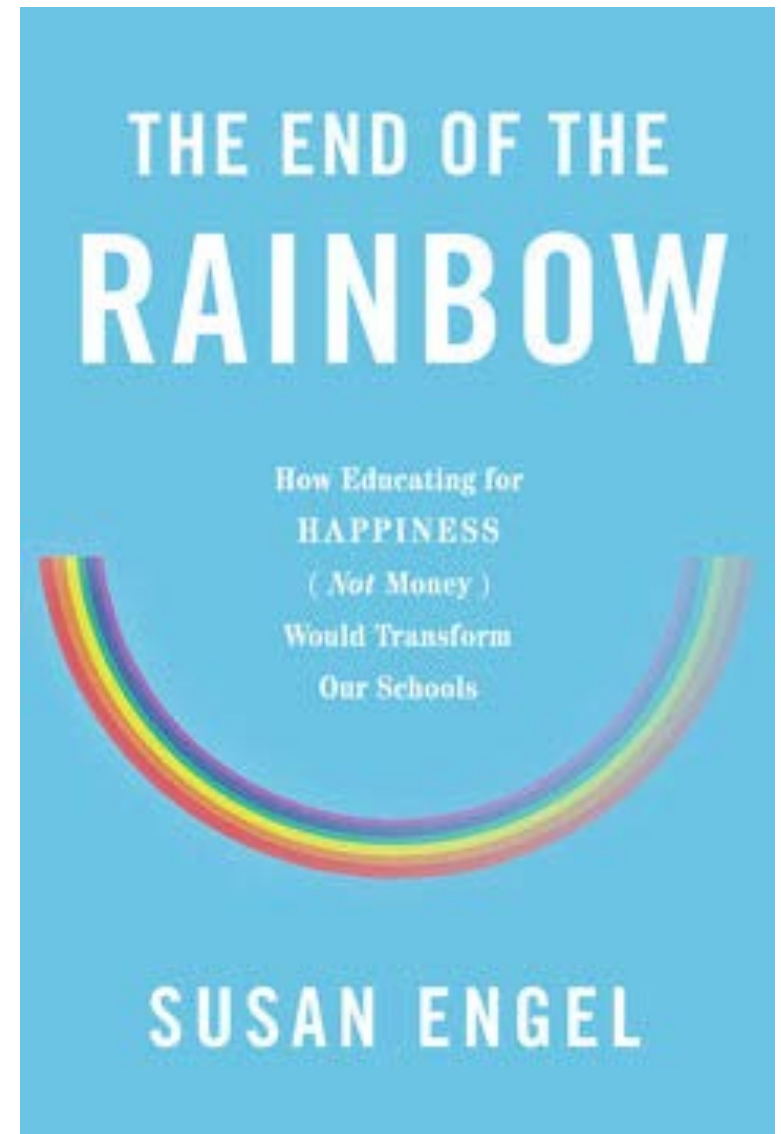
Engagement/Focus

Reading

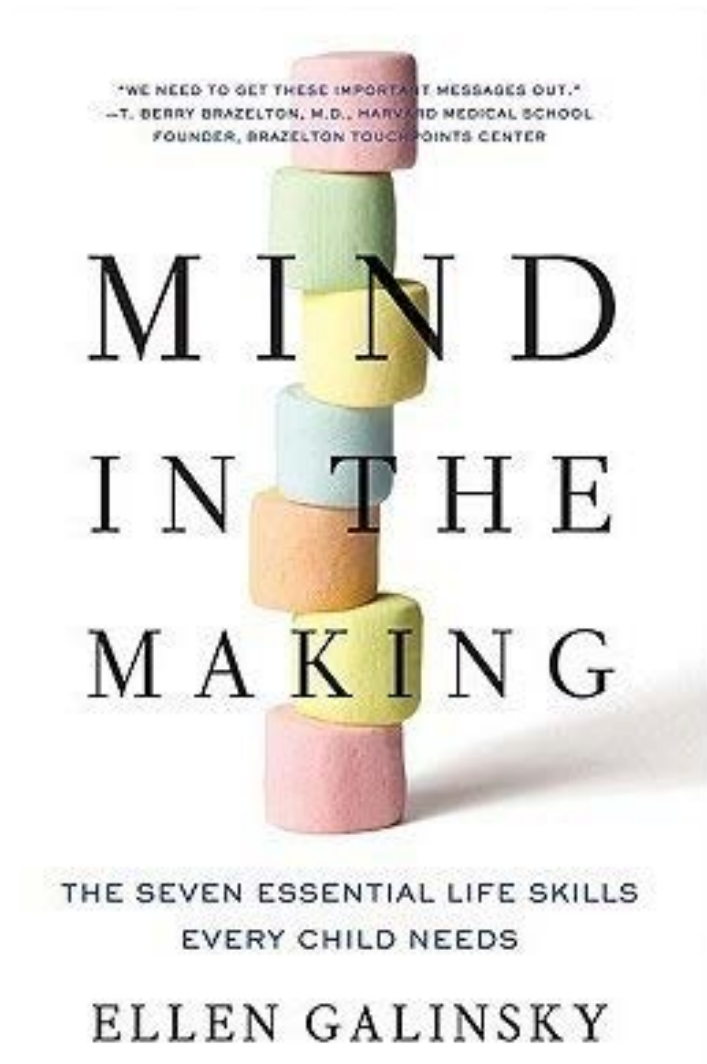
Inquiry/Flexible Thinking

Use of Evidence

Well being



Outcomes that Matter



Focus/Self-Control
Perspective Taking
Communicating
Making Connections
Critical Thinking
Taking on Challenges
Self-directed, Engaged Learning

Outcomes that Matter

Collaboration

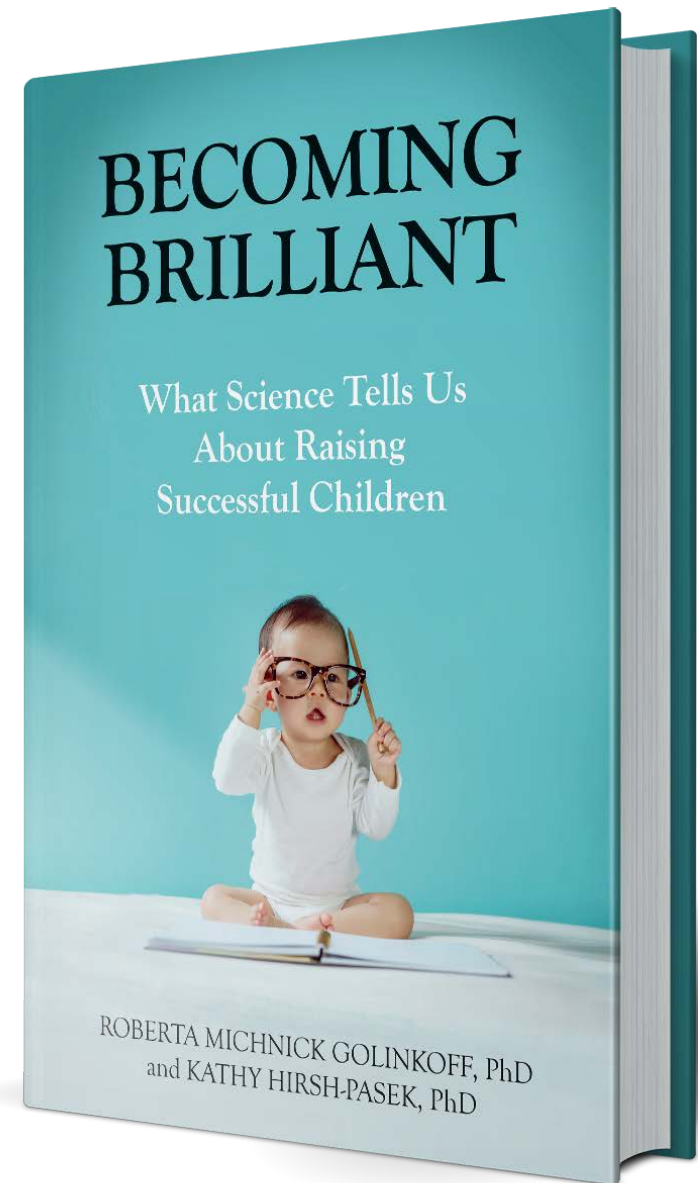
Communication

Content

Critical Thinking

Creative Innovation

Confidence



Outcomes that Matter

Initiation & Concentration	Inhibitory Control	Working Memory	Linguistic & Cultural Fluency	Social fluency & Emotional Flexibility
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Outcomes that Matter

Initiation & Concentration	Inhibitory Control	Working Memory	Linguistic & Cultural Fluency	Social fluency & Emotional Flexibility
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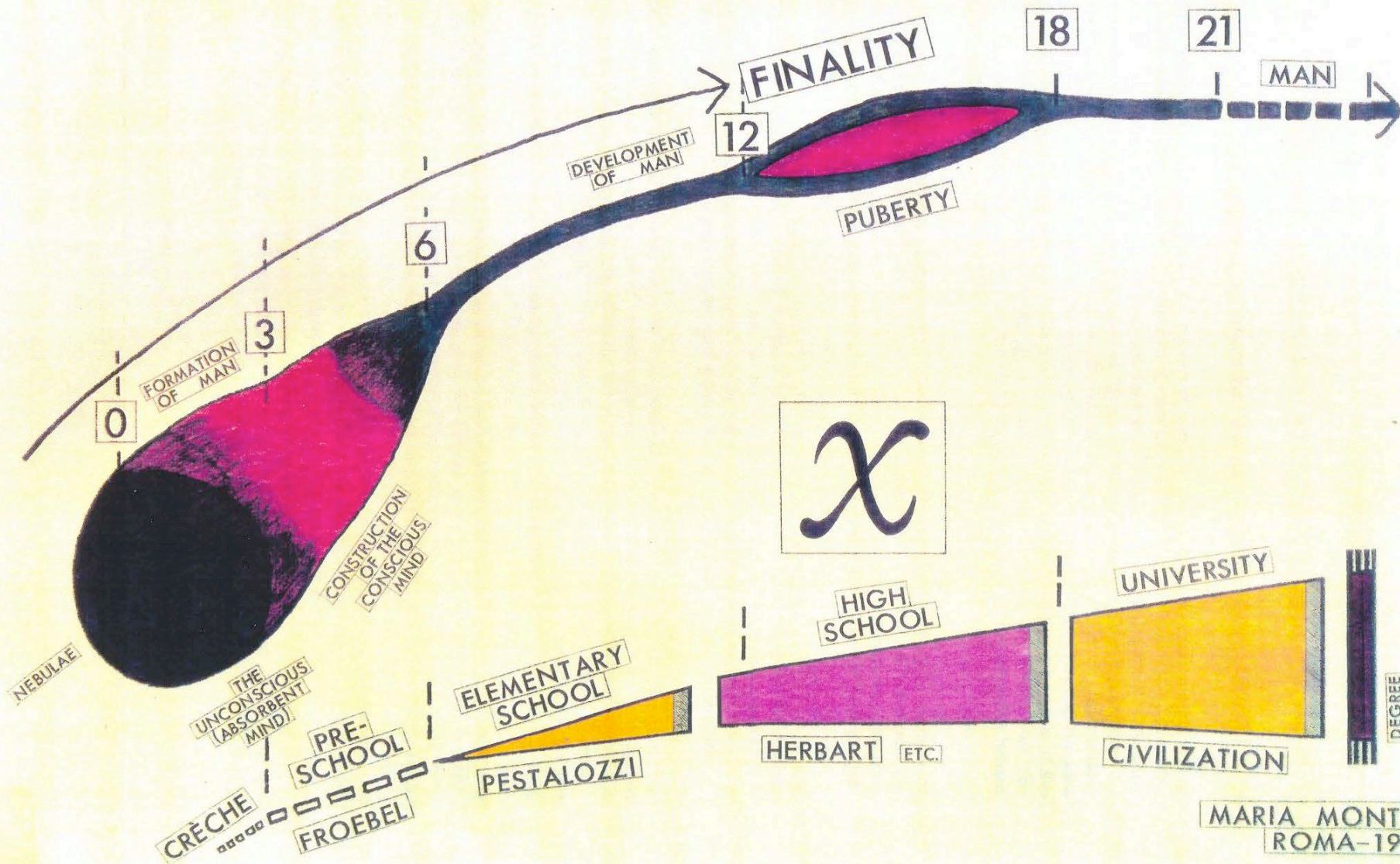
Outcomes that Matter

