### Intervening to Enhance Parenting of Vulnerable Infants: Attachment and Biobehavioral Catch-up

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### Human infant

- Biologically prepared to depend on caregivers
- Parents function as coregulators

### Failures in this caregiving system

Inadequate care, maltreatment, disruptions in caregiving

### Challenges among children who have experienced different types of adversity

- Attachment
- Biological regulation
  - Risk for problems regulating hormone production
  - Risk for problems regulating ANS activity
- Executive functioning
  - Risk for problems with development of range of executive functions

### Attachment and Biobehavioral Catch-up (ABC)

#### Designed to enhance parenting

- Neglecting birth parents of infants
- Foster parents of infants
- Parents adopting children after institutional care

Randomized clinical trials conducted with each of these groups

Mothers with opioid dependence

### Attachment and Biobehavioral Catch-up (ABC)

- 10- session intervention
- Targets key issues identified as problematic for children who have experienced early adversity
- Implemented in home

#### **Targets of Intervention**



### Nurturance

- Nurturance especially important for young children who have experienced adversity
  - Difficult to organize attachment behaviors without nurturing parent
  - Dozier et al., 2001

### Nurturance

- Nurturance especially important for children who have experienced early adversity
- Two things can get in the way
  - Children may push away
  - Nurturance does not come naturally to some parents

### Parents often do not provide nurturance when child turns away

 Contingency analyses reveal that parents respond "in kind"

Stovall-McClough & Dozier, 2004

### First target for intervention: Provide nurturance even when child does not elicit it

This child needs you even though she may not appear to need you

## Characteristic ways parents may be non-nurturing

- Exactly! I told you! (fussing)
- You're ok. You're not hurt. (dismissing)
- It's not broken. (making fun of child)
- You're a big boy.
- Look outside. There's a butterfly! (distraction)
- Ignore

All of these – giving child message that he or she shouldn't bring distress to parent

### How intervention is implemented

### Manualized content

- Present videos of other parents and of themselves
- Present evidence supporting importance of nurturing care
- In-the-moment comments

### **ABC intervention sessions**

#### **Manualized content**

#### Sessions 1-2: Providing nurturance

- Sessions 3-4: Following child's lead
- Sessions 5-6: Avoiding intrusive and harsh behavior
- Sessions 7-8: Over-riding "voices from the past"

Sessions 9-10: Consolidating

### How intervention is implemented

### Manualized content

- Present videos of other parents and of themselves
- Present evidence supporting importance of nurturing care
- In-the-moment comments

### Comments can have 1-3 components

Description of parent behavior
 "He's crying and you're holding him"

2. Link parent behavior to intervention target "*Good job nurturing him"* 

3. Link parent behavior to child outcome "That lets him know you're there for him"

### Coding 5 minute clip

Targets (Parent Behavior & Coach Comments)	No. Components		
1 = Follows the lead	0 = 0 components		
2 = Does not follow the lead	1 = 1 component		
3 = Delights in child	2 = 2 components		
4 = Follows the Lead with Delight	3 = 3 components		
5 = Nurtures			
6 = Does not nurture			
7 = Behaves in frightening way			
8 = Off-Target Comment			
0 = No Comment			

(Time) Description of Parent's Behavior	Behavior Target (1 - 7)	(Time) Parent Coach's response	Response Target (0 - 8)	Number of components (0 - 3)
Child cries while mother is holding him	5	"He's crying and you're holding him. Good job nurturing him. That lets him know you'll be there for him."	5	3

### **Targets of intervention**



### **Biological dysregulation**

Early adversity leads to biological dysregulation

Non-human and rodent (as well as human) studies have shown effects of early experience on HPA axis (e.g., Coe et al., 1985; Levine et al., 1983)

### HPA axis

H - Hypothalamus P - Pituitary A – Adrenal

Cortisol an end product

Sensitive to effects of early experience



### HPA axis: 2 orthogonal functions

### Stress reactive function

- Body's mounting a stress response
- Diurnal function
  - Organism functioning as diurnal (or nocturnal) creature

### When we measure cortisol



hg/dl

### Early adversity and diurnal cortisol



Bernard et al., 2010, Archives Ped Adol Med

### Dysregulation

- Biological dysregulation: cortisol
- Behavioral dysregulation:
  - Behavior problems
  - Inhibitory control

### Second target for intervention: Helping children develop better regulatory capacities

 Parents who follow child's lead have children with better self- regulation (Raver, 1996)

## Characteristic ways parents may follow the lead

- Follow child's behavior or vocalization
- Comment on what child is doing

Smooth interactions that are regulating

## Characteristic ways parents may not follow the lead

- Intrusive behaviors (e.g., messing with her head)
- Take control
- Correct child
  - Teachy ("what color is it?")
  - Bossy ("no, that's not how you do it")
- Ignore child

- Interactions are jarring, dysegulating
- As children get older, these interactions don't hold attention

### Comments can have 1-3 components

1. Description of parent behavior "Like her reaching out and your giving it to her"

2. Link parent behavior to intervention target

3. Link parent behavior to child outcome "That's going to make her feel important and like she can have an effect on things around her"

In the Moment Fidelity Coding		Targets (Parent Behavior & Coach Comments)	No. of components	
		1 = Follows the lead	0 = 0 components	
Coder:		2 = Does not follow the lead	1 = 1 component	
Date coded:		3 = Delights in child	2 = 2 components	
Coach First & Last Name:		4 = Follows the Lead with Delight	3 = 3 components	
Coach's Organisation:		5 = Nurtures		
Case:		6 = Does not nurture		
Session #:		7 = Behaves in frightening way		
Session date:		8 = Off-Target Comment		
Time coded:		0 = No Comment		
				Numver of
	Behavior Target		Response Target (0 -	components
(Time) Description of Parent's Behavior	(1 - 7)	(Time) Parent Coach's response	8)	(0 - 3)
Child hands out paper to mother. Mother	1	"Like her reaching out and your giving it to her. That's	1	2
takes it.		going to make her feel important and like she an have an		
		effect on things around her."		

