Fundamentals of School Readiness:
The ABC’s of young children’s social emotional development
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May 17, 2011
Acknowledgements

- Jack Shonkoff, Adele Diamond, Charlie Zeanah, and others who have graciously shared their powerpoint slides with me and whose work inspired this presentation
Overview

- Why this matters
- The ABC’s...
  - Attachment
  - Brain/Biology
  - Caregiving Context
  - Disposition
  - Executive Functioning
- Implications for your work
What is School Readiness?

**USA TODAY Snapshots**

*Early on, social skills trump smarts*

Percentage of 800 kindergarten teachers surveyed who say these skills are essential or very important:

- Paying attention: 86%
- Not being disruptive: 86%
- Following directions: 83%
- Getting along with others: 83%
- Problem-solving: 61%
- Knowing the alphabet: 32%
- Counting to 20: 27%

Source: Mason-Dixon Polling for Fight Crime: Invest in Kids

By Julia Neyman and Alejandro Gonzalez, USA TODAY
School Readiness Skills

- Emotional self-regulation
- Behavioral self-regulation
- Empathy and perspective taking
- Communicating needs, desires & interests in pro-social way
- Understanding cause & effect sequences
- Interest, motivation, persistence

Early Childhood Resource Center, RTI
Development of Abilities

Adapted from: White, B.L., The New First Three Years of Life, (p. 117).
Social Emotional Development

- Inter-relatedness of domains
- Intimately tied to caregivers mental health
- Involves learning to inhibit behaviors
A is for...

Attachment
Attachment

Functions of attachment for human beings:

- Provides sense of security; a feeling of being loved and loveable
- Regulation of affect/arousal through mutuality
- Expression of feelings and communication
- Base for exploration (secure base)
- Learning cause and effect
- Development of conscience
- Ability to develop other attachments
Bowlby’s Ethological Theory

- All humans born with behavioral tendencies that contribute survival of species
  - Built-in behaviors
  - Infant and caregiver both active participants
- Secure emotional bonds develop through learned responses during infant and caregiver interactions
- Attachment behavior universal
- Attachments relatively stable over time
Bowlby’s 4 developmental phases

<table>
<thead>
<tr>
<th>4 Phases</th>
<th>Age range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-attachment</td>
<td>Birth to 2 months</td>
<td>• Built-in signals bring newborn into close contact with other humans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Infant not attached to caregiver</td>
</tr>
<tr>
<td>“Attachment in the making”</td>
<td>2 to 7 months</td>
<td>• Infant responds differently to familiar caregiver and stranger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Infant not protest when separated from caregiver</td>
</tr>
<tr>
<td>“Clear cut” attachment</td>
<td>7-24 months</td>
<td>• Infant displays separation anxiety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Infant uses familiar caregiver as secure base</td>
</tr>
<tr>
<td>Formation of reciprocal</td>
<td>24 months–</td>
<td>• Separation protests decline</td>
</tr>
<tr>
<td>relationship</td>
<td></td>
<td>• Child negotiates with caregiver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Child develops internal working model</td>
</tr>
</tbody>
</table>
Identifying attachment types: The Strange Situation (Ainsworth)

### TABLE 5-1. The eight episodes of the strange situation

<table>
<thead>
<tr>
<th>EPISODE</th>
<th>EVENTS</th>
<th>POTENTIAL ATTACHMENT BEHAVIORS NOTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Experimenter introduces parent and baby to playroom and leaves.</td>
<td>Parent as a secure base</td>
</tr>
<tr>
<td>2.</td>
<td>Parent sits while baby plays.</td>
<td>Stranger anxiety</td>
</tr>
<tr>
<td>3.</td>
<td>Stranger enters, sits, and talks to parent.</td>
<td>Separation anxiety</td>
</tr>
<tr>
<td>4.</td>
<td>Parent leaves, stranger offers comfort if the baby is upset.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Parent returns, greets baby, and offers comfort if baby is upset.</td>
<td>Reunion behaviors</td>
</tr>
<tr>
<td>7.</td>
<td>Parent leaves room.</td>
<td>Ability to be soothed by stranger</td>
</tr>
<tr>
<td>8.</td>
<td>Stranger enters and offers comfort.</td>
<td>Reunion behaviors</td>
</tr>
<tr>
<td></td>
<td>Parent returns, greets baby, offers comfort if necessary, and tries to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>interest baby in toys.</td>
<td></td>
</tr>
</tbody>
</table>