Initiation & Concentration	Inhibitory Control	Working Memory	Linguistic & Cultural Fluency	Social fluency & Emotional Flexibility
Attention/Focus Being Alert Orienting	Screening out distraction Resisting impulses Shifting when necessary	Holding and updating information at the same time Relating one idea to another	Proficiency in spoken and written language Proficiency in interpreting cultural attitudes & expectations	Responding to social cues Understanding emotions; recovering from disappointment

Outcomes that Matter

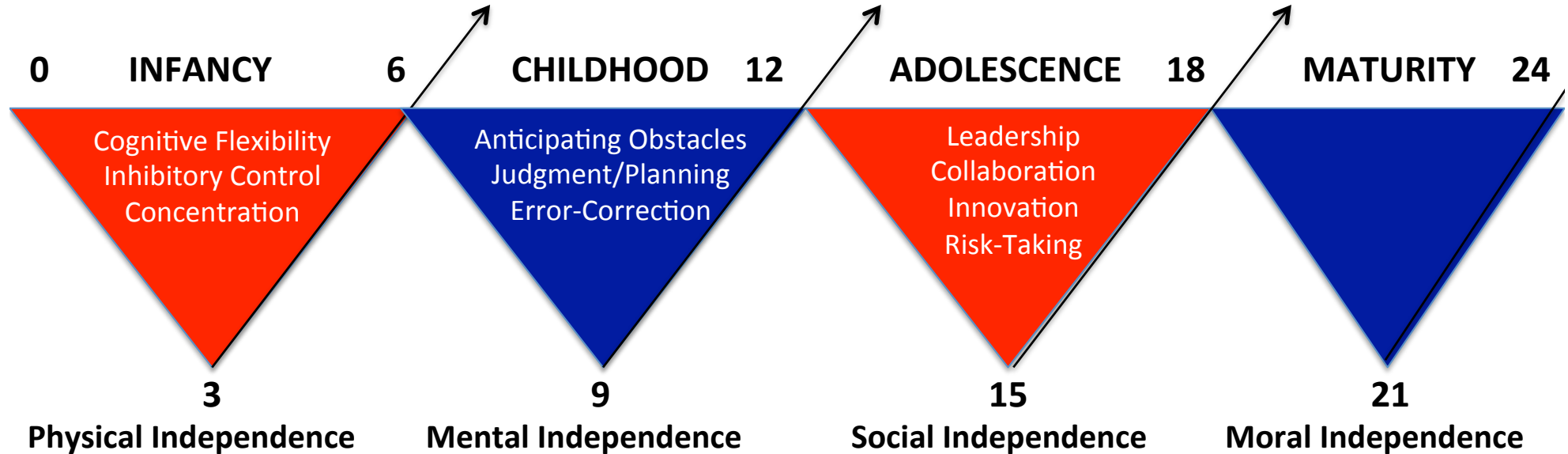
Initiation & Concentration	Inhibitory Control	Working Memory	Linguistic & Cultural Fluency	Social fluency & Emotional Flexibility
<p>Attention/Focus</p> <p>Being Alert</p> <p>Orienting</p>	<p>Screening out distraction</p> <p>Resisting impulses</p> <p>Shifting when necessary</p>	<p>Holding and updating information at the same time</p> <p>Relating one idea to another</p>	<p>Proficiency in spoken and written language</p> <p>Proficiency in interpreting cultural attitudes & expectations</p>	<p>Responding to social cues</p> <p>Understanding emotions; recovering from disappointment</p>
<p>Persistence</p> <p>Cognitive Flexibility</p> <p>Adaptation</p> <p>Self Regulation</p>		<p>Planning</p> <p>Prioritizing</p> <p>Reflecting</p>	<p>Perspective Taking</p> <p>Adaptability</p>	<p>Empathy</p> <p>Compassion</p> <p>Resilience</p>

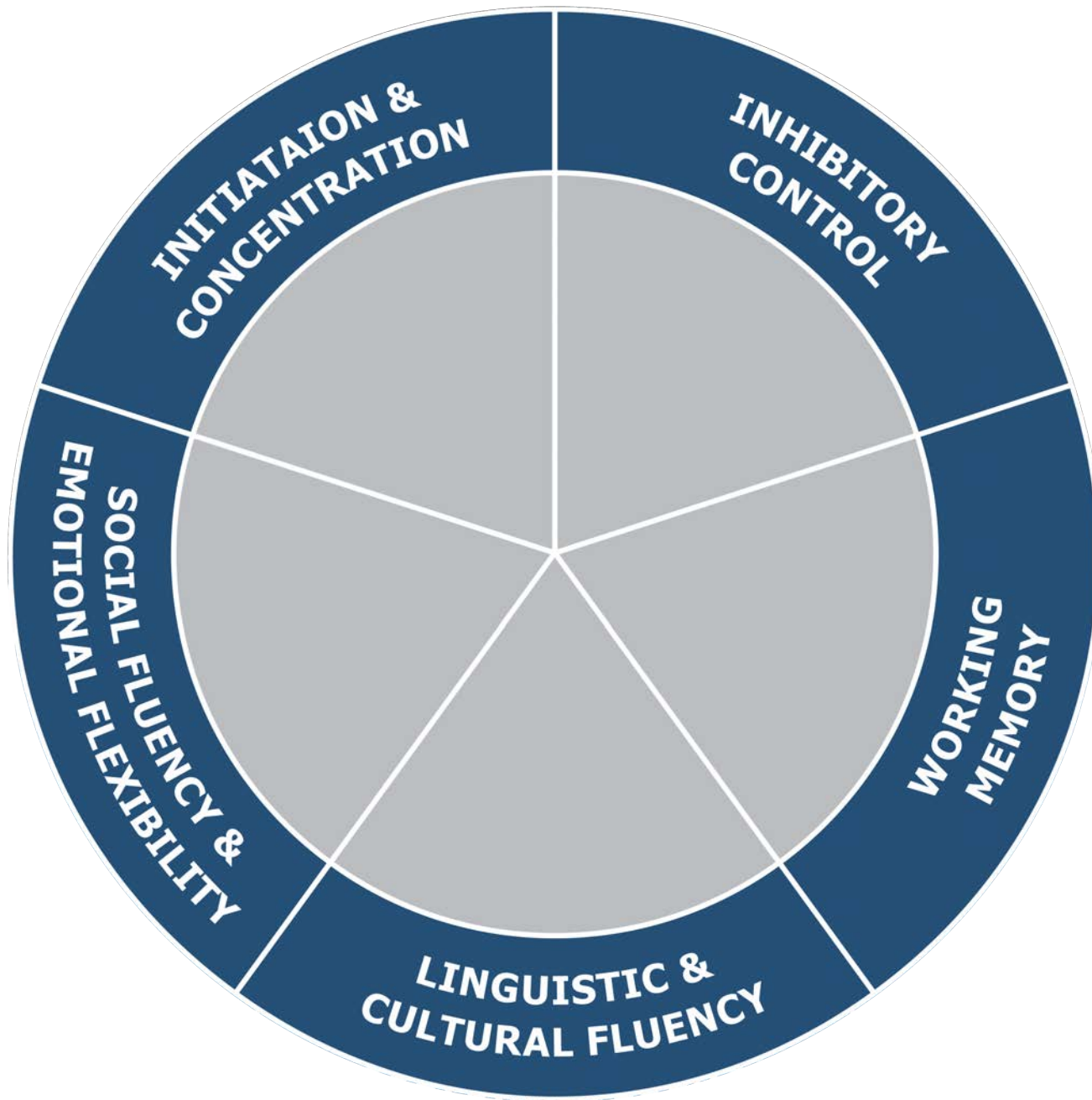
THE 4 PLANES OF DEVELOPMENT THE «BULB»



MARIA MONTESSORI
ROMA-1951

EF's and Human Development

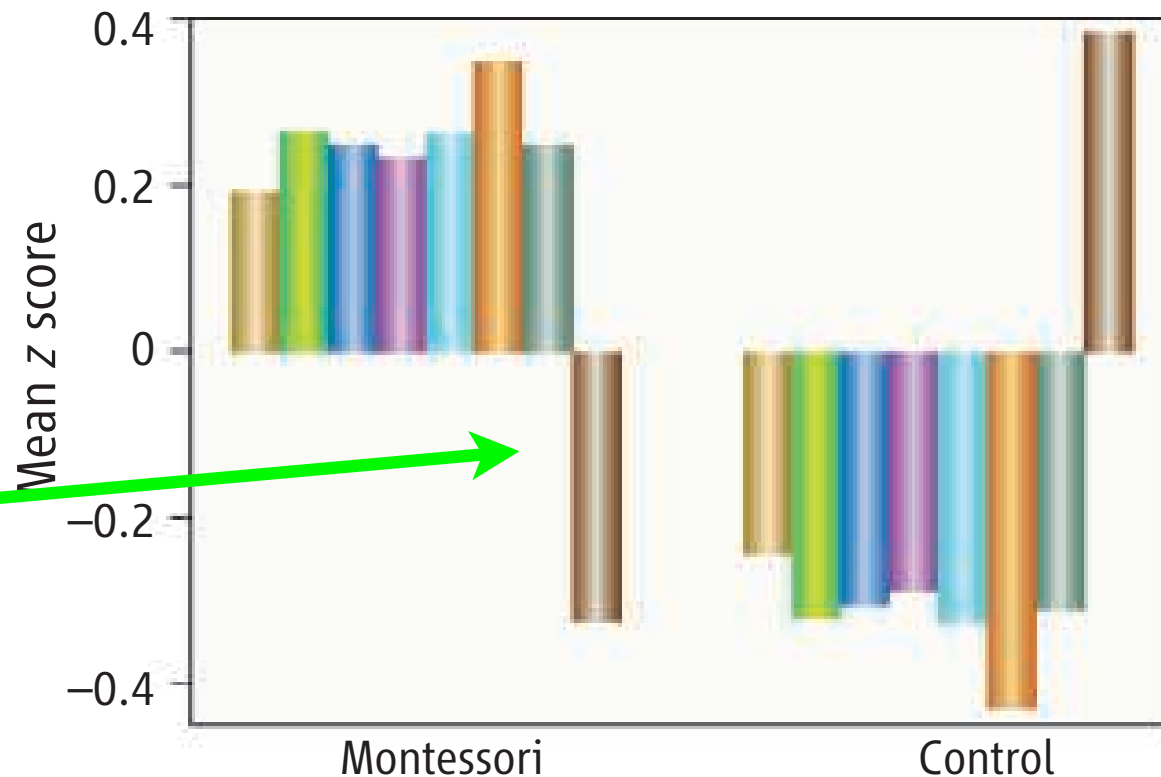




Measuring Outcomes

TASKS

(Down is better)



- WJ letter-word
- WJ word attack
- WJ applied math
- Card sort (executive function)
- False belief (social cognition)
- Refers to justice
- Positive shared play
- Ambiguous rough play

Age 5

REVIEW

Interventions Shown to Aid Executive Function Development in Children 4 to 12 Years Old

Adèle Diamond^{a,*} and Kathleen Lee¹

To be successful takes creativity, flexibility, self-control, and discipline. Control to all these are executive functions, including mentally playing with ideas, giving a considered rather than an impulsive response, and staying focused. Diverse activities have been shown to improve children's executive functions: computerized training, noncomputerized games, aerobics, martial arts, yoga, mindfulness, and school curricula. All successful programs involve repeated practice and progressively increase the challenge to executive functions. Children with worse executive functions benefit most from these activities; thus, early executive-function training may avert widening achievement gaps later. To improve executive functions, focusing narrowly on them may not be as effective as also addressing emotional and social development (in de curricula that improve executive functions) and physical development (shown by positive effects of aerobics, martial arts, and yoga).