#### **Targets of intervention**



### **Frightening behavior**

- Harsh, frightening, and/or intrusive behavior
  - Undermines child's ability to regulate behavior and biology
  - e.g., Bernard et al., 2010; Lyons-Ruth et al., 1993; Madigan et al., 2016

### **Assessing effectiveness**

Randomly assigned children and parents to Attachment and Biobehavioral Catch-up (ABC) or to an alternate intervention (DEF)

Focus here on outcomes for neglected/CPS-involved sample (n=120)

Children birth-24 months at start of intervention

### **DEF** (Developmental Education for Families)

Control intervention focused on cognitive and motor development

Structure same as for ABC 10 weekly sessions in home

## Intervention effects on child attachment security

- Assessed in Strange Situation
- Parents involved in child welfare system
- N=120

Secure

Insecure

## Intervention effects on child attachment security



### Intervention effects on diurnal cortisol production

 Assessed at wake-up and bedtime postintervention over 3 days



### Early adversity and diurnal cortisol



Bernard, Butzin-Dozier, Rittenhouse, & Dozier, 2010

### Intervention effects on diurnal cortisol 1 month post-intervention



Bernard, Dozier, et al., 2015, Development and Psychopathology

### Intervention effects on diurnal cortisol 3 years post-intervention



Bernard, Hostinar, & Dozier, 2015, JAMA - Peds

### **Inhibitory control**

- Inhibitory control is key to success in school (Blair et al., 2007; Kochanska et al., 1994; Mischel et al., 1972)
  - Doing what one is supposed to do
  - Inhibiting prepotent response

### **Assessment of inhibitory control**

- Put attractive toys in front of child
- Tell him or her not to play with them, instead play with crayons (boring in this context)

### Intervention effects on inhibitory control



Lind, et al., 2017

# Child brain activation (assessed through fMRI)

- Study differences in brain functioning among children
- N=75 (25 ABC, 25 DEF, 25 low-risk)
- In collaboration with Nim Tottenham

### **Attention to threat task**



#### Push button when you see butterfly

### **Attention to threat task**

### Fear faces (High Risk minus Low Risk)



 High risk (ABC + control) greater activation of occipital cortices and fusiform gyrus than low risk

High Risk → greater attention to threat

### **Attention to threat task**

### Fear faces (ABC minus DEF)



- ABC children had greater activation in
  - R orbitofrontal cortex
  - R Insular cortex
  - Anterior cingulate cortex

than control children while viewing fear faces

ABC  $\rightarrow$  greater regulation to threat

### ABC affects targets and outcomes (assessed through RCTs)

### Child:

- Attachment
- Cortisol production (immediate and 3 years post-intervention)
- DNA Methylation (whole genome analyses Hoye and Roth)
- Language development (2 years post-intervention) (Raby)
- Emotion expression (2 years post-intervention) (Lind)
- Executive functioning (3 years post-intervention)
  - Inhibitory control (Lind)
  - Set-shifting (Lewis-Morrarty)
- Security (8 years post-intervention) (Zajac)
- Neural activity/EEG (8 years post-intervention (Bick)
- Brain activation/fMRI (8 years post-intervention (Valadez & Tottenham)
- ANS regulation (9 years old) (Tabachnick)

## Intervention effects on parental sensitivity

- Parents who received ABC more sensitive and less intrusive (assessed behaviorally) at postintervention than DEF parents
- These gains sustained 3 years later
  Bick & Dozier, 2013; Raby et al. in prep; Yarger et al., 2016

### Intervention effects on parental neural activity

 Neural activity of neglecting mothers indicated failure to discriminate faces (Rodrigo et al., 2011)

### Intervention effects on mothers' neural activity 3 years post-intervention

- Looked at through event related potentials (ERPs)
- Compared 3 groups:
  - Low-risk comparison
  - DEF (high-risk control)
  - ABC (high-risk experimental)

Kristin Bernard dissertation

Bernard et al., 2015, Child Development

### **Results- N170**

#### Low-risk comparison group



Bernard, Simons, & Dozier, 2015, Child Development

### **Results- N170**

#### DEF (High-risk control group)



### **Results- N170**



### ABC affects targets and outcomes (assessed through RCTs)

#### Parent:

- Sensitivity (3 years post-intervention)
- Neural activity/ERP (3 years post-intervention) (Bernard)
- Attachment script knowledge (Raby)

#### Child:

- Attachment
- Cortisol production (immediate and 3 years post-intervention)
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## Comments regarding following the lead and nurturance

Central to the intervention

# In-the-moment commenting predicts change in parenting

- In-the-moment commenting predicts parenting behavior
  - Higher frequency of on-target comments
  - More components included in comments

Greater increases in parent following lead and greater decreases in intrusiveness

Caron et al., 2016

### Alignment of screening, training, supervision, fidelity monitoring (with regard to active ingredient)

- Screening
- Training
  - Introduce on day 1 of training
- Supervision
  - 30 minutes of supervision on in-the-moment comments weekly for 1 year
  - 60 minutes of clinical supervision
- Certification
  - Must meet criteria (e.g., 1 comment per minute, at least 1 component per comment, etc.)

### Pre- and post-intervention parenting behaviors in community (n=315, 18 sites, 36 parent coaches)



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