

Keynote Address.

presented at 103rd Arizona Town Hall.
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What might AZ do
to more effectively
educate its young
children? What are
the best practices?

Do **NOT** push academics in preschool or kindergarten.

Yikes: “AZ’s implementation of the Common Core Standards has increased the rigor of curriculum beginning in kindergarten.”

Yikes: “**Literacy** is a key focus and is integrated throughout all standards.”

Oral language is the foundation of early literacy (Paris & Paris, 2003; Kirkland and Patterson, 2005; Kendeou et al., 2009).

Oral language is also an important aid in EF development (Vygotsky, 1978) since children talk themselves through what they should and should not do.

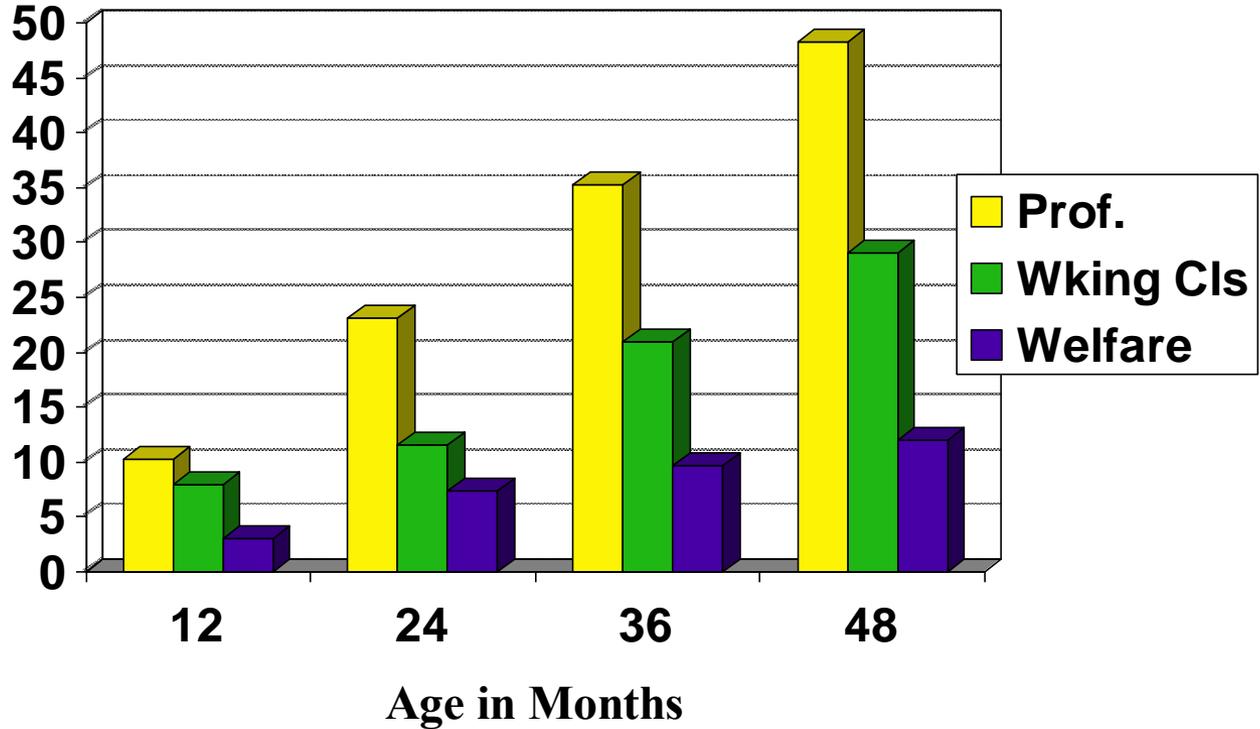
Young children need to
be exposed to A LOT of
RICH ORAL LANGUAGE.



The difference in the number of words that middle-income and low-income children get exposed to in the first 3 years of life is astronomically huge (25 million).



Millions of
Words
Addressed to
Child



of words heard per hour:

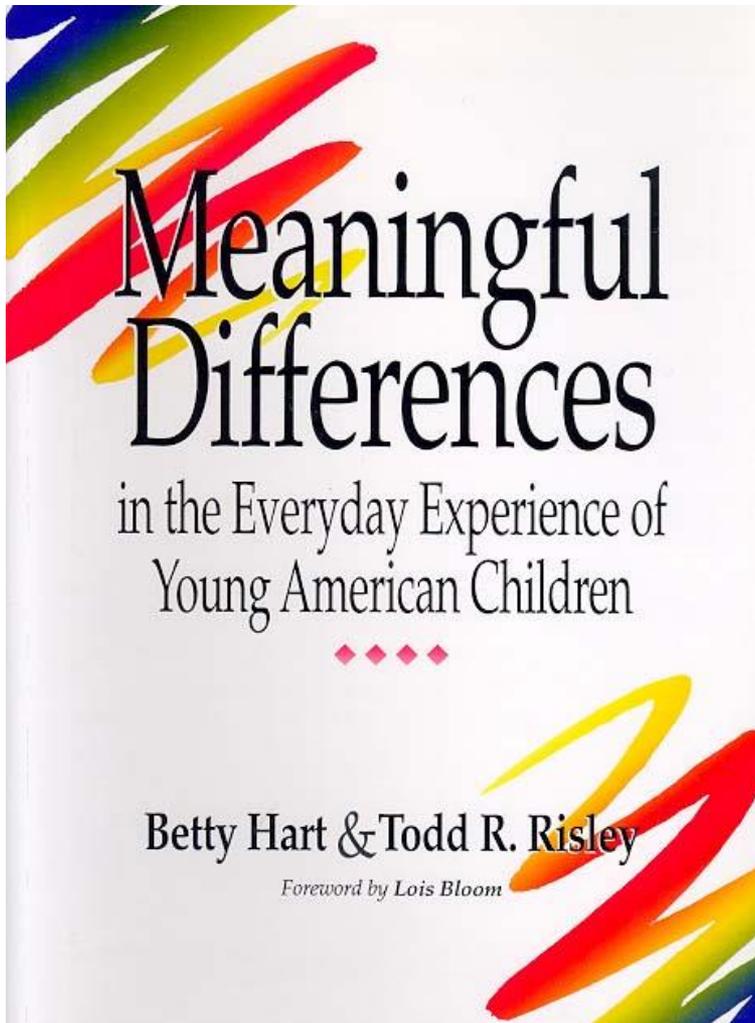
Welfare - 616

Working Class - 1,251

Professional - 2,153

1995: Hart and Risley

Meaningful Differences



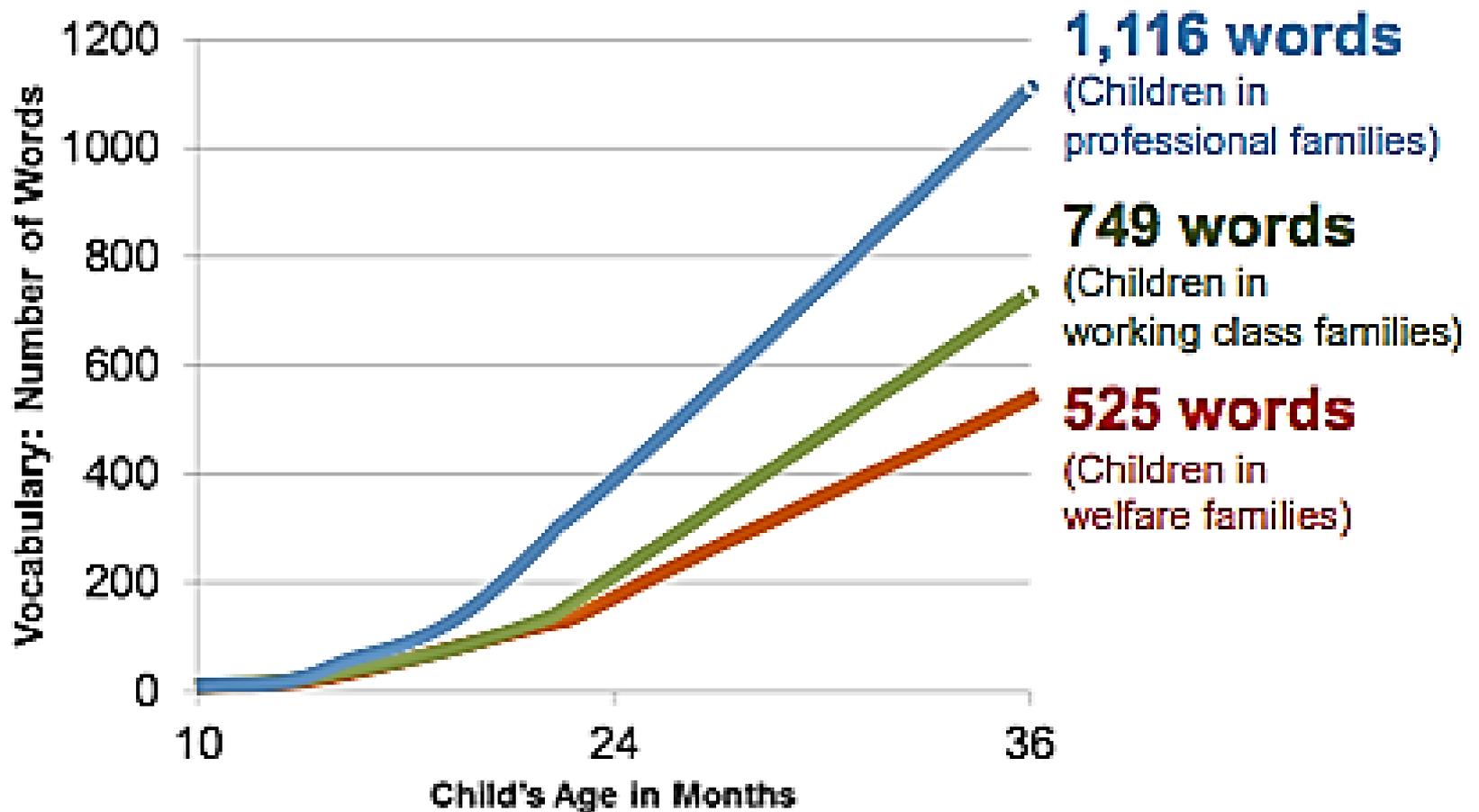
Examines language input to children from...