Note: All episodes except the first last 3 minutes, although separation episodes may be abbreviated and reunion episodes extended for babies who become extremely upset.

http://www.youtube.com/watch?v=QTsewNrhUHU&feature=related
## 4 types of attachment

<table>
<thead>
<tr>
<th>Attachment Type</th>
<th>% of U.S. Children*</th>
<th>Description</th>
</tr>
</thead>
</table>
| Avoidant (A)          | 20%                 | - Unresponsive to parent  
                        - Not cry when separated from parent  
                        - Act similar towards parent and stranger  
                        - Avoid parent during reunion            |
| Secure (B)            | 65%                 | - Use parent as secure base from which to explore  
                        - May cry when separated from parent  
                        - Show preference for parent over stranger  
                        - Actively seek contact with parent during reunion  
                        - In mother’s presence may be outgoing with stranger |
| Resistant (C)         | 10% to 15%          | - Seek closeness to parent and often fail to explore  
                        - Become very distressed during separations  
                        - Display anger and not easily comforted during reunions  
                        - Wary of stranger                           |
| Disorganized/Disoriented (D) | 5% to 10%   | - Most insecure; characteristics of Avoidant and Resistant types  
                        - Display variety of confused/contradictory behavior during reunion  
                        - Dazed facial expression                      |

*Distribution differs across cultures partially as a function of child-rearing practices.
Separation Responses

Normal Attachment
- Turns to primary caregiver when hurt or distressed
- Social references caregiver (looks to for guidance or reassurance)

Attachment Problems
- Overly compliant or overly eager about separation
- Separates passively without referencing caregiver
Reunion Responses

Normal Attachment
- Acknowledges or greets caregiver upon return
- Brightens when caregiver returns

Attachment Problems
- Ignores or avoids caregiver upon return
- Displays intense anger or indifference when caregiver returns
Association between attachment and children’s outcomes

- Secure attachment associated with:
  - High social competence (problem solving, social skills)
  - Superior achievement (intellectual curiosity, academic performance)
  - High self-esteem

- Insecure attachment associated with:
  - Poor peer relations
  - Emotional problems (anxiety, aggression)
  - Poor academic performance
  - Physical health problems
B is for...

Brain/Biology
Neurons to Neighborhoods

...virtually every aspect of early human development, from the brain’s evolving circuitry to the child’s capacity for empathy is affected by the environments and experiences that are encountered in a cumulative fashion, beginning in the prenatal period and extending throughout the early childhood years.”

Shonkoff and Phillips, 2000
The brain is a pathway by which experiences get under the skin to affect health, learning and behavior.
The Biology of Brain Development

• Conditions of early life affect the differentiation and function of billions of neurons in the brain.

• This early experience sets up the pathways (connections) among the different centers in the brain.
Human Brain Development – Synapse Formation

Sensing Pathways (vision, hearing) → Language → Higher Cognitive Function

Brain Plasticity Diminishes Over Time

• Brain circuits stabilize with age, making them increasingly more difficult to alter.

• The window of opportunity for adaptive development remains open for many years, but the costs of remediation grow over time.