What will children need to be successful? What programs are successfully helping children develop these skills in the earliest school years? What do these programs have in common?

Four of the qualities that will probably be key to success are creativity, flexibility, self-control, and discipline. Children will need to think creatively to devise solutions never considered before. They will need working memory to mentally work with masses of data and see new connections among elements, flexibility to appreciate different perspectives and take advantage of serendipity, and self-control to resist temptation and avoid doing something they would regret. Tomorrow's leaders will need the discipline to stay focused, seeing tasks through to completion.

All of these qualities are executive functions (EFs), the cognitive control functions needed when you have to concentrate and think, when acting on your initial impulse might be ill-advised. EFs depend on a neural circuit in which the prefrontal cortex is central. Core EFs are cognitive flexibility, inhibition (self-control, self-regulation), and working memory (7). More complex EFs include problem-solving, reasoning, and planning. EFs are more important for school readiness than is intelligence quotient (IQ) (2). They continue to predict math and reading competence throughout all school years [e.g., (3)]. Clearly, to improve school readiness and academic success, targeting EFs is crucial. EFs remain critical for success throughout life [in career (4) and mar-

riage (5)] and for positive mental and physical health (6, 7).

Children with worse self-control (low persistence, more impulsivity, and poorer attention regulation) at ages 3 to 11 tend to have worse health, earn less, and commit more crimes 30 years later than those with better self-control as children,



Fig. 1. A teen working at a CogMed game. (Photo courtesy of CogMed)

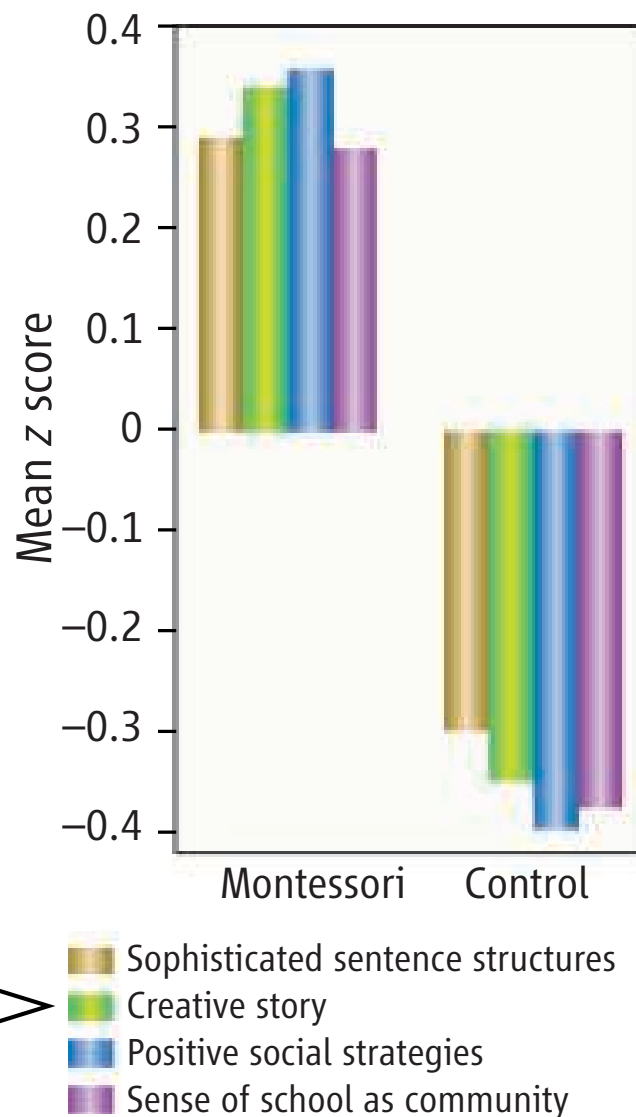
SPECIAL SECTION

controlling for IQ, gender, social class, and more (8). Since "self-control" effects follow a [linear] gradient, interventions that achieve even small improvements in self-control for individuals could shift the entire distribution of outcomes in a salutary direction and yield large improvements in health, wealth, and crime rate for a nation" (9).

What Programs Have Been Shown to Help Young Children Develop These Skills?

There is scientific evidence supporting six approaches for improving EFs in the early school years. Tables S1 and S2 provide details on each intervention and their outcomes.

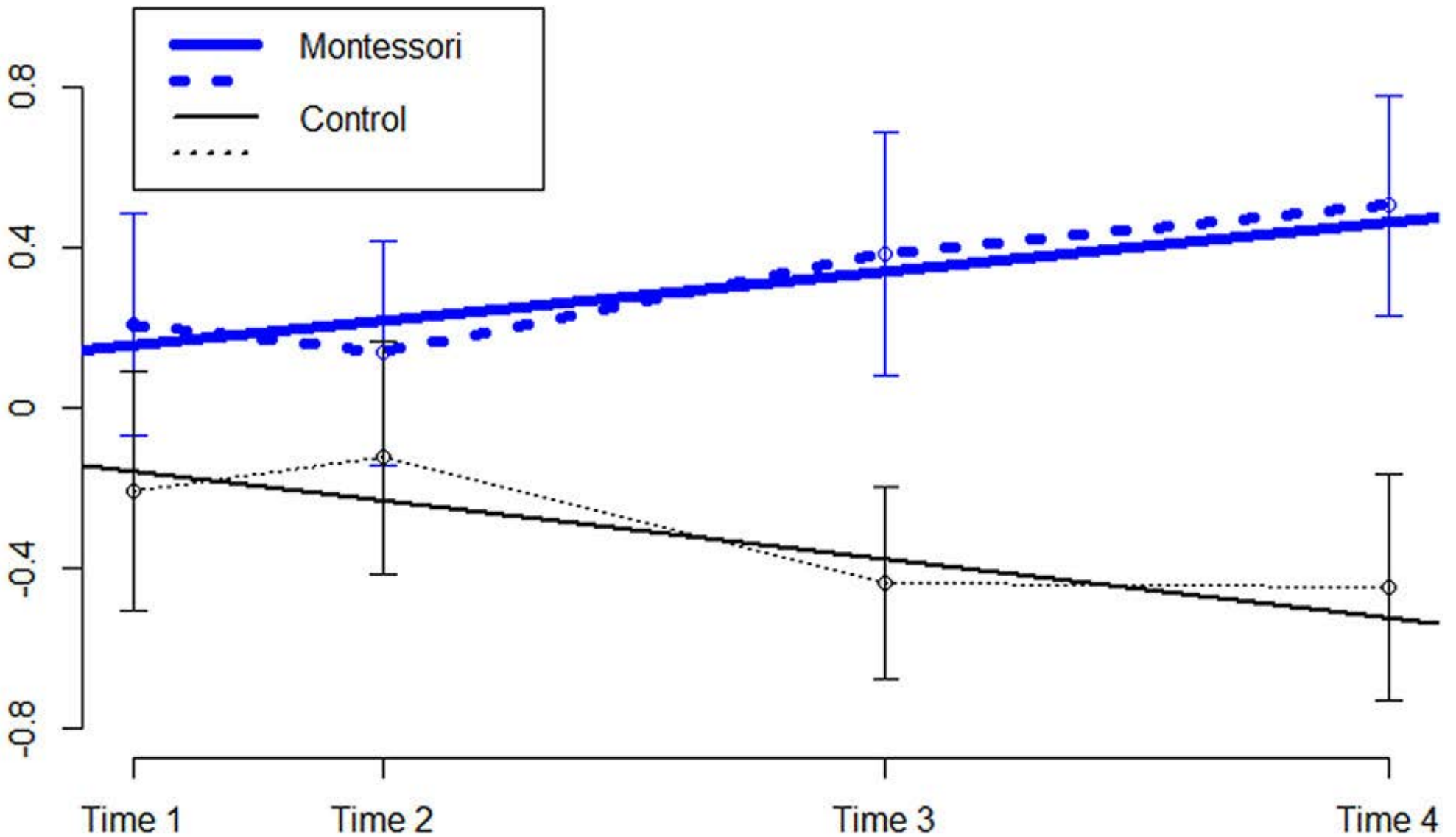
Computerized training. The most researched approach, and one repeatedly found successful, is CogMed (Parsons Education, Upper Saddle River, NJ) computerized working-memory training (9–13), which uses computer games that progressively increase working-memory demands. Youngsters improve on games they practice (Fig. 1), and this transfers to other working-memory tasks. Groups studied have been typically developing children (12) and those with attention deficit hyperactivity disorder (ADHD) (16, 13) or poor working-memory spans (9). Benefits usually do not generalize to unpracticed EF skills (14). These studies (9–13) included controls who played the same training games without increasing difficulty; those controls did not show the same gains. Two studies looked 6 months later and found EF benefits remained (9, 13). For math, gains were



Age 12

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Growth Over Time

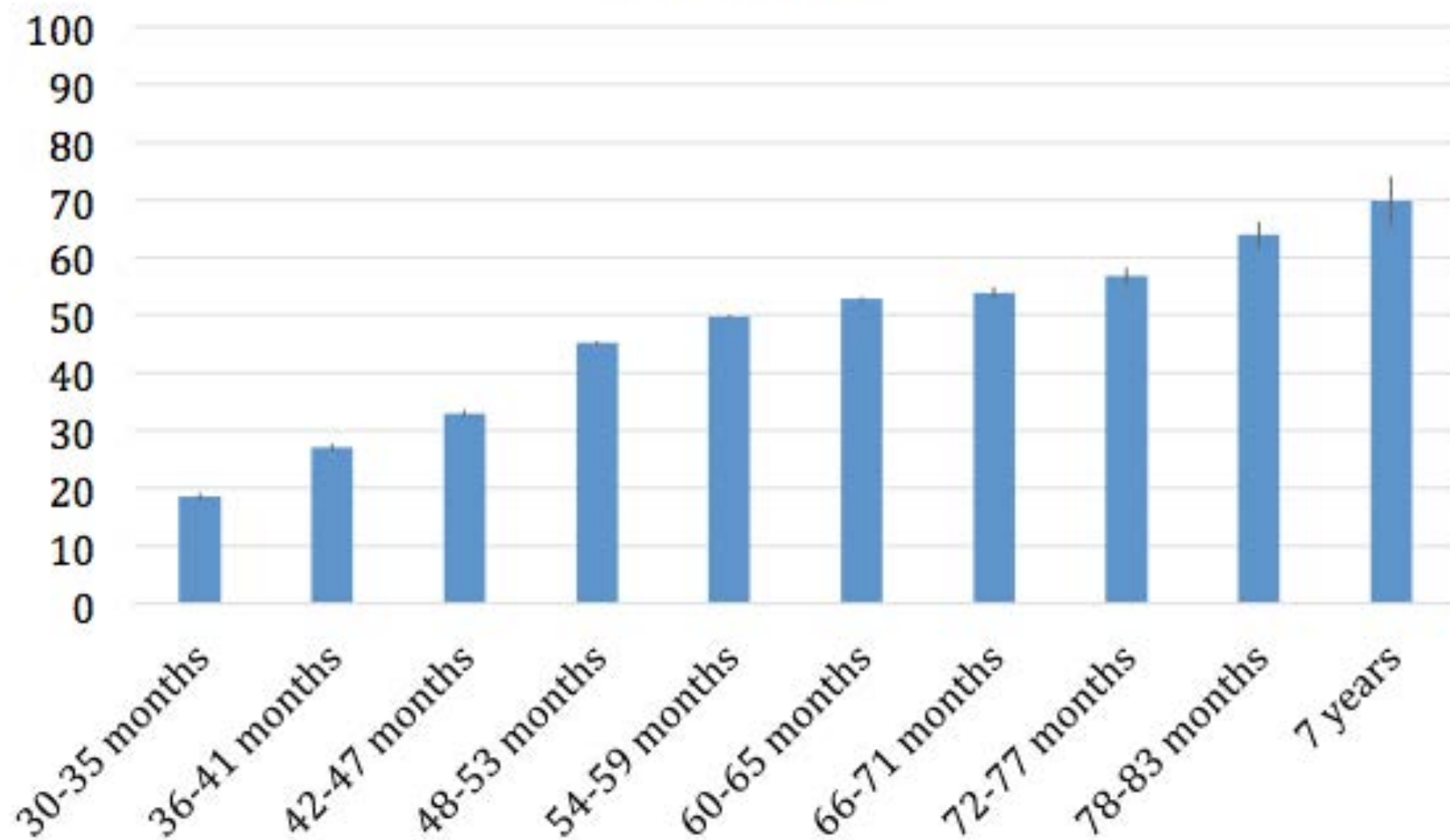


Minnesota Executive Function Scale (MEFS)