Welfare

Working class

Professional families

(see also Hoff, 2002, 2003, 2013; Rowe et al., 2013; Pancsofar & Vernon-Feagans, 2010)



**Vocabulary assessed
at age 3 strongly
predicts reading
comprehension at 9-
10 years of age**

A researcher (Gallets 2005) randomly assigned children in Kindergarten & Grade 1 to storytelling or story-reading -- 2x a week for 12 weeks.

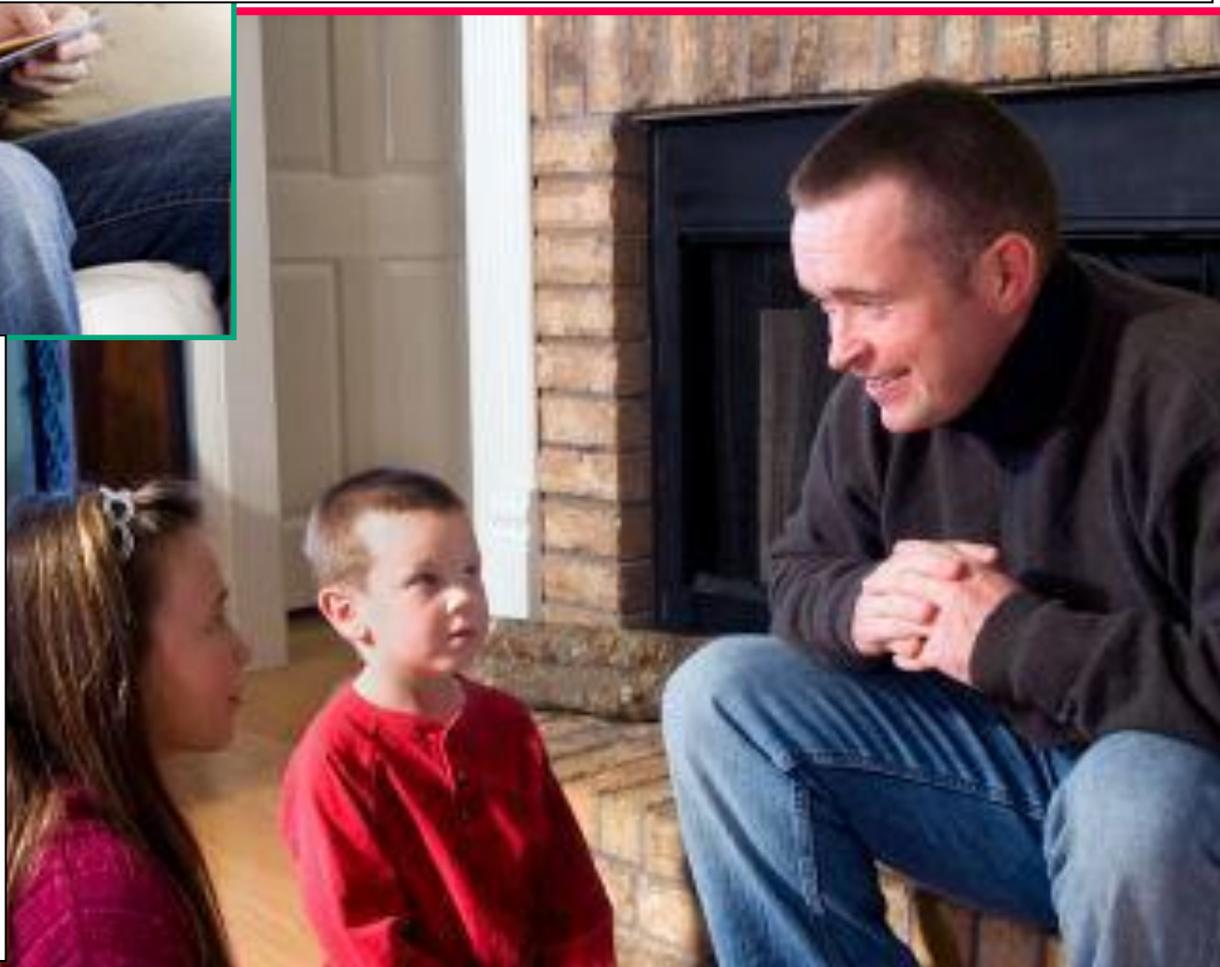
Recall improved more in the children assigned to storytelling than in children assigned to story-reading.

Children in the storytelling condition recalled more story characters & more story episodes than did children in story-reading.

Maybe one reason is that when you are reading to, or with, a child you are looking down at the page.



But when you are telling a story you are looking directly at the children & interacting more.



The more interaction, the more conversation between the story-reader or storyteller & the children, the more actively engaged the children are, the more their vocabulary improves.

Questions interspersed during a story help most, but just commenting during sharing a story helps more than just conveying the story.

The conversation that takes place in the context of reading seems to have more benefit than the reading itself.

Walsh, B.A., & Blewitt, P. (2006). The effect of questioning style during storybook reading on novel vocabulary acquisition of preschoolers. *Early Childhood Education J.*, 33, 273-278.

Sénéchal, M., Thomas, E., & Monker, J. (1995). Individual differences in 4-year-old children's acquisition of vocabulary during storybook reading. *J. of Ed. Psychology*, 87, 218-229.

Kertoy, M.K. (1994). Adult interactive strategies and the spontaneous comments of preschoolers during joint storybook readings. *Journal of Research in Childhood Education*, 9, 58-67.

**Can bring in Elders from
Native Communities,
can bring in retirees from
all communities,
to tell stories to
the children, to
talk with them.**





AVOID children having failure experiences

We are biological built to acquire oral language, but reading is too new; we have no biological predisposition for it.

Some children can easily learn to read at an early age. But critically for some others it is beyond their ability.

We want children to LOVE learning & enjoy school, not to feel that they can't learn & hate school.

And, those who could have easily learned to read early, will make up completely for any lost time when reading is introduced, precisely because it comes more easily to them.

Ex.: Finland -- They don't have children start school or begin to learn to read until they are 7. Finnish children score the best of any children in the entire world in PISA testing.

Dangerous Fallacies:

The earlier you start teaching academic subjects, the better children will be at academic subjects.

If we don't start academics early, our children will be at a disadvantage.

Tortoise & the Hare

**Very often what produces
the best short-term
outcomes
is different from what
produces the best
long-term outcomes**

**Rosenbaum et al., 2001;
many papers by Robert Bjork's lab 2007-2012**

Children drilled in literacy in K will test better on literacy at the end of K than children steeped in oral language in K.

But by the end of Grade 2, those steeped in oral language in K will be the better readers.

Literacy in English ends up being best...

when schools start with
a child's native (first) language.

Why?

- comprehension
- feeling comfortable, at home,
like you belong
- need to start to learn how
language works

THEN, segue into English.

BILINGUALISM

improves EF

development and

speed of processing

LOTS of res., email me for refs.

**AZ is squandering a
HUGE opportunity.**

re: Do **NOT** push academics in preschool or kindergarten.

Concepts are first introduced and grasped **viscerally** in Montessori before any linguistic terms are ever attached to them.

By the time these terms are interested, children have a **deep** understanding of the concept.



Do NOT require young children to sit for any length of time.

It is developmentally inappropriate, and that is especially true for little boys.

Too often, schools are unfriendly or unhappy places for little boys.

And boys are dropping out of school at much higher rates than girls.



Nearly 6.2 million students in the US between 16-24 dropped out of high school in 2007 -- almost half of all public high school students in the 50 largest cities fail to graduate.

Girls graduate high school at a higher rate (72%) than boys (65%) nationally.

