



Self-Regulation in Context: Developmental Processes at Home and School

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Human Capital Research Collaboration

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Self-Regulation

Home

School

Stress Physiology

Parent-Child Processes

- Sensitivity
- Co-regulation
- Speech Prosody
- Touch

HPA Axis

- Cortisol

Autonomic (ANS)

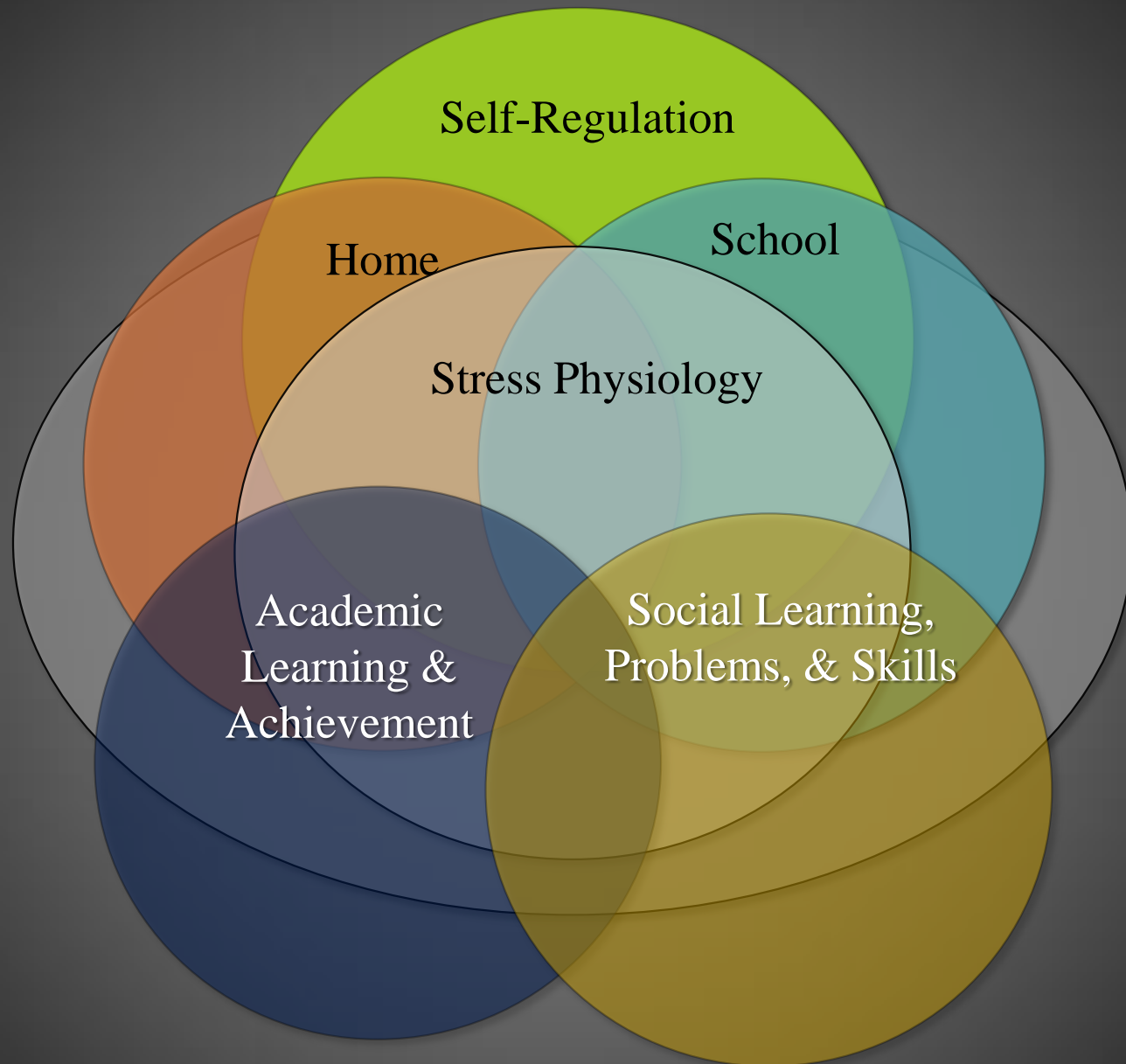
- Vagal Tone & Regulation
- PEP
- sAA

Teacher & Peer Processes

- Classroom Climate
- I-C Relationships
- Social Networks

- Poverty
- Social Marginalization
- Social Policy

Distal Ecology



Berry et al., 2012; Blair & Razza, 2007; Espy et al., 2004;
Masten et al., 2012; Mischel et al., 1989 ; Ponitz et al., 2009;
Raver et al., 2011