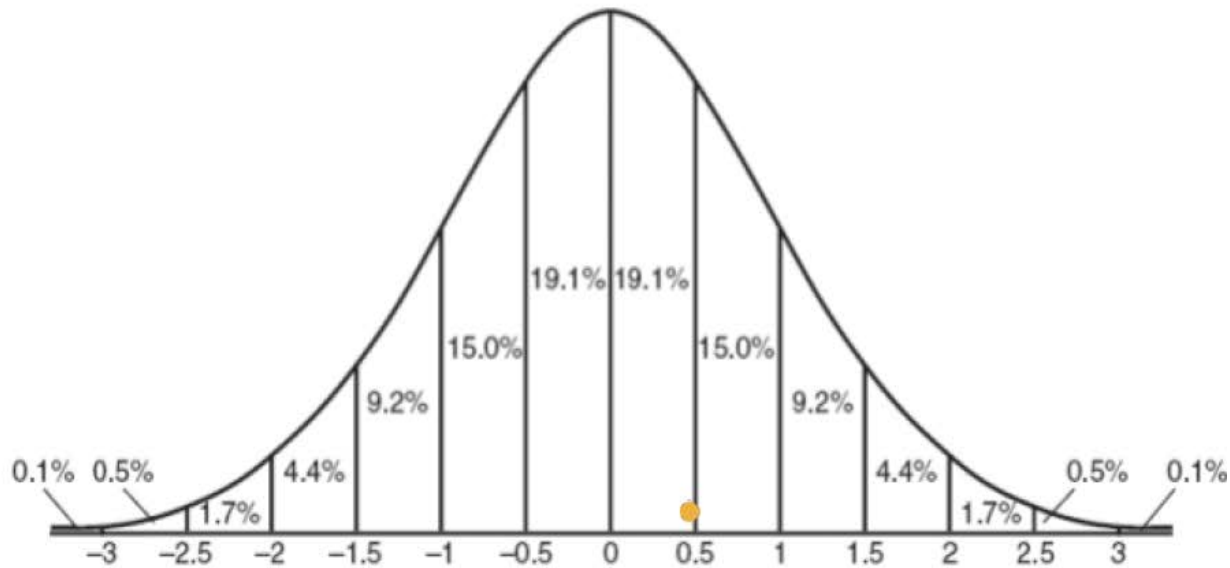
- ❖ Engaging iPad tablet game
- ❖ Administered one-on-one
- ❖ Children sort virtual cards into two boxes according to rules and make a rule-switch, with increasing difficulty across 7 levels



Average MEFS Adjusted Score Age 2.5-7 Years (N = 8,030)



Profile Summary



Description

Well below age norms	Moderately below age norms	Age typical (low)	Age typical (high)	Moderately above age norms	Well above age norms
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Interpretation Key

Well below age norms: Compared to other children at this age, child lacks proficiency in executive function.

Moderately below age norms: Compared to other children at this age, child is somewhat less proficient in executive function.

Age typical (low): Child's proficiency in executive function is typical for children at this age.

Age typical (high): Child's proficiency in executive function is typical for children at this age.

Moderately above age norms: Compared to other children at this age, child is somewhat more proficient in executive function.

Well above age norms: Compared to other children at this age, child is highly proficient in executive function.

Level 4

[Home](#)

Look, I have these boxes here. This one is orange and this one is green. This is the color game. In the color game, all the orange ones go here and all the green ones go here. (tap + button)



COR9999

Level 4 Demonstration

See, here's a green one. It goes in the green box. (E drag)



COR9999

Level 4 Demonstration

Level 4

[Home](#)

(tap + button)



COR9999

Level 4 Demonstration

Level 4

[Home](#)

And here's an orange one. It goes in the orange box. (E drag)



COR9999

Level 4 Demonstration

Level 4

[Home](#)

Now it's going to be your turn to play the color game! (tap + button)



COR9999

Level 4 Rule Check

Level 4

[Home](#)

Can you put this green one where it goes? (child drag)



COR9999

Level 4 Rule Check

Level 4

[Home](#)

(tap + button)



COR9999

Level 4 Rule Check

Level 4

[Home](#)

Can you put this orange one where it goes? (child drag)



COR9999

Level 4 Rule Check

Can you put this orange one where it goes? (child drag)



Okay let's play.
Press Continue button when ready.

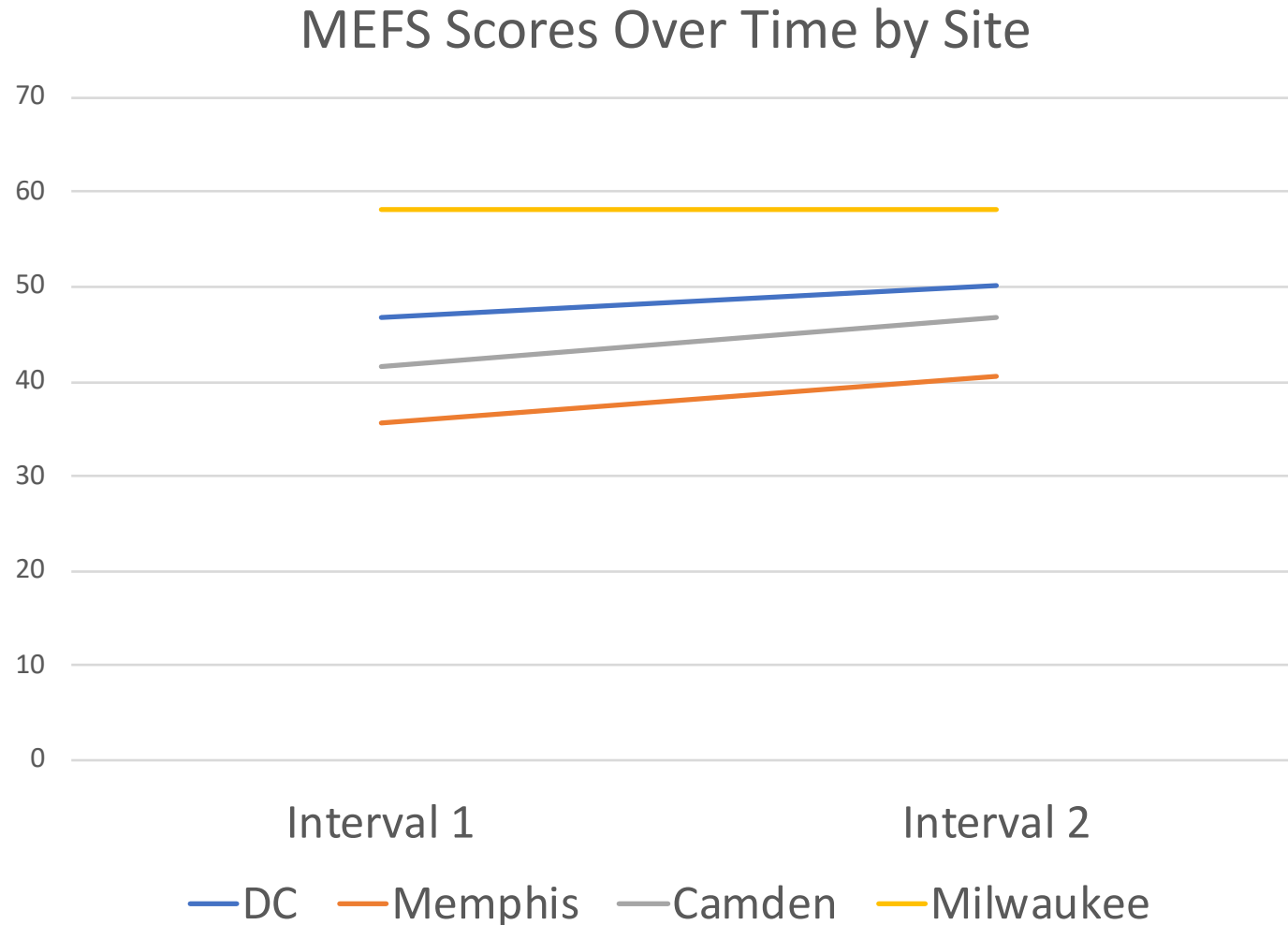
[Continue](#)