The gender gap in graduation rates is particularly large for minority students. While 59% of African-American (58% Hispanic) females graduate high school, only 48% of African-American (49% Hispanic) males earned a diploma (a difference of 11 percentage points).

Civic Report #48 April 2006 Jay Greene & Marcus Winters:
Leaving Boys Behind: Public High School Graduation Rates

And on multiple indicators, the academic performance of boys is declining.

The Pell Inst. reports that 34% of boys are in grades below their age, compared with 26% of girls.

Nationally, women have outnumbered men in university enrollments since 1993.

**The Importance of
...Action for Learning
...Learn through Doing
at any age, but especially for
young children**



Hands-on Learning

We evolved to be able to learn to help us act, to help us do what we needed to do.

If information is not relevant for action, we don't pay attention in the same way (hence the difference in route memory for the driver, versus the passenger, of a car).

You learn something when you NEED it for something you want to DO.

(My son teaching me to program the VCR)

The same is true when we teach children in school. They need opportunities to concretely apply what they are taught. They need to have an immediate need & use for what they are being taught to do something **THEY care about.**

**Decades of research have shown that
our skills improve more & we learn
more when we are actively engaged
than when we passively listen.**

Diamond, A. (2010). The evidence base for improving school outcomes by addressing the whole child and by addressing skills and attitudes, not just content. *Early Ed. and Dev.*, 21, 780-793.

When you have hands on learning,
when children are able to work on
their own or in pairs or small groups
then teachers can then give each
child individual attention:

to observe, to listen, & to teach
(provide individual instruction)

And each child can progress at his
or her own pace.

The teacher then acts as a scientist,
testing out hypotheses about

- why is a particular child having difficulty?
- what kind of assistance might be most helpful to that child?
- are any children ready for new challenges?

This is at least as demanding as my
scientific work. It is not easy. It takes
training.

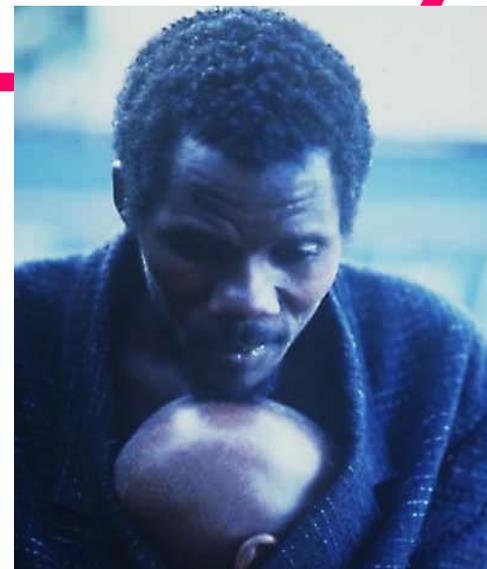
Training in Careful Observation,
Training in Generating
Hypotheses,
Training in Creatively coming up
with just the Right Touch at the
Right Time
Takes Time.

You cannot expect someone with only a high school degree or a year of college to do this well.

Someone who can do this well needs the salary and respect he or she deserves.

And the early years are the hardest years to teach. In high school, teachers primarily need to know their subject. In ECE, teachers need to deeply understand child development, psychology, plus the academic subjects they will teach.

EVERYONE starts out
wanting to be a good
parent - **EVERYONE**



But we have no courses or training in how to be a good parent.

We have courses in SO many other things, but none on parenting.

Generations ago, when we all lived around family, we didn't need that.



AZ could save billions and head off lots of wasted human potential if it provided parents-to-be and new parents with guidance -- such as the Nurse-Family Partnership.

What children need **most**
is to feel the adult taking
care of them genuinely,
truly cares about them.



What matters most in ECE is...

Not the # of children

Not the caregiver: children ratio

Not having the best materials

**but the caring relationship between
the teacher and the children**

**As international studies show (e.g.,
Melhuish , 1990 a & b)**

Jerome Frank conducted a study comparing several different forms of psychotherapy to one another.

He concluded:

“A totally untrained therapist who exercises a great capacity to love will achieve psychotherapeutic results equal to the best.”



The best body of work on the relative effectiveness of different types of psychotherapies comes from

Bruce Wampold, Prof. at Univ. of Wisc. - Madison.

In 2001, he wrote a landmark book:
***The Great Psychotherapy Debate:
Models, Methods, and Findings***

He comprehensively reviewed the research on psychotherapy and concluded that:

**the client-therapist relationship trumps
technique hands down.**



Comparative Efficacy of Seven Psychotherapeutic Interventions for Patients with Depression: A Network Meta-Analysis

Jürgen Barth et al. (2013)

Overall the results are:

The different psychotherapeutic interventions for depression yield comparable benefits.

All 7 psychotherapies tested were better than wait-listing or usual care.

When comparing the therapies with each other, there were small or no differences.

Few studies had ≥ 50 patients. Looking only at those studies, cognitive-behavioral therapy, interpersonal therapy, & problem-solving therapy yielded benefits greater than the other 4 therapies.

“Clients respond more to the **quality of the therapeutic relationship** than to this new technique or that.... The evidence in this book has shown that specific ingredients are not active in and of themselves. Therapists need to realize that the specific ingredients are necessary but active only in the sense that they are a **component of the healing context**. **Slavish adherence to a theoretical protocol and maniacal promotion of a single theoretical approach are utterly in opposition to science.** Therapists need to have a healthy sense of humility with regard to the techniques they use.”

Relationship

RELATIONSHIP

RELATIONSHIP

PISA tests evaluate students' academic performance worldwide.

The 2 countries that come out on top are **Finland and South Korea**.

What do they have in common?

The respect for teachers is enormous.

Teachers are paid extremely well.

Save money on the student: teacher ratio
& on equipment & high tech gadgets

Spend money on teacher training
& teacher salaries





Your humanity is more important than material possessions, supplies, equipment, or even doing the textbook-perfect thing.



**CHILDREN NEED TO
BELIEVE IN THEMSELVES.
THEY NEED TO HAVE SELF-
CONFIDENCE.**



Two routes to that:

- They need to feel **you believe in them** - that you fully expect them to succeed.

&

- They need **do-able challenges**. They need opportunities to do things that enable **them to see for themselves** that they are capable.

Starting point: “There’s no question you are going to master this.”

When a toddler falls while trying to learn to walk, we don’t say he gets a ‘D’; we say, “Don’t worry; I know you’re going to be able to do this.”

**“Treat people as if they
were what they ought to be
and you help them become
what they are capable of
being.”**

– Johann W. van Goethe

Powerful Role of Expectations (by others AND yourself) and Attitude

Pygmalion in the Classroom -- powerful
role of expectations Robert Rosenthal

Stereotype threat - female performance on
math exams Claude Steele

**Another way to show children
we believe in them and have
faith in them is to give them an
important responsibility.**

the 'Coca Cola' study

Do-able challenges:

Pride, self-confidence, joy come from seeing yourself succeed at something that you know is not easy.

Children need opportunities to solve problems.

Listen with your undivided, complete attention but let the solutions emerge from the child.

LESS IS MORE.

We are midwives, facilitators; don't try to do everything for a child.

Children need to feel safe

...to push the limits of what they know,

...to venture into the unknown,

...to take the risk of making a mistake or of being wrong.

The need to know it is okay to make a mistake.

Children can't relax if they're worried you might embarrass them.

Focus on the strengths of each child, rather than on their weaknesses & failings.

Dog training -- negative reinforcement/ feedback doesn't work

Coaches know this too -- focus on the potential

In the SUMMARY I did not see
mention of **INCLUSION**.

Inclusion is critical for both
the special needs child **AND**
the other children.

**Learn... problem-solving skills,
empathy & compassion,
and that we *all* have quirks
and shortcomings, we're all
different, **AND** yet we *all*
have strengths and
contributions to make**

**Expectations often become
self-fulfilling prophecies.**

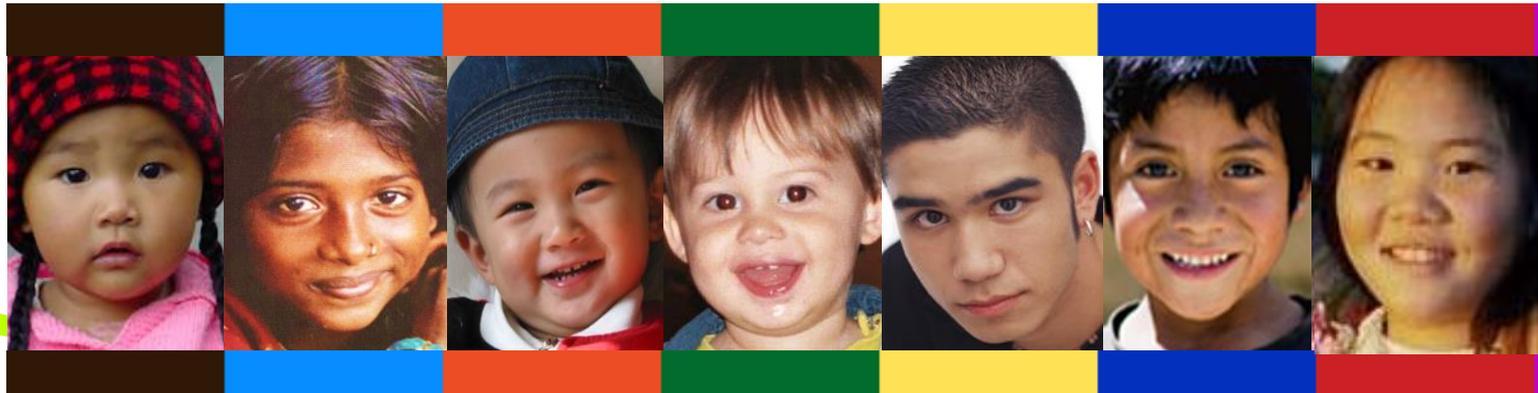


**If we fully expect a child with
special needs will succeed,
the child often will.**

**Children don't just learn
socializing skills & how to build
relationships in ECE, as your
Summary mentions,
they receive critical training
in executive functions!**

My specialty is

“Executive Functions”



Many of the abilities and skills our children need to succeed in life are executive functions.