• It is more efficient, both biologically and economically, to get things right the first time than to try to fix them later.
Relationships are the “Active Ingredients” of Early Experience

- Crucible of infant experiences are in caregiving relationships
- Nurturing and responsive relationships build healthy brain architecture that provides a strong foundation for learning, behavior, and health.
- When protective relationships are not provided, elevated levels of stress hormones disrupt brain architecture by impairing cell growth and interfering with the formation of healthy neural circuits.
Early Childhood Adversity Can Have Lifelong Consequences

Research on the biology of stress helps explain some of the underlying reasons for differences in learning, behavior, and physical and mental health related to early childhood adversity.
### Adverse Childhood Experiences Are Common

<table>
<thead>
<tr>
<th>Household dysfunction:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance abuse</td>
<td>27%</td>
</tr>
<tr>
<td>Parental sep/divorce</td>
<td>23%</td>
</tr>
<tr>
<td>Mental illness</td>
<td>17%</td>
</tr>
<tr>
<td>Battered mother</td>
<td>13%</td>
</tr>
<tr>
<td>Criminal behavior</td>
<td>6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abuse:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>11%</td>
</tr>
<tr>
<td>Physical</td>
<td>28%</td>
</tr>
<tr>
<td>Sexual</td>
<td>21%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neglect:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>15%</td>
</tr>
<tr>
<td>Physical</td>
<td>10%</td>
</tr>
</tbody>
</table>
Adverse Childhood Events and Adult Depression

Chapman et al, 2004
Adverse Childhood Events and Adult Substance Abuse

Self-Report: Alcoholism
Dube et al, 2002

Self-Report: Illicit Drug Use
Dube et al, 2005
Adverse Childhood Events and Adult Ischemic Heart Disease

Dong et al, 2004
Physiological Responses to Stress

- Increased Cortisol Levels
- Higher baseline of stress and startle response
- Tension and contraction of muscles
- May affect the growth and pruning of neural connections
Levels of Stress

- Positive Stress: normative, helps in development
- Tolerable Stress: outside the normal range, one time events, buffered by caregivers
- Toxic Stress: prolonged activation of the stress response system, in absence of buffering adult

Harvard Center for the Developing Child
Emotional Stimulus

Amygdala

Hippocampus

Hypothalamus PVN

CRH

PIT

Adrenal Cortex

Cortisol

ACTH

LeDoux, *Synaptic Self*
Interaction of the Brain and Immune System

Hypothalamus

Pituitary Gland

CRH

Adrenal Gland

Cortisol

ACTH

Immune Cells

Cytokines

Immune Organs

Locus Ceruleus

CRF

Sympathetic Nervous system

Vagus Nerve
C is for...

Caregiving

Context
The Mutual Regulation Cycle

Signals of Need

Security Trust Attachment

Signals of Discomfort

Signals of Comfort

Satisfaction of Need
Effects of Caregiving Context

http://www.youtube.com/watch?v=apzXGEbZht0
Consequences of Perinatal Depression

- **Mother-infant interaction**
  - Mothers: understimulating or overstimulating
  - Infants: Less responsive, more gaze avoidant, more distress

- **Infant development**
  - Emotion dysregulation
  - Cognitive and language delays
  - Increased risk for psychopathology

- **Mothers’ well-being**
  - Decreased Maternal Self-Efficacy

- **Fathers’ well-being**
  - Increased depression & marital stress
  - Increased concern of infants

Field, 1997; Milgrom & McCloud, 1996; O’Hara, 1994
Teachers’ Mental Health Matters Too!

- Teachers reporting higher levels of stress and depression:
  - provide lower quality of care (Weaver, 2002)
  - use a limited variety of teaching strategies, provide less structure and limits (de Schipper, Riksen-Walraven, Geurts & Derksen, 2008; Goldsmith & Rogoff, 1995)
  - interact less frequently with children & interact more negatively with less sensitivity (Hamre & Pianta, 2004)
Healthy Teachers Leads to Healthy Children!

Teachers reporting low levels of stress:
- Are more supportive and more respectful toward children
- Provide higher quality instructions
- Express less negativism
- Express more positive affect toward children

Children who interact with positive, sensitive (unstressed) teachers:
- Demonstrate greater attachment security
- Demonstrate less challenging behaviors

(de Schipper, Riksen-Walraven, Geurts, & Derksen, 2008; Howes, Galinsky, & Kontos, 1998)
D is for...