COR9999

Level 4 Rule Check

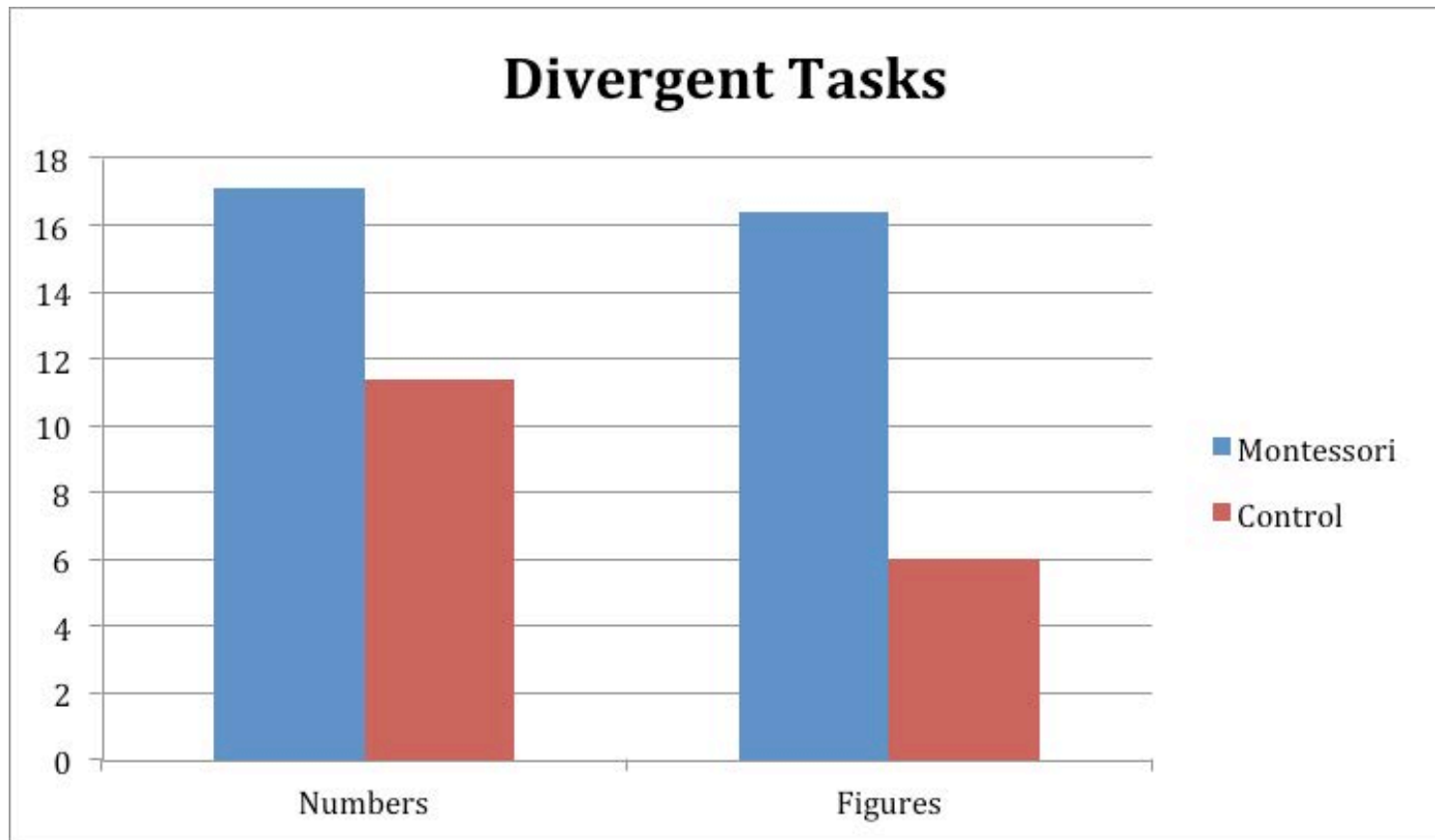
Tracking Growth In EF's



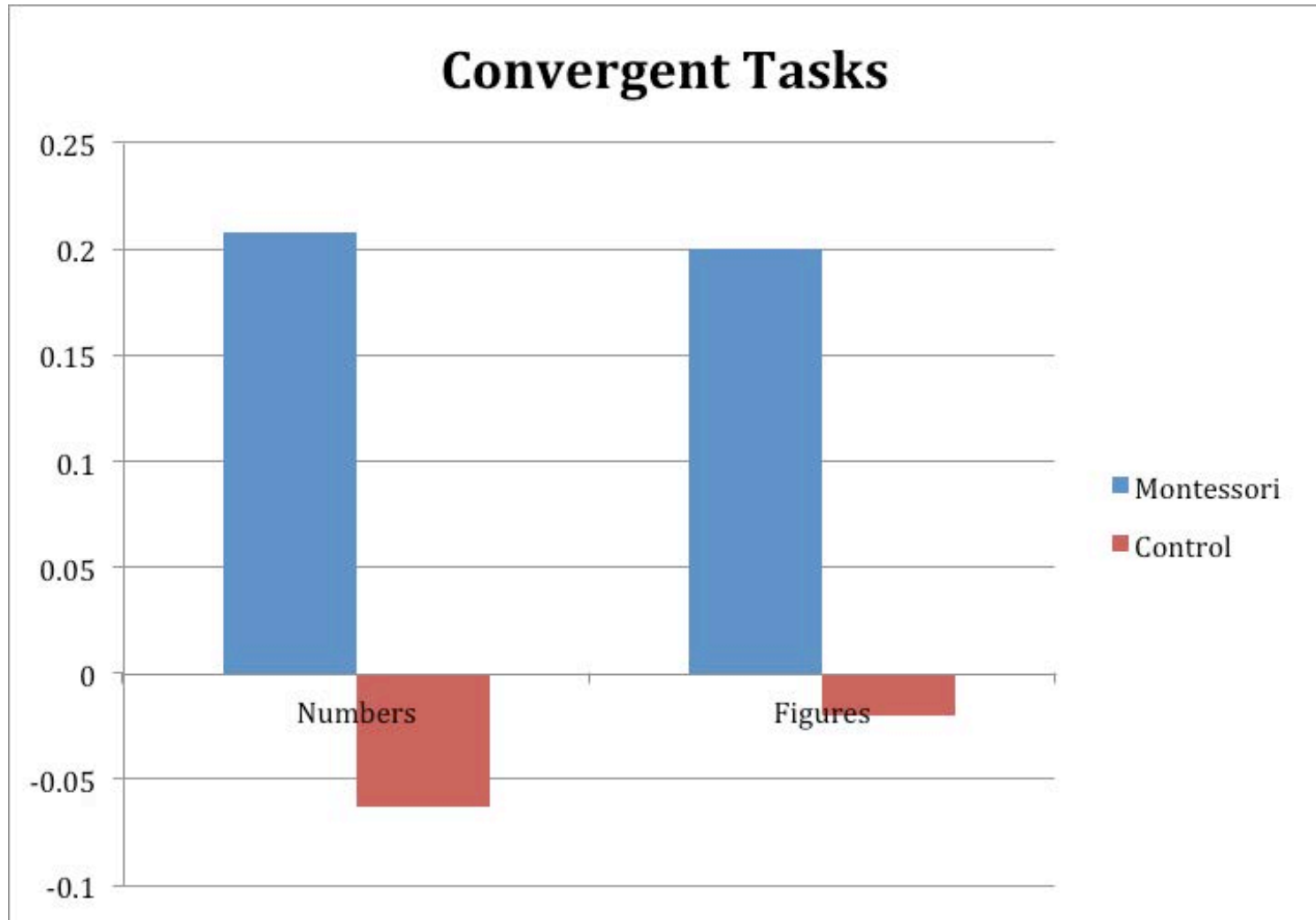
Total Number of Children: **498**

Percent Low Income: **65**

Creativity and Math



Creativity and Math



SURVEYS

Please circle the response that best describes you

1. I am well-prepared for the work that is expected of me in my new school

Very much Mostly Somewhat Not much Not at all

2. I enjoy most of the work I am expected to do at my new school

Very much Mostly Somewhat Not much Not at all

3. When focused on a task, I usually stick with it until it is complete

Very much Mostly Somewhat Not much Not at all

4. I am really good at _____

5. I am less good at _____

6. When I have trouble with work, I feel comfortable asking for help

Very much Mostly Somewhat Not much Not at all

7. When conflicts happen at school, I try to help resolve them peacefully

Very much Mostly Somewhat Not much Not at all

8. When I see another student having difficult, I try to help them

Very much Mostly Somewhat Not much Not at all

9. I generally get along with my classmates

Very much Mostly Somewhat Not much Not at all

What else would you like to tell us about your experience in your new school?

Dear (insert name of teacher)

We are committed to ensuring that our graduates are well prepared for the challenges of new learning environments.

We appreciate you taking a few minutes to complete the questionnaire below

Please circle the response that best describes this student

1. The student is genuinely curious about the academic work offered in my classroom

Very much Mostly Somewhat Not much Not at all

2. The student has strong interests in certain subjects and communicates those interests clearly

Very much Mostly Somewhat Not much Not at all

3. When focused on a task, the student sticks with his/her work until it is complete

Very much Mostly Somewhat Not much Not at all

4. The student seems happiest when engaged in highly concentrated work

Very much Mostly Somewhat Not much Not at all

5. The student has overcome setbacks in order to meet an important challenge

Very much Mostly Somewhat Not much Not at all

6. When a classmate or peer is in need, the student offers to help

Very much Mostly Somewhat Not much Not at all

7. When conflicts arise, the student participates in peaceful resolutions

Very much Mostly Somewhat Not much Not at all

8. When encountering problems or challenges, the student asks for help

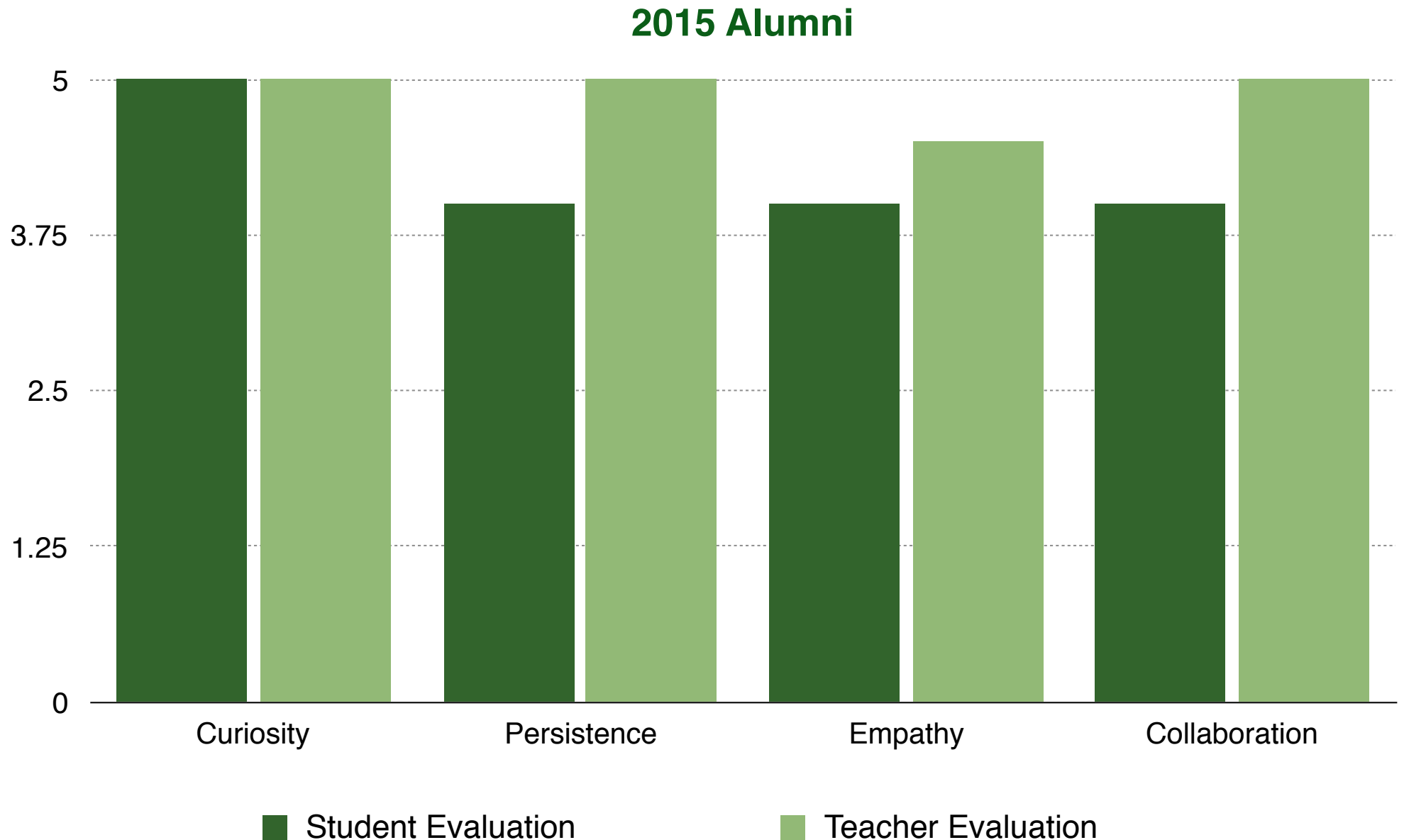
Very much Mostly Somewhat Not much Not at all

9. The student is adept at working or playing as part of a team

Very much Mostly Somewhat Not much Not at all

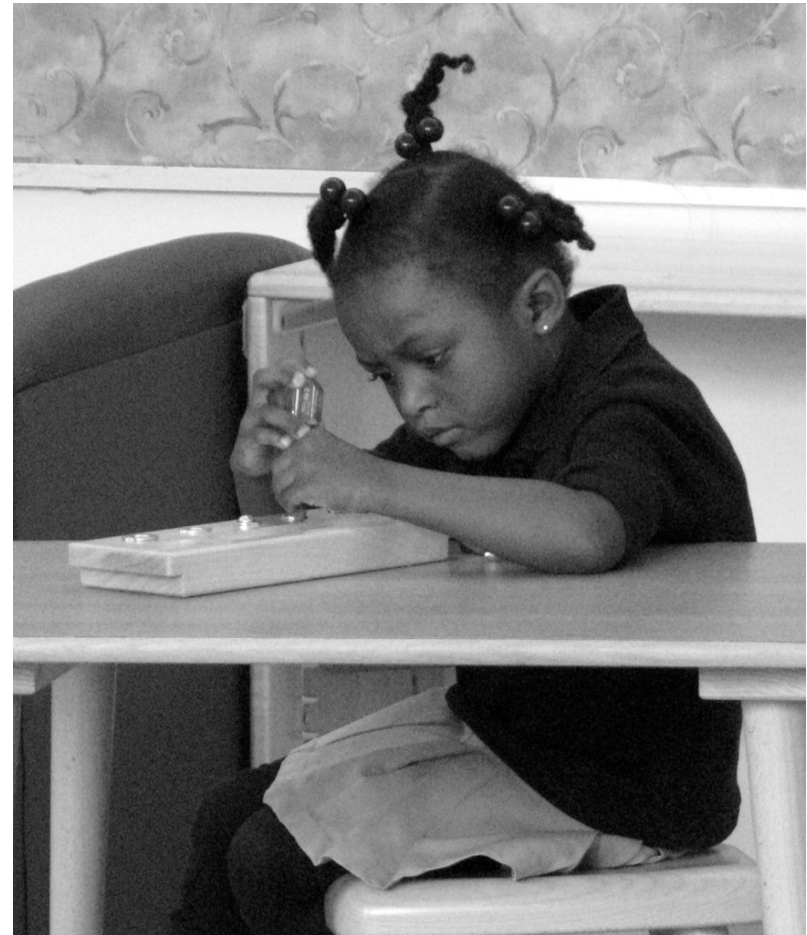
What else would you like to tell us about this student?