- **SELF-CONTROL** (resisting temptations, not acting impulsively, taking the time to give a more considered response)
- **DISCIPLINE** (to stay on task & finish what you've started, despite many temptations not to)
- **REASONING** (holding info in mind, relating one idea or piece of info to another)
- **CREATIVE PROBLEM-SOLVING** (thinking outside the box, envisioning new ways to attack a problem)
- **FLEXIBILITY** (to meet novel, unanticipated challenges, take advantage of an unanticipated opportunity, or admit your own error when given new info)

The 3 core Executive Functions are:

- Cognitive Flexibility (including being able to switch perspectives & see things in a new light, also selective attention)
- Inhibitory Control
(which includes self-control & discipline)
- Working Memory (holding info in mind & MANIPULATING it; essential for reasoning)

Higher-order Executive Functions are:

- Problem-solving
- Reasoning
- Planning

**Inhibitory control predicts
academic performance in
the earliest elementary
grades through university
better than does IQ.**

Children with better inhibitory control (i.e., children who were more persistent, less impulsive, and had better attention regulation) as adults 30 years later have...

- **better health**
- **higher incomes and better jobs**
- **fewer run-ins with the law**
- **a better quality of life (happier)**

than those with worse inhibitory control as young children,

controlling for IQ, gender, social class, & home lives & family circumstances growing up across diverse measures of self control.

That's based on a study of 1,000 children born in the same city in the same year followed for 32 years with a 96% retention rate.

by Terrie Moffitt et al. (2011)

Proceedings of the Nat'l Academy of Sci.

“Interventions that achieve even small improvements in [inhibitory 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.”

Working memory is critical for making sense of **anything that unfolds over time**, for that always requires holding in mind what happened earlier & relating that to what is happening now.



How can we stop ourselves from get really upset when a child misbehaves? What we usually get upset about is the intent we think is behind an action.

Could use Cognitive Flexibility to re-frame:

A child might be acting in the most awful manner because he has been terribly hurt and is afraid of being hurt again, so he will push you away before you have a chance to reject him or he will test you to see if are *really* someone he can feel safe with.

If we see the misbehavior as coming from hurt, we can react completely differently.

**Executive Function skills
are more important for
school readiness than are
IQ or entry-level reading or
math.**

**(e.g., Blair, 2002; 2003; Blair & Razza,
2007; Normandeau & Guay, 1998)**

Executive Functions are also important for school success throughout the school years.

(e.g., Blair & Razza, 2007; Espy et al., 2004; Gathercole et al., 2004, 2005; McClelland et al., 2007; Passolunghi et al., 2007; Savage et al., 2006)

Executive Functions are also critical for **job success.**

Poor EFs lead to poor productivity and difficulty finding and keeping a job (Prince et al. 2007).



Executive Functions are also important for marital harmony.

People with poor EFs are more difficult to get along with, less dependable, and more likely to act on impulse (Eakin et al. 2004).



Executive Functions are also important for making and keeping friends, for being accepted by other children.

Children with poor EFs often respond impulsively, have trouble resisting urges, & are forgetful; they don't wait their turn, forget the rules that all agreed to, etc.



Poor EFs can lead to **social problems**

such as **aggression, emotional outbursts, & crime** (Bailey 2007; Broidy et al. 2003; Moffitt et al. 2011; Prince et al. 2007; Saarni 1999).

Early EF gains can reduce the later incidence of aggression & anti-social behavior (Nagin & Tremblay 1999).



EFs are impaired in many **mental health disorders**

e.g., addictions, ADHD, OCD, depression, conduct disorder, & schizophrenia (Verdejo-García et al. 2006; Penadés et al. 2007; Diamond 2005; Lui and Tannock 2007; Taylor-Tavares *et al.*2007; Barch 2005).

Such disorders are increasing at alarming rates (Moffitt et al. 2010; Robinson et al. 1999) & account for more lost years of life & productivity than any other illness including cancer (Prince et al. 2007).



Good EFs are critical for mental and physical health.

For example, individuals with worse EFs are more likely to be obese, over-eat, make poor food choices, drink too much, abuse drugs, & have unsafe sex. They are less likely to sustain close adherence to doctors' instructions.

**EFs are core skills critical
for cognitive, social, and
psychological development,**



**EFs are core skills critical
for cognitive, social, and
psychological development,
mental and physical health,**



EFs are core skills critical for cognitive, social, and psychological development, mental and physical health, and success in school and in life.



EFs during early
childhood often predict
adult outcomes **better**
than does IQ or SES.



**“A good early education
[read EFs] reduces the
incidence of dropouts,
delinquency, teen pregnancy,
& other social problems at
later ages.” --- your Summary**



For example, of 500 fraternal twin pairs, the twin with poorer EC at age 5 was more likely to smoke, do poorly in school, & engage in aggressive or antisocial behavior at age 12, though each pair grew up together.

Wong et al. (2010) in *Epigenetics*

Of 1,000 children born in the same city, same year, those with worse EFs as young children were, as teens, more likely to smoke, make risky choices, have unplanned pregnancies, & drop out of school; & as adults, earned less, were more likely to have a criminal record, an addiction, or be a single parent than those with better EFs as young children, controlling for IQ, gender, SES, & family circumstances (Moffitt et al., 2011)

Teens with poorer inhibitory control were found to be “exponentially more likely” to suffer from 9 of 10 adverse health conditions (e.g., high blood pressure, high cholesterol) examined in a large sample of 14,000 (Miller et al., 2011).

But what gets tested is what gets emphasized.

It is far easier to test academic content, than to test problem-solving, reasoning, creativity, or perseverance.

“Executive Functions”
depend on **Prefrontal Cortex** and the other
brain regions with which
it is interconnected.



Prefrontal Cortex & Executive Functions are the first to suffer, & suffer disproportionately, if we are

- **sad or stressed**
- **lonely or**
- **not physically fit**



We have to care about the whole child (cognitive, social, emotional, and physical) if we want improve academic achievement.

To show the EFs they are capable of, to achieve the academic outcomes of which they are capable, children need to

- feel relaxed and happy (not stressed)
- feel they are in a supportive community they can count on, and
- their bodies need to be fit and healthy.