Disposition
Also known as Temperament
Temperament

- Characteristics of an individual
- Present at birth (and maybe in the womb)
- Evidences some stability
- Criteria for inclusion as a dimension
  - Should be present in all children
  - Significant influence on child’s psychological development
Dimensions of Temperament

- Activity Level
- Rhythmicity
- Distractibility
- Approach/Withdrawal
- Adaptability
- Attention Span/Persistence
- Intensity of Reaction
- Threshold of Responsiveness
- Quality of Mood

- Activity level
- Soothability
- Attention Span/ Persistence
- Fearful Distress
- Irritable Distress
- Positive Affect

(Thomas & Chess, 1977)
(Rothbart, 1981; 2000)
Patterns in Temperament

- Combination or clustering of different dimensions
  - Easy
  - Difficult
  - Slow to warm up
- One-third do not fit into a particular grouping

http://www.youtube.com/watch?v=CGjO1KwItOw
Goodness of Fit

- Extent to which the temperament of the child is compatible with the environment, expectations and demands
E is for...

Executive Functioning
The “Executive Functions” (EF) that depend on prefrontal cortex include 3 core abilities:

1) Inhibitory Control
2) Working Memory
3) Cognitive Flexibility

Adele Diamond, Head Start Conference Presentation
(a) Inhibitory control... is the ability to resist a strong inclination to do one thing and instead do what is most appropriate or needed

Adele Diamond, Head Start Conference Presentation
Being able to...

1) resist first impulse (perhaps a socially inappropriate remark or grabbing another’s toy) and give a more considered (polite) response instead

2) stay on task despite boredom or the temptation to go out and play

Adele Diamond, Head Start Conference Presentation
Being able to…

3) control your attention despite 
   distraction (selective or sustained attention)

e.g., suppressing attention to what 
your neighbors are saying so that 
you can concentrate on what the 
teacher is saying

Adele Diamond, Head Start Conference Presentation
Why is INHIBITION important?

The ability to inhibit a strong behavioral inclination helps make discipline and change possible, as well as social politeness & focused atten.

Inhibition allows us a measure of control over our attention and our actions, rather than simply being controlled by external stimuli, our emotions, or engrained behavioral tendencies.

Adele Diamond, Head Start Conference Presentation
(b) Working Memory:

Holding information in mind while mentally working with or updating it

Tasks such as:

- relating one idea to another
- relating what you read earlier to what you are reading now
- doing mental arithmetic (e.g., adding or subtracting)
- remembering the order in which things need to be done
Why is WORKING MEMORY important?

WM makes it possible to
- consider things from different perspectives,
- understand a story – relating the beginning, middle, & end
- translate instructions into action plans.

It is critical to our ability to see connections between seemingly unconnected things, and hence for creativity, for the essence of creativity is to be able to disassemble and re-combine elements in new ways.

Adele Diamond, Head Start Conference Presentation
being able to flexibly switch perspectives or the focus of attention,
flexibly adjusting to changed demands or priorities.

Note that shifting mental sets involves both: activating the new set & de-activating the old one.

Adele Diamond, Head Start Conference Presentation
Why is COGNITIVE FLEXIBILITY important?

This is critical for creative problem-solving...

for considering something from a fresh or different perspective, and for ‘thinking outside the box.’

Adele Diamond, Head Start Conference Presentation
So, Executive Functions are required whenever going “on automatic” would not suffice or would be detrimental. such as when...

learning new or challenging material, in a noisy or distracting environment, or there are strong temptations to be undisciplined.

Adele Diamond, Head Start Conference Presentation
EF is important for **school** success. Working memory and inhibitory control each independently predict both math & reading competence throughout the school years.

Discipline accounts for over twice as much variance in final grades as does IQ, even in college (Duckworth & Seligman, 2005).

Adele Diamond, Head Start Conference Presentation
Kindergarten children at risk because of economic disadvantage are disproportionately behind in EF relative to other cognitive skills and relative to children from middle-income homes.