Longitudinal Documentation



What's going on with **this child**?

- What is she doing?
- What is she ready for?
- What interests her?
- What is in her way?

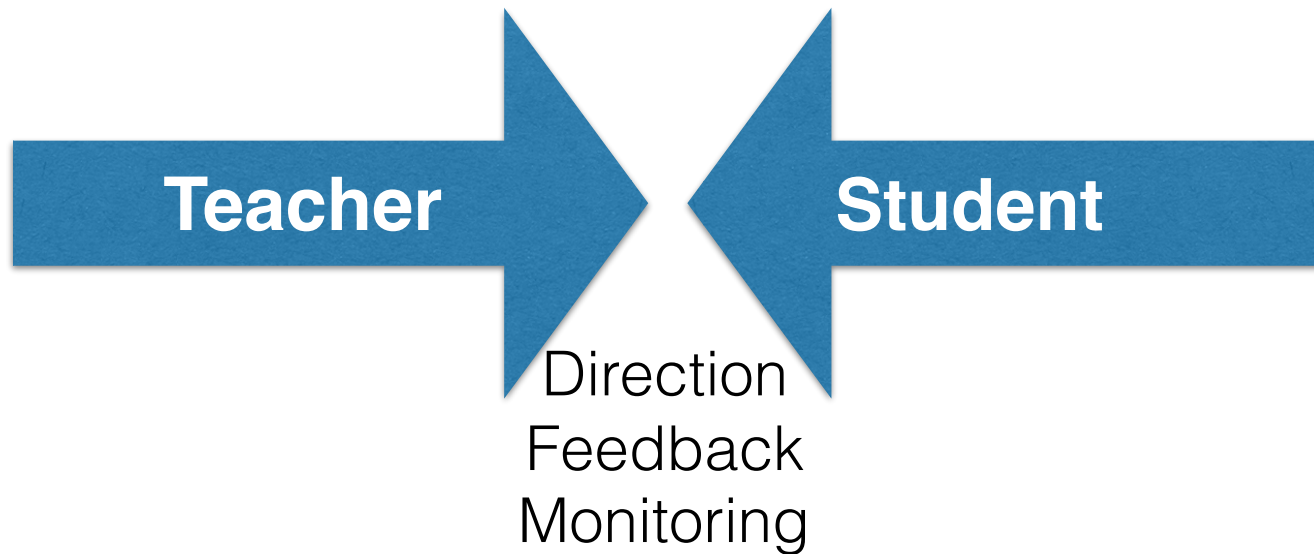


Measuring Inputs

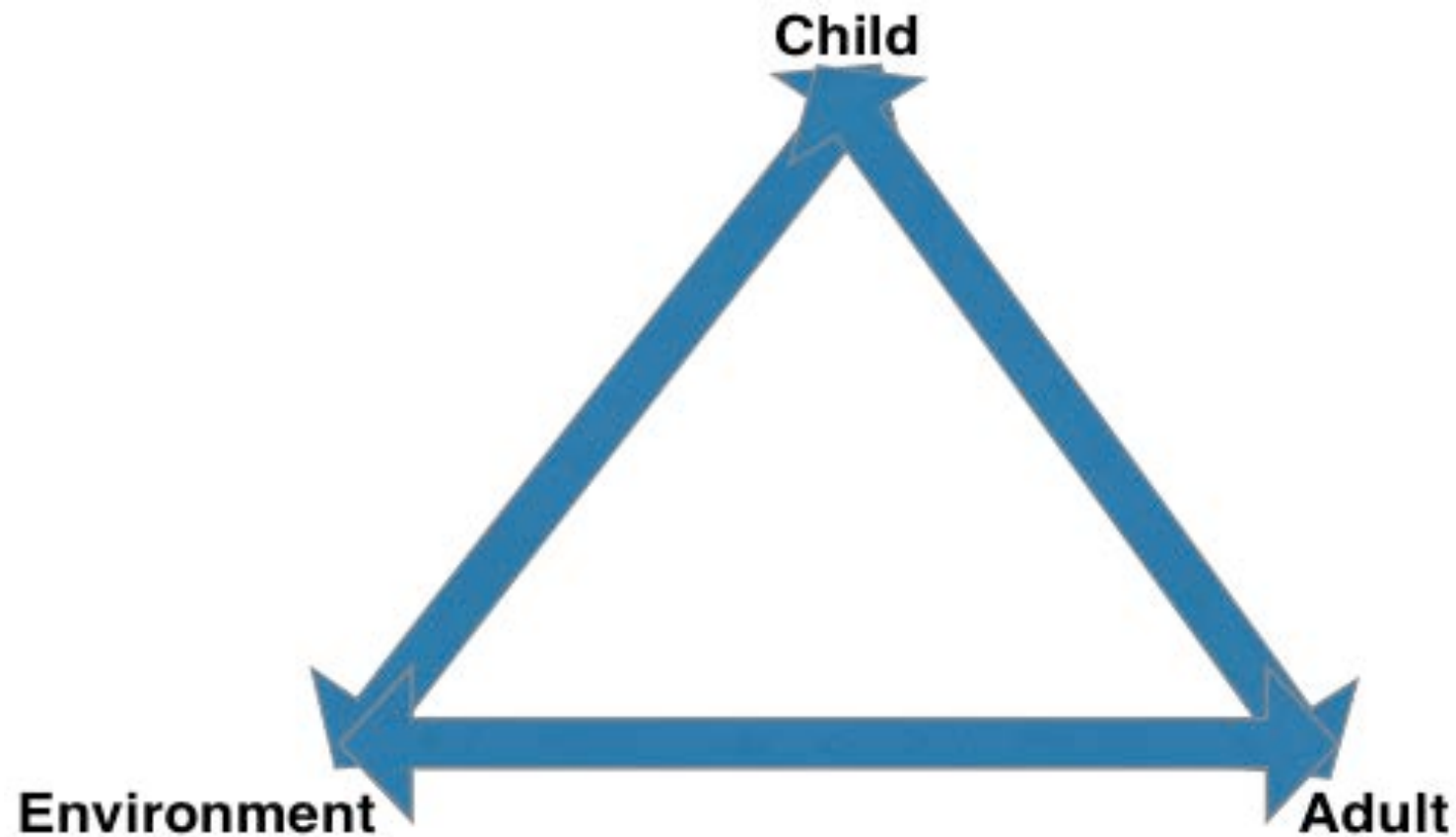
WHAT'S GOING ON IN THIS CLASSROOM?

CHILD/CHILDREN	ADULTS	ENVIRONMENT
WHAT ARE CHILDREN LEARNING?		