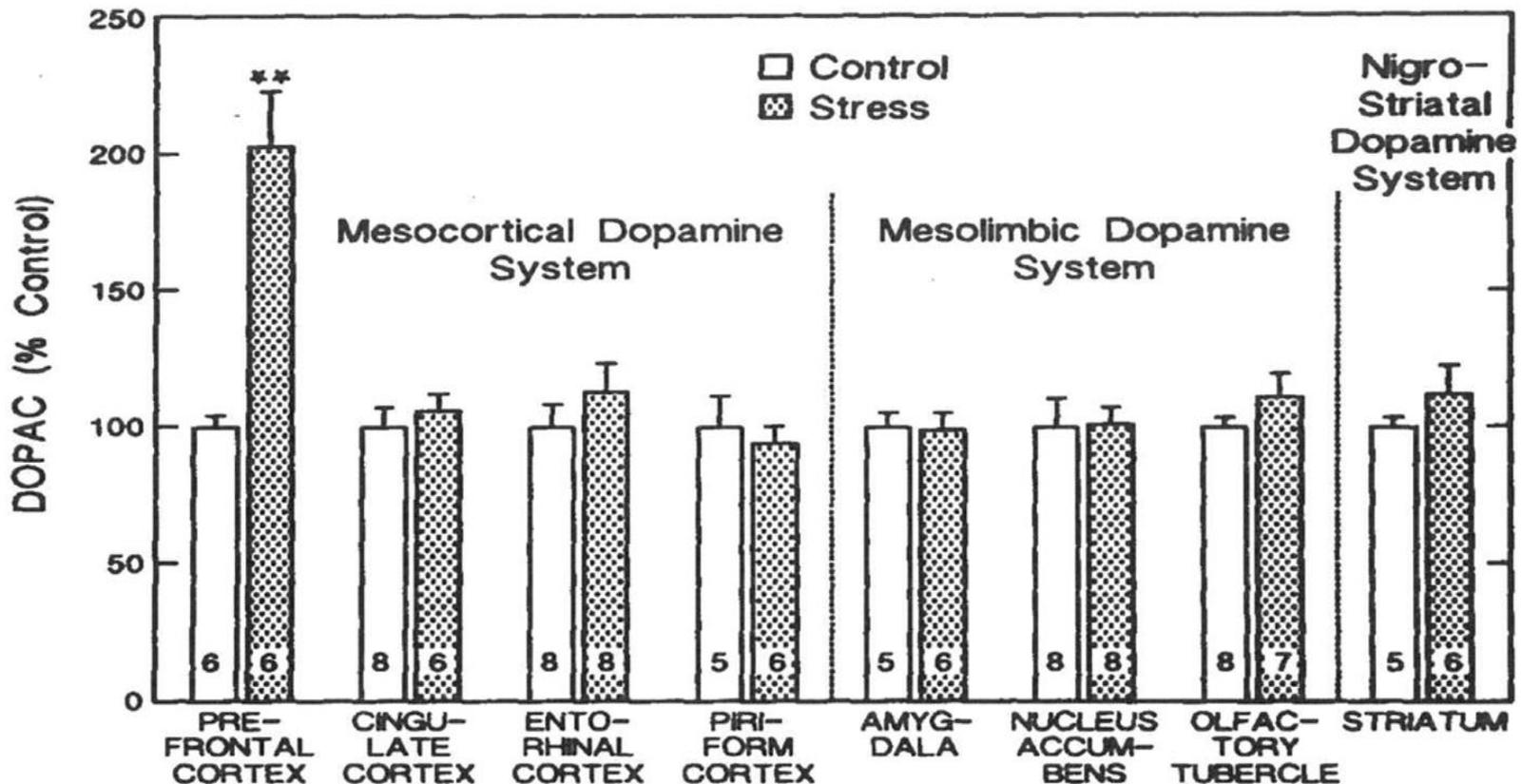
Our brains work better
when we are not in a
stressed emotional state.

Amy Arnsten, 1998
The biology of being frazzled
Science

This is *particularly* true for PFC & EFs.

Stress and Prefrontal Cortex

Even mild stress increases DA release in PFC but not elsewhere in the brain



(Roth et al., 1988)

Stress impairs EFs and can cause anyone to look as if he or she has an EF impairment when that's not the case.

(You may have noticed that when stressed you cannot think as clearly or exercise as good self-control.)

**If you're stressed,
you cannot be the
parent or teacher you
want to be.**

**If you're stressed,
your children will pick on it.
It will cause them to feel
stressed.**

**And if they're stressed, their
EFs will suffer & therefore
their school performance will
suffer.**

Chronic stress is toxic to learning. Children cannot concentrate & they can't remember what they learned.

We have to care about stress in the lives of children and their families.

We also have to care about teachers' & caregivers' stress.

They cannot be the teachers & caregivers we want them to be & that they want to be if they are stressed out.

You're not perfect.

You're going to make mistakes.



RELAX

Imperfect \neq Worthless

**We are not just intellects,
we have emotions
we have social needs
& we have bodies**

Our brains work better when we are not feeling lonely or socially isolated.

Loneliness: Human Nature and the Need for Social Connection
2008

a book by John Cacioppo & William Patrick

This is *particularly* true for PFC & EFs.



Roy Baumeister et al. (2002, *Journal of Personality and Social Psychology*)

- One group of subjects were told beforehand they'd have close relationships throughout their lives;
- another group was told the opposite;
- a third group was told unrelated bad news.

On simple memorization questions, the groups were comparable.

On sections involving logical reasoning (EF), subjects told they'd be lonely performed much worse.

Campbell et al. (2006) found that during math tests there was Prefrontal Cortex worked less efficiently among participants who felt isolated.

We are fundamentally social.

We need to belong.

We need to fit in & be liked.

Children who are lonely or ostracized will have more difficulty learning.

**We are not just intellects,
we have emotions
we have social needs
& we have **bodies****



Children need their sleep.





Lack of sleep will produce deficits in EF skills, and cause someone to look as if he or she has an EF impairment, like ADHD.



Our brains work better when our bodies are physically fit.

Nature Reviews Neuroscience (January 2008)

“Be Smart, Exercise Your Heart:

Exercise Effects on Brain and Cognition”

Charles Hillman, Kirk Erickson & Art Kramer

“There is little doubt that leading a sedentary life is bad for our cognitive health.”

This is *particularly* true for PFC & EFs.



**Young children need
daily physical exercise.**



The brain doesn't recognize the same sharp division between cognitive and motor function that we impose in our thinking.

The SAME or substantially overlapping brain systems subserve BOTH cognitive and motor function.





For example, the pre-Supplementary Motor Area (SMA) is important for sequential tasks, whether they are sequential motor tasks or sequential numerical, verbal, or spatial cognitive tasks.

Hanakawa et al., 2002

**Motor development and
cognitive development appear
to be fundamentally intertwined.**

Diamond, A. (2000)



Close interrelation of
motor development and cognitive development
and of the cerebellum and prefrontal cortex.

Child Development, 71, 44-56



Sitting upright plays a critical role in infant cognitive development

Rebecca Woods &
Teresa Wilcox (2012)
Developmental
Psychology





When cognitive development
is perturbed,
as in a neurodevelopmental
disorder,
motor development is often
adversely affected as well.





For example.....

At least half of all children with ADHD, dyslexia, or autism have poor motor coordination & fit the diagnosis for developmental coordination disorder.

At least half of all children with developmental coordination disorder would also fit the diagnosis for ADHD, dyslexia, or autism.



The different parts of the human being are fundamentally interrelated.

Each part (cognitive, social, emotional, & physical) probably develops best when no part is neglected.

Diamond, 2000

To achieve the academic outcomes we all want...

Note for your Summary

- we need to try to reduce stresses in children's lives & give them better tools to manage stress. Children need to do things that give them JOY.
- no child should feel alone; the classroom, the school community, and the wider community need to be supportive of our children
- we have to care about children's health -- they need good nutrition, sleep, exercise, & time outdoors.

If we ignore that a child is stressed, lonely, or not healthy because of poor nutrition, lack of sleep or lack of exercise those unmet needs will work against that child showing as good EFs as he or she could & doing as well in school as he or she could.

**“Brain-based” does NOT mean
immutable or unchangeable.**

**Experience and activity change the
brain (neuroplasticity).**

EFs depend on the brain --

but they can be improved

by the proper activities at any age

That's good because evidence shows that **early deficits in EFs often do not disappear but can grow larger** (Nigg et al. 2006; O'Shaughnessy et al. 2003; Riggs et al., 2003).



**“Brain-based” does NOT mean
immutable or unchangeable.**

**Experience and activity change the
brain (neuroplasticity).**

EFs depend on the brain --

but they can be improved

by the proper activities at any age

but earlier is better

Children at-risk start school with worse EFs than more economically advantaged children and fall progressively farther behind each school year

(O'Shaughnessy et al. 2003).



Children at-risk fall progressively farther behind other children over the school years (O'Shaughnessy et al. 2003).

That widening gap may result from two opposing dynamisms going in opposite directions.



Consider the negative feedback loop beginning with poor initial EFs:

Poor EFs lead to problems paying attention in class, completing assignments, and inhibiting impulsive behaviors.

School is less fun...

the teacher is always getting annoyed with you & compliance w/ school demands is very hard.

Teachers come to expect poor self-regulation and poor work, and the children come see themselves as poor students.

On the other hand, children who have better EFs are likely to be praised for good behavior, enjoy school more and want to spend more time at their lessons. Their teachers enjoy them and a self-reinforcing positive feedback loop is created.

Powerful Role of Expectations (by others AND yourself) and Attitude

Pygmalion in the Classroom -- powerful
role of expectations Robert Rosenthal

Stereotype threat - female performance on
math exams Claude Steele

Small differences at the beginning can lead to bigger and bigger differences over time.



**Improving EFs early
might be able to nip
that in the bud.**



Indeed, those with initially poorest EFs consistently show the most improvement from any program that improves EFs.

That being so....

Improving EFs **early** might go
a long way to **reducing social**
inequalities in achievement
and in health.



Early EF training is an excellent candidate for leveling the playing field and reducing the achievement & health gap between more- and less-advantaged children.

Science asked me to write a review of all interventions shown to improve EFs in young children

Diamond, A. & Lee, K.

(2011)

**Interventions shown to Aid
Executive Function Development
in Children 4-12 Years Old**

***Science*, vol. 333**

accompanying online tables

Diverse activities including computerized training, aerobics, martial arts, yoga, mindfulness, & certain school curricula have all been shown to improve children's executive functions.

EFs can be improved,
but to do so they need
to be continually
challenged &
practiced.

Older brain regions have had far longer to perfect their functioning; they can subserve task performance ever so much more efficiently than can prefrontal cortex (PFC).