(Farah et al., 2006; Noble et al., 2005, 2007; D'Angiulli et al., 2008; Neville & colleagues)
Consider:

Poor EF leads to problems paying attention in class, completing assignments, and inhibiting impulsive behaviors.

School is less fun because…
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.

Adele Diamond, Head Start Conference Presentation
How can we help young children develop these critical executive function / self-regulation abilities?

Adele Diamond, Head Start Conference Presentation
Elena Bodrova & Deborah Leong

PRESCHOOL PROGRAM IMPROVES COGNITIVE CONTROL

Adele Diamond
Steven Barnett
Jessica Thomas & Sarah Munro

SCIENCE
vol. 318, Nov 30 2007

Adele Diamond, Head Start Conference Presentation
Vygotsky: Engagement in mature make-believe play is the major mechanism for developing self-regulation in preschoolers.
During social pretend play, children must hold their own role and those of others in mind (working memory)

inhibit acting out of character (employ inhibitory control), and

flexibly adjust to twists and turns in the evolving plot (cognitive flexibility)

-- all three of the core executive functions thus get exercise.
<table>
<thead>
<tr>
<th></th>
<th>1 or 2 Yrs of District Curr.</th>
<th>1 Yr of Tools</th>
<th>2 Yrs of Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age in years</td>
<td>5.14</td>
<td>5.15</td>
<td>5.12</td>
</tr>
<tr>
<td>Percent Hispanic</td>
<td>93</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>Percent Male</td>
<td>55</td>
<td>41</td>
<td>51</td>
</tr>
<tr>
<td>% w/ family income &lt;$25,000/year</td>
<td>76</td>
<td>71</td>
<td>86</td>
</tr>
<tr>
<td>Avg yrs of mother's ed</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Ns per group</td>
<td>62</td>
<td>32</td>
<td>63</td>
</tr>
</tbody>
</table>

HEARTS & FLOWERS version of the DOTS task from the DIRECTIONAL STROOP BATTERY

Congruent

Push Left

Push Right

Incongruent

Push Right

Push Left
HEARTS - CONGRUENT

Each time you see a HEART, press with the thumb or forefinger on the SAME side as the stimulus.

For example, if the heart appears on the left, press with your left hand.

Remember:

PRESS ON THE SAME SIDE AS THE HEART

Adele Diamond, Head Start Conference Presentation
FLOWERS - INCONGRUENT

Now you'll see a flower. Press on the side OPPOSITE the flower.

For example, if a flower appears on the left, press with your right hand.

(Here, you'll need to inhibit on every trial the natural tendency to respond on the same side as the stimulus)

Remember:

PRESS ON THE SIDE OPPOSITE THE FLOWER

Adele Diamond, Head Start Conference Presentation
HEARTS & FLOWERS-MIXED: Now you will sometimes see a heart and sometimes a flower.

On only half the trials will you have to inhibit the tendency to press on the same side as the stimulus, BUT you'll have to switch between the same-side and opposite-side rules.

The rules stay the same:

For HEARTS, press on the SAME side.

For FLOWERS, press on the OPPOSITE side.

HEARTS - SAME SIDE

FLOWERS - OPPOSITE SIDE

Adele Diamond, Head Start Conference Presentation
Percentage of Correct Responses on the Dots Task - Incongruent Block

Dots Task – Mixed Block
Percent of Children who Passed Criterion for Testing

No Tools

Tools

Almost 2x as many in Tools passed practice

EF skills can be improved in preschoolers.

This can be done in regular classrooms, with regular teachers, without special equipment.

Part of why social dramatic play is important is that it exercises ALL of the 3 key executive functions.

But another reason why PLAY is important is that it is FUN.
Implications for your work...

- [attachment + biology (temperament * executive functioning)] * caregiving + context = school readiness
- Mature dramatic play is a critical determinant of executive functioning and should be emphasized in young children’s lives