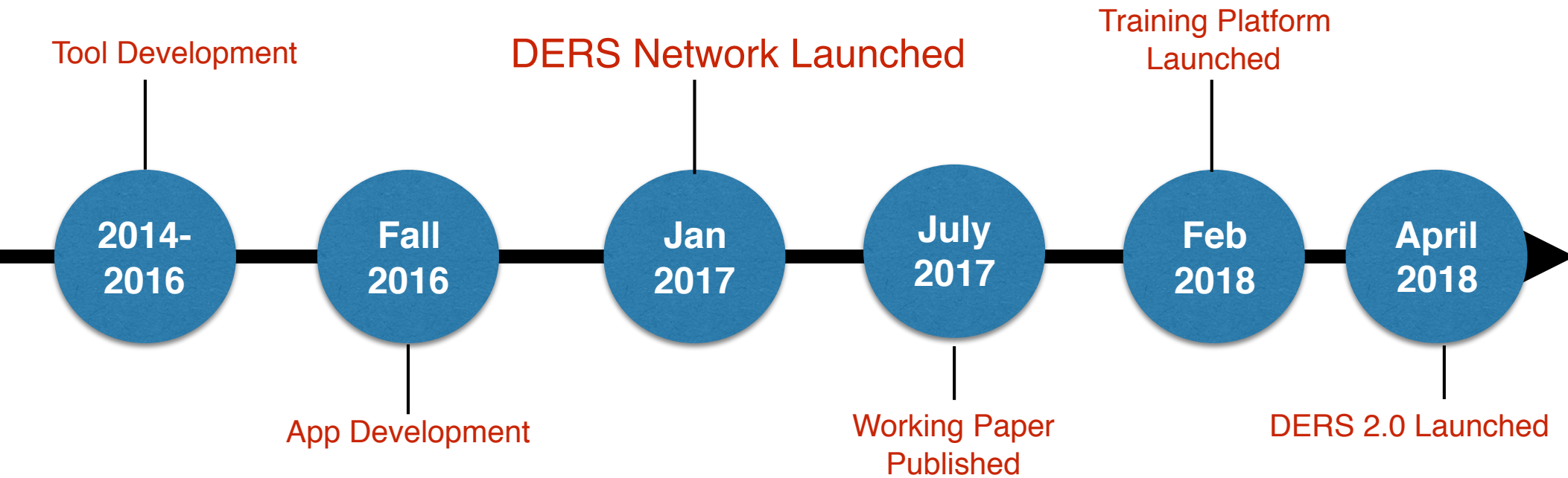
Common Assumptions of Quality



The Developmental Core



Overview



TODAY

73 Schools/Training Centers

225 Individuals Trained/Introduced

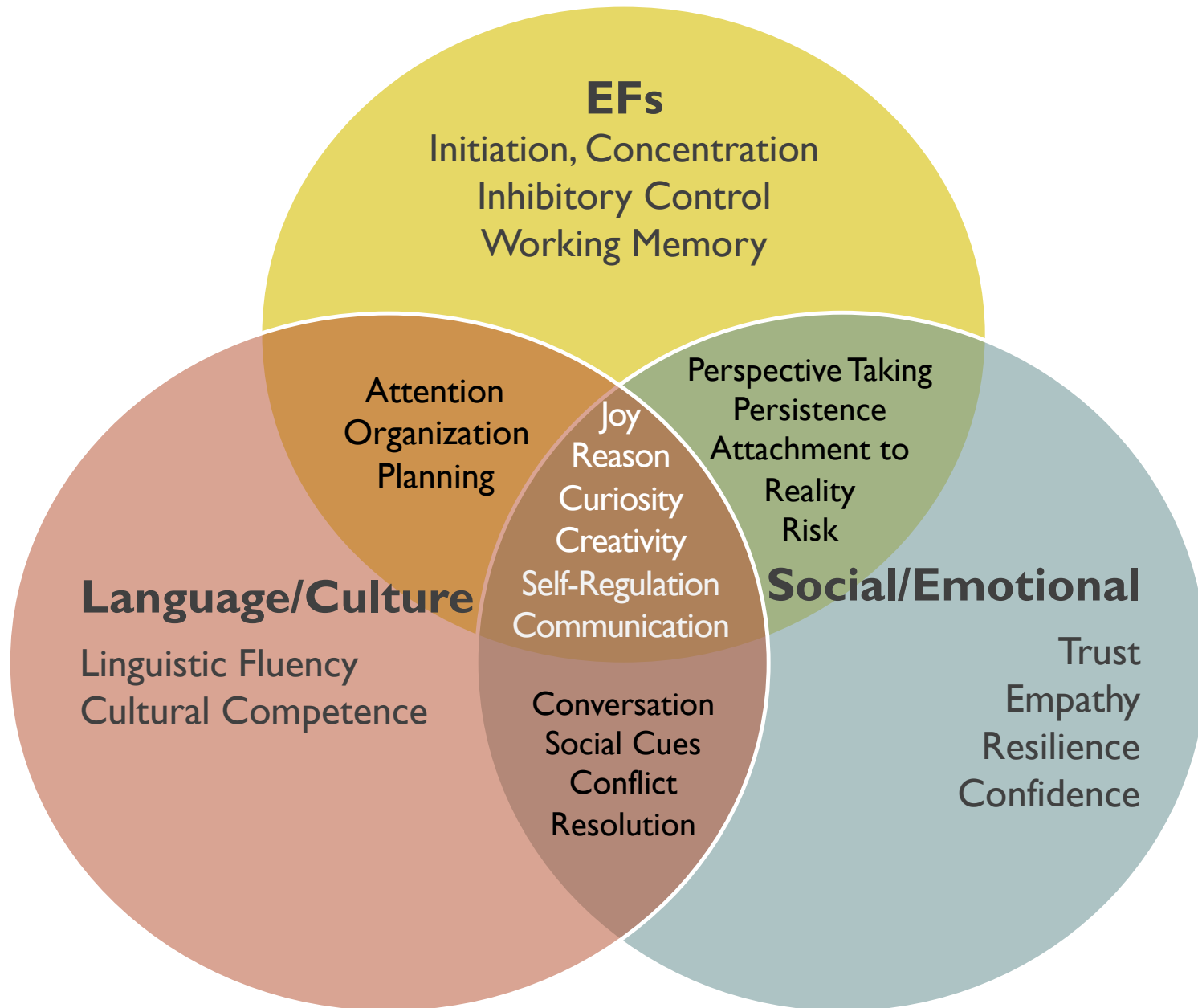
145 Certified Observers

Why DERS

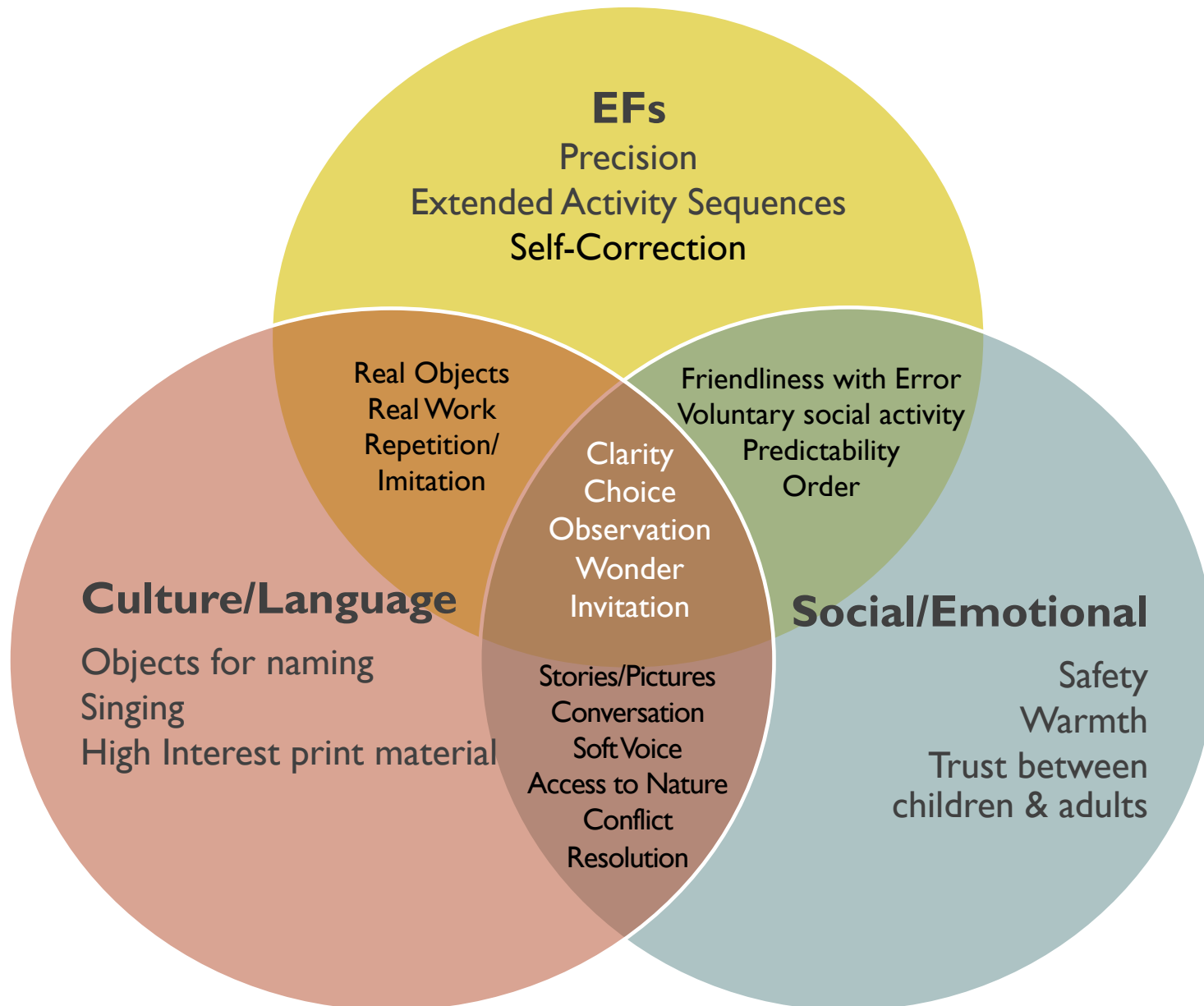
Capturing the complexity of developmental learning environments

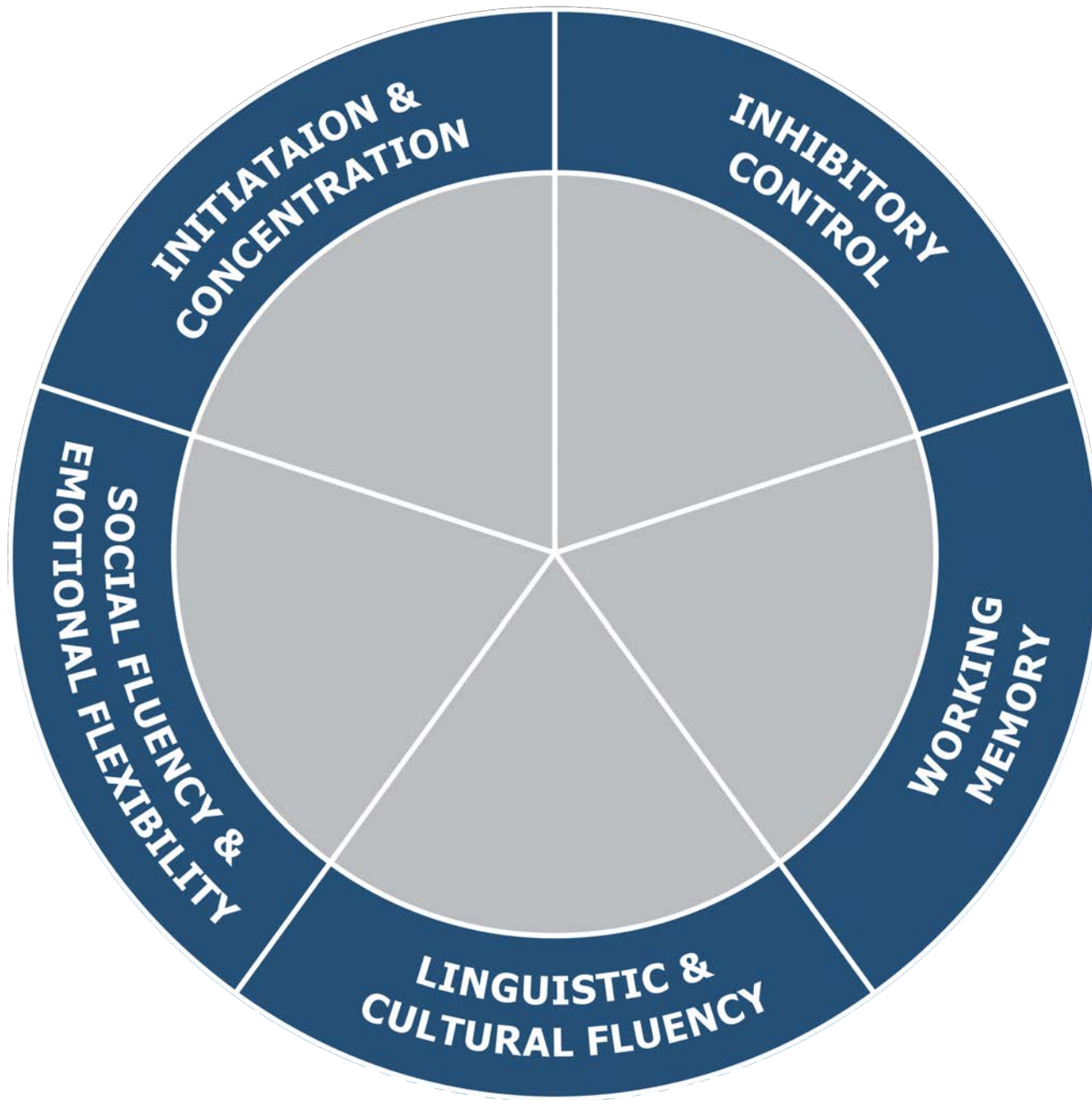
Formative Assessment	Summative Assessment
<ul style="list-style-type: none">• Walk-Through/Rounds• Self-Assessment• Coaching• Professional Development<ul style="list-style-type: none">• Calibrating definitions of quality• Tuning up observation protocols	<ul style="list-style-type: none">• Quality Rating Assessments• As one data-point in:<ul style="list-style-type: none">• Teacher Evaluation• 360 Program Evaluation• Program Accreditation