A child may know intellectually (at the level of PFC) that he shouldn't hit another, but in the heat of the moment if that knowledge has not become automatic (passed on from PFC to subcortical regions) the child hit another (though if asked, he knows he shouldn't do that).

knowing what one should do

vs.

2nd nature (automatic)

(i.e., NOT dependent on PFC)

**The only way something
becomes automatic
(becomes passed off from
PFC) is through action,
repeated action.**

Nothing else will do.

**How can someone practice
a skill he or she is not yet
capable of performing?**

The answer: Scaffolds

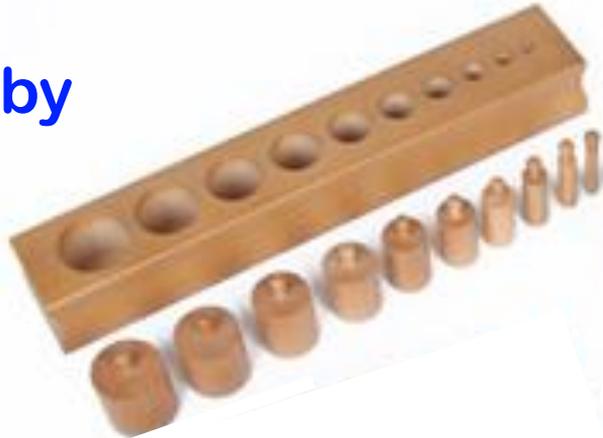


Scaffolds enable children to practice skills they would not otherwise be able to practice.

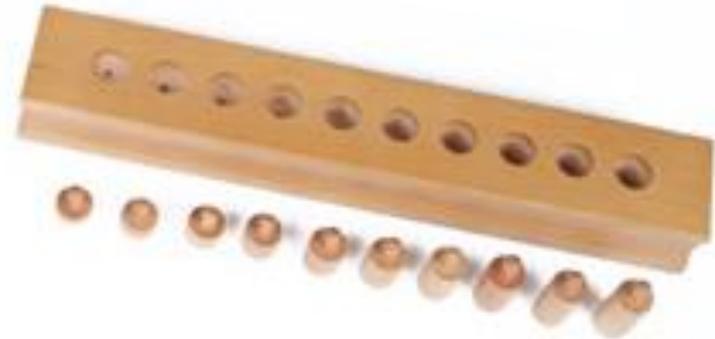




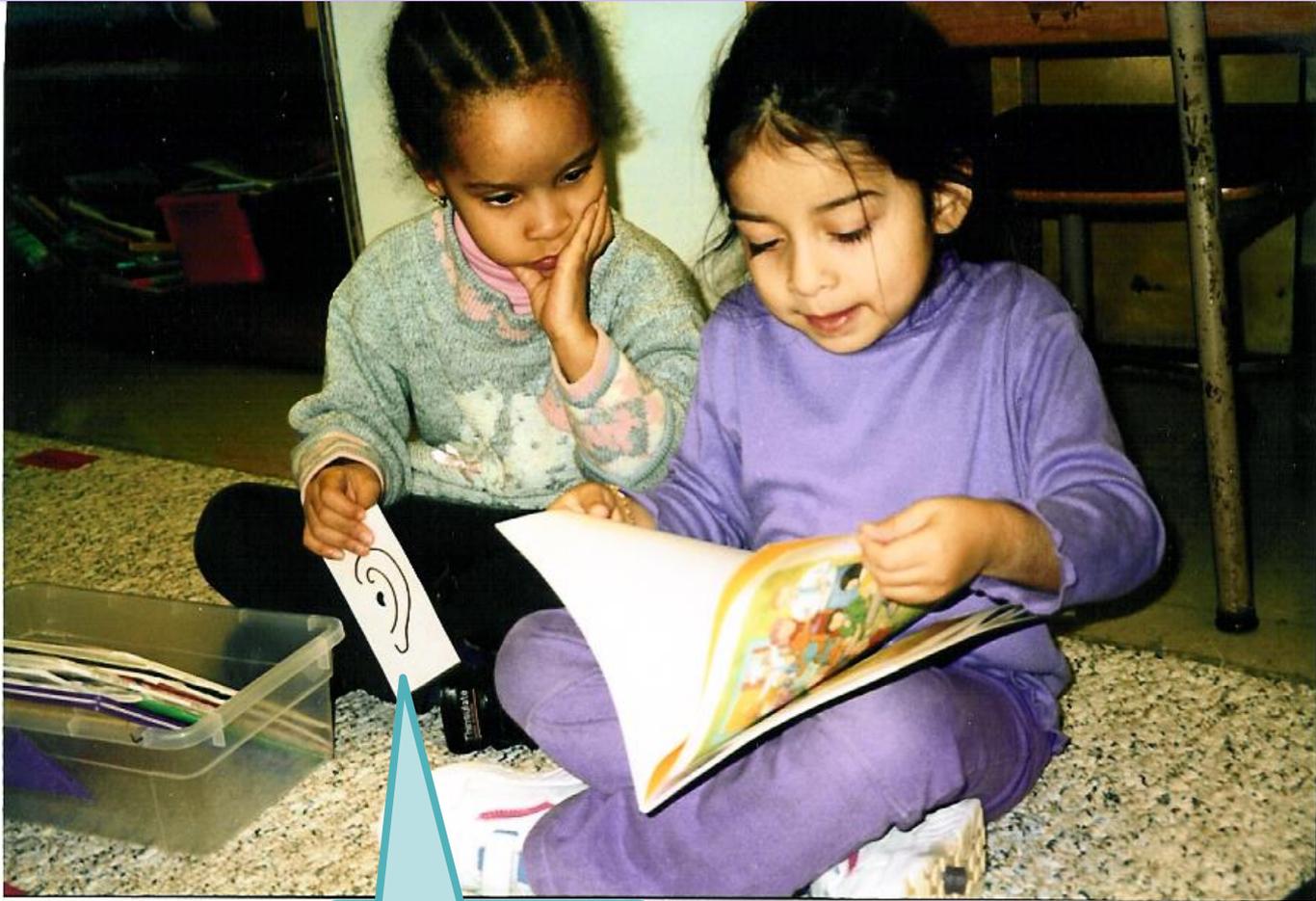
only vary by diameter



only vary by height



Buddy Reading



a scaffold

When their rudimentary EFs are working well **and are scaffolded**, children can work in small groups, pairs, or alone without constant supervision.





**MANY activities not yet
studied might well
improve EFs.**



The most important element is probably that the child really want to do it, so that s/he will spend a lot of time at it.

It's the discipline, the practice, produces the benefits.



**Might as well have children
do something they can put
their heart and soul into.**







El Sistema



The National Dance Institute (NDI) was founded in 1976 by the remarkable Jacques d'Amboise, a former principal dancer for the American Ballet Theater for whom Ballanchine choreographed dances, recipient of the National Medal of Honor - to help troubled youth.

Jacques came from a poor family, dropped out of school, and was headed for trouble. His life was transformed by dance.

NDI has met with great success with some of the poorest, neediest children in New York City slums, Native American reservations, and abroad, including Senegal, West Africa.







could be caring for an animal....





SERVICE ACTIVITIES

activities where the children are working to help their community or people elsewhere

a goal larger than oneself --

helping children in Haiti, helping a local family whose home burned down, lobbying to get a new playground for the neighborhood

Free the Children

Children Changing the World

More than 1.7 million youth involved in innovative education and development programs in 45 countries.

Educates, engages, and empowers young people to be confident young change-makers and lifelong active citizens.



Educators whose students are engaged in Free the Children report:

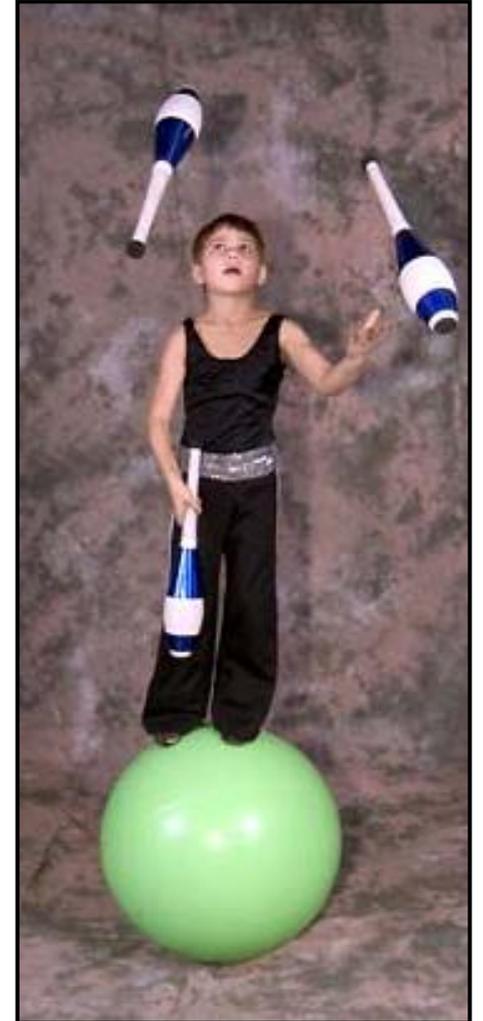
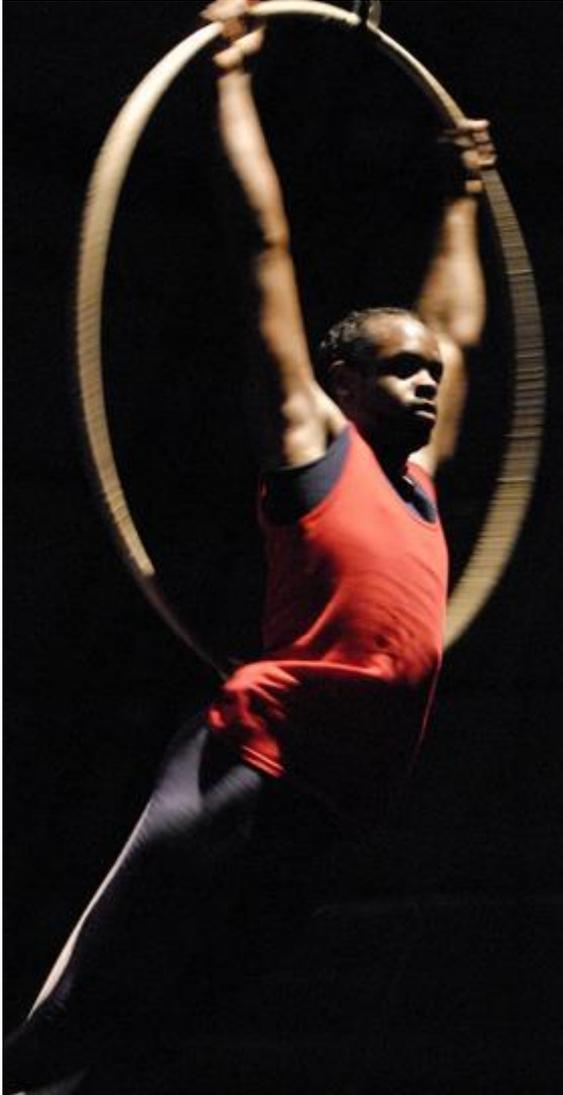
97% of their students now believe they can make a difference in the world.

85% find a greater atmosphere of caring and compassion in the school.

89% confirm that their students are more confident in their goal-setting and completion.

90% of their students have demonstrated increased leadership among their peers.

Youth Circus



These activities

...challenge us mentally,



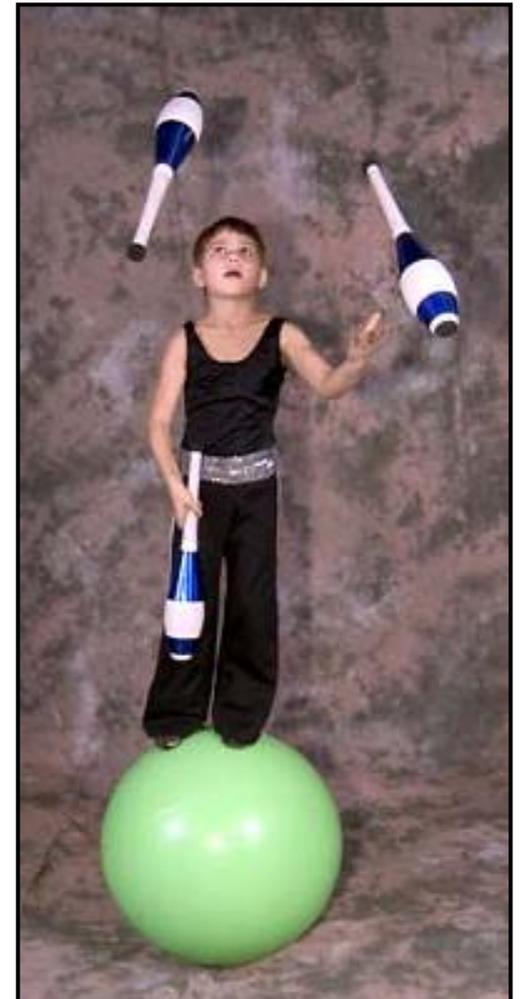
...make us happy & proud,

...address our social needs, and

...help our bodies develop

Circus

challenges one's executive functions;
have to concentrate & *stay* focused



These activities

...challenge us mentally,

...make us happy & proud,

...address our social needs, and

...help our bodies develop

Doing circus arts brings kids JOY
and builds their confidence, & sense of self-
efficacy. They learn that with effort they
can succeed. (fail, then succeed, iteratively)



These activities

...challenge us mentally,

...make us happy & proud,

...address our social needs, and

...help our bodies develop

These activities

...challenge us mentally,

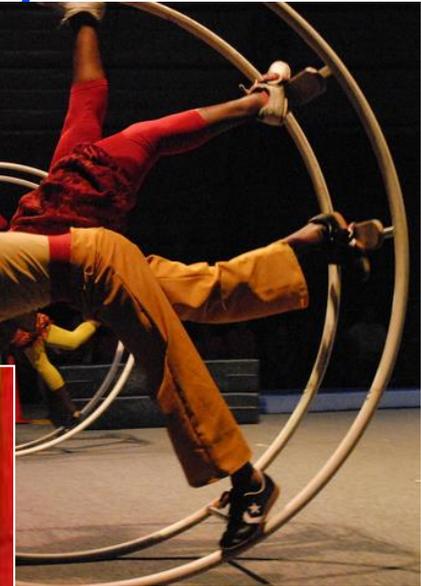
...make us happy & proud,

...address our social needs, and

...help our bodies develop

Circus

develops physical skills (fitness, balance, coordination, strength, flexibility)



Because they challenge EFs directly,
and indirectly support EFs by
increasing joy,
a sense of belonging, &
physical exercise,

I predict they should improve EFs.

(and we're hoping to get funding to test my prediction for
El Sistema Orchestra & for social, communal dance)



For 10's of 1,000's of years, across *all* cultures, storytelling, dance, art, and play have been part of the human condition.

People in *all* cultures made music, sang, danced, and played games. There are good reasons why those activities have lasted so long and arisen everywhere.

**Music-making, dancing, and
playing together address our
cognitive,
emotional,
social, &
physical needs.**



JOY is **NOT** the
opposite of **SERIOUS**

Serious business (like
learning) can be **JOYFUL**

**What nourishes the
human spirit may also
be best for Executive
Functions.**



Perhaps we can learn something from the traditional practices of people across many cultures & 1,000's of years.

The arts, play, and physical activity may be critical for achieving the outcomes we all want for our children.

**How does the
quality and
availability of ECE
affect AZ?**

**It is fiscally
irresponsible to
NOT invest in Early
Childhood Care &
Education**

re: Your Summary

Not that investing in early
education **MAY**...

Investing in early education
WILL reduce costs later

**AND not only because fewer
remedial programs will be
needed**

LOTS of other reasons

**Importance of
getting in early -
of getting children
off to a GOOD start**

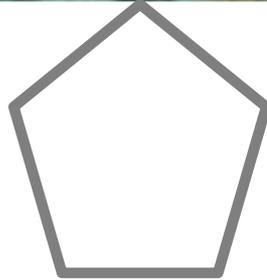
**Preventing problems by getting
children started on a healthy
trajectory with good EFs**

**is far more effective
and far less costly**

**than trying to correct or reverse
problems later once they've been
allowed to develop.**











Improving EFs increases the rate of high school graduation.

The estimated cost savings if the high school graduation rate increases by only 1% is **over \$7.7 billion** for Canada.

It must be in the billions for AZ.

**Predictions about the needs
for future prison capacity
are said to be based on the
percent of 3rd graders
reading significantly below
grade level.**

Remember that Moffitt et al. (2011) predicted that **interventions that achieve even small improvements in [EFs]** for individuals could shift the entire distribution of outcomes in a beneficial direction & **yield large improvements in health, wealth, & crime rate for a nation.**

SAVE MONEY

Experience Corps

**Save 100's of
millions of dollars
a year**



No had ever investigated
the efficacy of
incubators



It turns that **skin-to-skin contact** **blows away** incubators, and the smaller and less stable the baby, the more so.



A randomized control trial in Sweden found that at-risk newborns do FAR better if in skin-to-skin contact with an adult (with all the wires & IV, etc.) than in an incubator.



Swedish hospitals now use skin-to-skin contact as a matter of course and the results continue to amaze doctors and parents.

More survive.

**Those who survive are
healthier.**

They get out in **half the time.**

It costs about $\frac{1}{2}$ million dollars a week to keep an infant in a NICU.

Fragile premies often spend months in the NICU.

For each of the babies who gets out in half the time, AZ would save *at least* 3 million dollars.