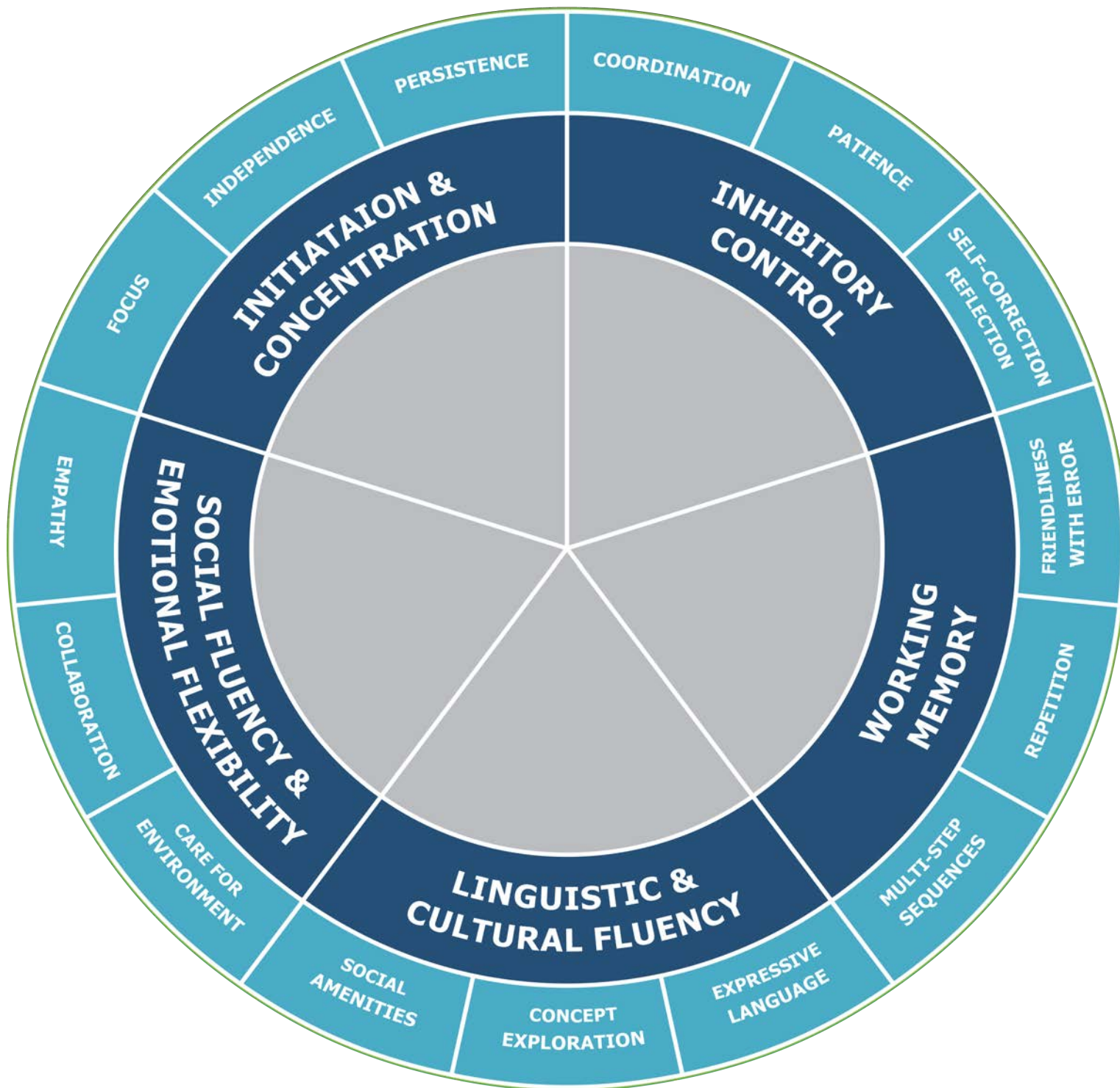
OUTCOMES THAT MATTER

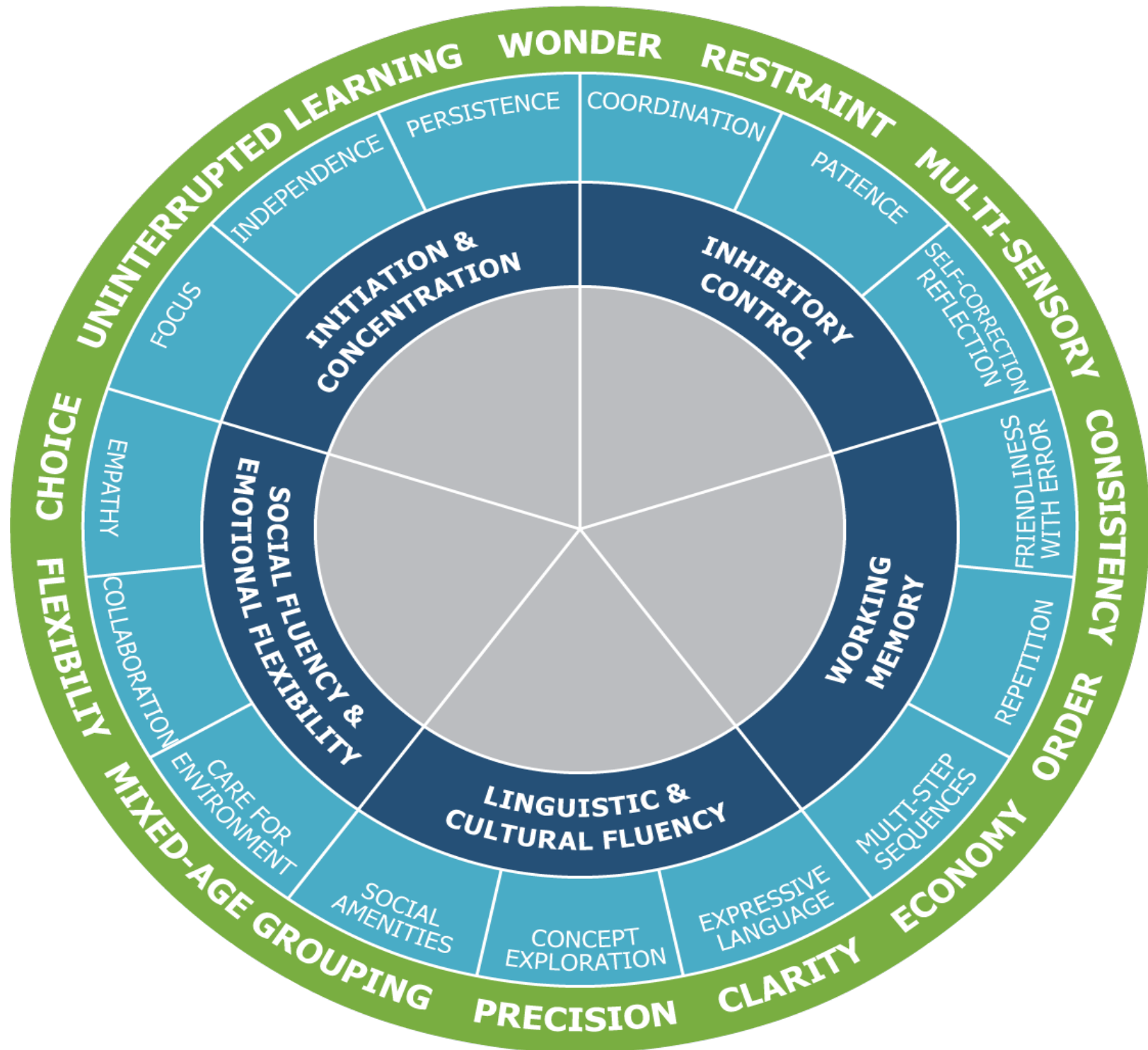


ATTRIBUTES THAT MATTER









Magnitude Attributes

57:28

CHILD

ADULT

ENVIRONMENT

Materials ready
for use

Mixed age
grouping

Multisensory

Natural materials

Plants

Presence of
digital technology

Real tools and
real work

Uninterrupted
work

click here once you complete the observation

FINISH OBSERVATION

Magnitude Attributes

58:49

CHILD

ADULT

ENVIRONMENT



Caring for
classroom



Completes a work
cycle



Conversation

Disrupting

Engaging with
purpose

Joy

Misusing
materials

Navigating the
room with care

click here once you complete the observation
FINISH OBSERVATION



Joy

- Smiling, laughing, singing.
- Clearly comfortable in the environment.
- Expressing satisfaction with work.
- Peaceful.

0

No children are observed exhibiting joy.

1

Some children exhibit joy.

2

Most children exhibit joy.

3

Almost all children exhibit joy.

Review Observation

Done

Frequency Attributes

Magnitude Attributes

CHILD

ADULT

ENVIRONMENT

Caring for
classroom

Completes a work
cycle

Conversation

Disrupting

Engaging with
purpose

Joy

Misusing
materials

Navigating the
room with care



Report for Grabowski classroom

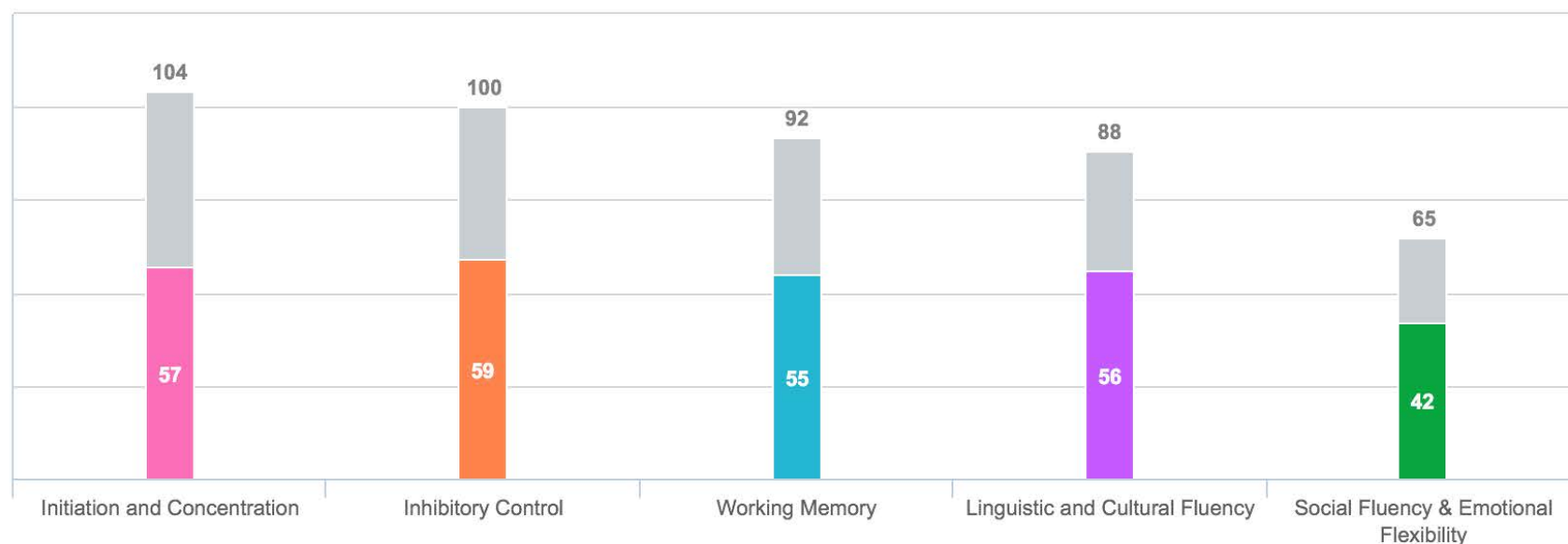
Organization Name: **Practice School**

Rated Attributes

Class Name: **Grabowski**

Observation Date: **04/12/2018**

Duration: **00:12:27**



Initiation & Concentration



A few students initiate work, but most work is directed by adults. Many children sought approval or permission from the teacher. Adults shared genuine enthusiasm and joy for the child's accomplishments, but refrained from praise intended to flatter the child. Adults were seen sitting in an observers' chair, taking notes. Adults consistently offered children choices of activities and solutions. Adults often use loud, didactic talk that could be heard above student discussion. Adults consistently communicated genuine curiosity about content; lessons are usually presented as invitations to discover something exciting. All



Report for Grabowski classroom

[← BACK](#)

Rated Attributes

Early Childhood Child Behaviors

Work as prop

Engaging with purpose

Offering/receiving help
from peers

Social graces

Interrupting

Initiating work



Report for Grabowski classroom

Navigating the room
with care

Resolving needs with
words

Waiting turn

Handling materials
with care

Joy

Caring for classroom



NATIONAL CENTER for MONTESSORI in the PUBLIC SECTOR

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