Not to mention all the savings in health costs throughout that child's life.



re: Public & Private Resources

Look into EDUCARE

as a model of Public-

Private Partnerships

that work

*thanks so much for
your attention*





Questions?

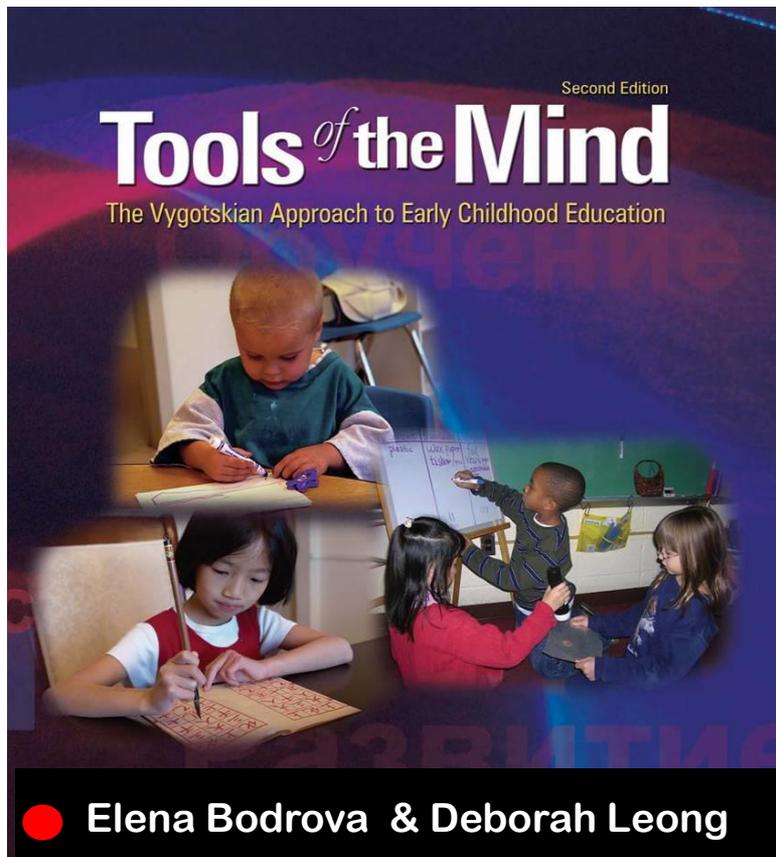
Comments?



My thanks to the NIH (NIMH, NICHD, & NIDA), which has continuously funded our work since 1986, & to the Spencer Fdn, CFI, NSERC, & IES for recent support our work - and especially to all the members of my lab.



School curricula empirically shown to improve EFs share several features in common.



Montessori

By looking at what **Montessori & Tools of the Mind** have in common, perhaps we can learn something about what elements might be most important in early education.



There are no external rewards (no stickers, no gold stars) in either programs.

It's expected that learning and mastery themselves are sufficient reward. And there is decades of research in psychology that backs that up (e.g., White 1959, 1960).

Both programs:

- challenge children to improve; challenge EFs
- scaffold, never embarrass
- hands on learning makes possible:
 - giving each child individual attention - Listen
 - dynamic assessment - carefully Observe
 - individual pacing; individualized instruction
- have children teaching & helping one another
- make it clear they expect each child will succeed
- foster community & consideration for others
- joyful - less stress - more relaxed
- strong emphasis on oral language

For most of our evolutionary past, people lived in close communities and very young children could accompany others as they worked and even contribute to the work.

Infants heard a lot of language; they were spoken sweetly often. They were in almost constant physical contact with another person.

Young children got a lot of exercise, felt proud to be able to help with the work of their elders, felt they belonged to a social group that valued them, and spent most of their time out in the natural world.

If you live on a ranch, farm, or commune where young children can still experience this, your children probably don't need to go to daycare or preschool.

But if your life is more like this (& household chores can be every bit as demanding), then your child is not getting everything he or she needs at home.





If this is all too common
in your home,
then your child needs
preschool.



Mom, even mom & dad, were never intended to do everything, & be everything, for their baby or young child.

Many, many others in the community, including children just a few years older, helped.

Human Interaction is Key

Kuhl examined toddlers learning a second language when a speaker interacted with them & when they saw a video of the speaker doing exactly the same thing; **toddlers learned from the live interaction, but *not* from the video.** (Kuhl et al. (2003) Science)

Walker studied comprehension of oral stories told live or heard from a CD; children enjoyed using the computer but showed **much better comprehension from the live telling.**

PREDICTABILITY



Importance of routine.

**Not changing where things are
or re-arranging to room.**

Enriched

≠

Noisy

Attachment is what we call the love between a baby and a caregiver.

Secure attachment is the **cornerstone for everything else in life** -- interpersonal relations, doing well in school, having the courage to explore & take risks, etc.

Attachment is different from romantic love. Romantic love is monogamous.

But attachment to one person is not diminished by attachment to another person. When we all lived near family, babies were not only attached to mom & dad, but also grandparents, aunts, uncles, and cousins.

Attachment also differs from romantic love in that it is **unconditional**.

As adults we have to work on relationships; we have to earn the affection of another, and we can lose that affection.

Attachment is a love that doesn't have to be earned, can never be lost, and can be **absolutely 100% counted on**. It's knowing beyond any shadow of a doubt that you can count on your parents (or caregivers).

Before the term 'attachment' existed,
ERIK ERIKSON called this

BASIC TRUST, which he defined as

- knowing beyond any shadow of a doubt that you are loved
- feeling the world is basically a good, safe, trustworthy place
 - where you'll be helped if you need it
 - where things make sense and are predictable.

He considered this 'the cornerstone of a healthy personality.'

Normally this happens quite naturally because babies are built to especially like the human face, human voice, human pace of walking, etc.

And we adults are built to especially like happy responses from babies.

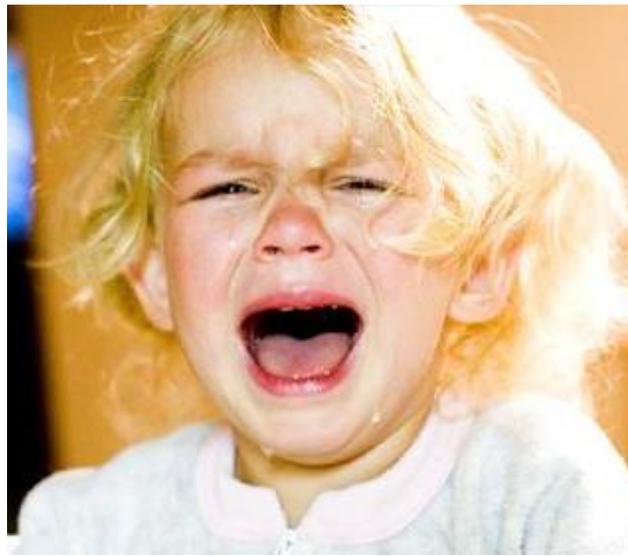
But this can get off track if the baby is premature, has FASD, etc.

Berry Brazelton - videos

Change your expectations. Give the baby more time to respond. Slow down.

Less excitement. Less exuberant bouncing. Softer tones.

When a child **doesn't** feel heard, little things can become **BIG** issues.



In Gottman's studies, if the wife felt she was being heard the marriage was essentially divorce-proof.

Gottman JM & Levenson RW. (1999). Rebound from marital conflict and divorce prediction. *Family Process*. 38(3):287-92.

“Differences must be grasped, even if no problems are solved. One of the reasons empathy works so well is because it does not require a solution. It requires only understanding.”

John Medina, *Brain Rules for Baby*

The most powerful way to communicate to our children that we care about them is to listen to them.

Truly listen.

Give them our time and our attention.

The quality of our listening, rather than the wisdom of our words, is often what has the most impact.

Mindful Listening -- staying fully in the present moment, giving your child your full, undivided attention -- **that's not easy.**

To do that you need to set aside your own worries and preoccupations, thinking about what you need to do next, even trying to anticipate where your child's train of thought is going or whether you are sufficiently in tune with your child.

When we interrupt to try to show we understand, we move the focus of attention to ourselves.

Listening with your heart as well as your head -- listening not just to the words but to what's unspoken.

It's not easy, but it is so worth it:

“The greatest gift
I can conceive of
having
from anyone
is
to be seen by them,
heard by them,
to be understood.”

-- Virginia Satir



Fire

What makes a fire burn
is space between the logs,
a breathing space.

Too much of a good thing,
too many logs
packed in too tight
can douse the flames
almost as surely
as a pail of water would.

So building fires
requires attention
to the spaces in between,
as much as to the wood.

When we are able to build
open spaces
in the same way
we have learned
to pile on the logs,
then we can come to see how
it is fuel, and absence of the fuel
together, that make fire possible.

We only need to lay a log
lightly from time to time.

A fire
grows
simply because the space is there,
with openings
in which the flame
that knows just how it wants to burn
can find its way.

- Judy Brown

**EF skills can be improved
even in infants or preschoolers**

**without expensive, highly
technical equipment**

**by regular teachers
in regular classrooms**