Carlson et al., 2004; Doan et al., 2012; Eisenberg et al.,
2009; Hughes & Ensor, 2010; Sequin et al., 1999; Sulik,
Blair, Berry, & Greenberg, 2015

Contextual Risk & Self-Regulation



Distal Factors:

- **Income/poverty**
(Raver, Blair, & Willoughby, 2013)
- **Cumulative risk**
(Evans, Li, & Whipple, 2013)

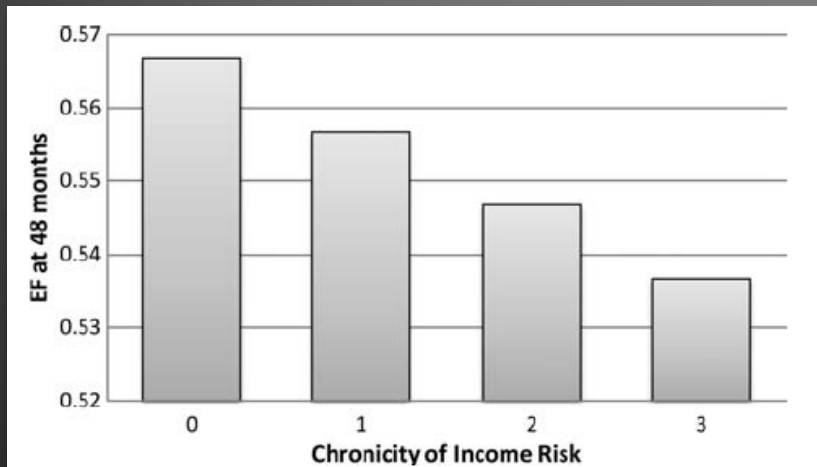
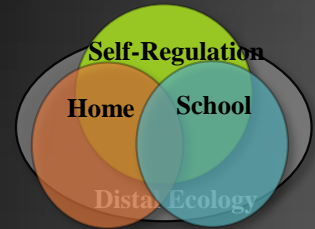


Figure 1. Executive functioning (EF) at 48 months predicted by chronicity of income risk, where chronicity (i.e., a value of 0, 1, 2, or 3) is defined as the number of 12-month time periods in which family income falls at or below the U.S. poverty threshold.

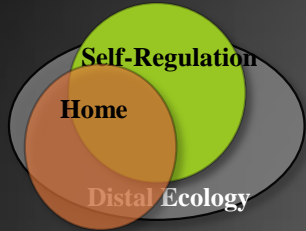
Contextual Risk & Self-Regulation

Proximal Factors: *Parent–Child Interactions*

- Parental sensitivity (Raver, Blair, & Berry, 2014)
- Scaffolding/autonomy support (Bernier, Carlson, & Whipple, 2010)
- T–C relationships (Berry, 2012; in prep)



Contextual Risk & Self-Regulation



Proximal Factors:

Household Chaos

- Disorganization
- Unpredictably
- Instability

Early Childhood

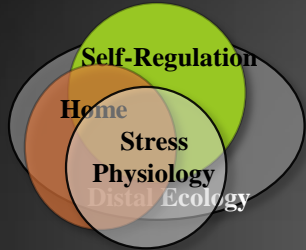


Middle to Late Childhood

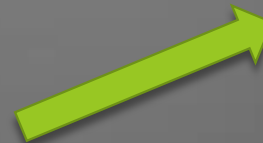
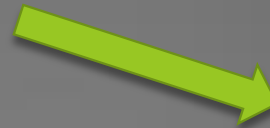
- Self-regulation (behavioral)
- Behavior problems
- Academic achievement



Contextual Risk, Self-Regulation, & Stress



Physiological Stress:



Early
Childhood?

Autonomic
(e.g., RSA, sAA)

HPA axis
(e.g., cortisol)

Allostatic load
(e.g., physio
composite)

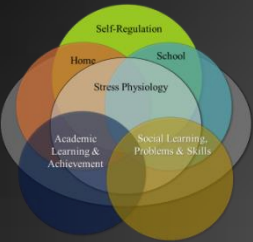
Child-Fixed Effects: Chaos \rightarrow sAA & Cortisol (Berry et al., submitted)

Contextual Risk, Self-Regulation, & Stress

Early Childhood Across Contexts

Non-Parental Childcare (CC)

- 43% children in poverty attend regular non-parental care by nine months (Capizzano & Adams, 2003).
- Lower Risk Populations:
 - ↑ CC hours (especially center-based), ↑ Behavior problems (Belsky et al., 2007; NICHD ECCRN, 2003)
 - CC days predict atypical cort vs. Home days (Dettling et al., 1999; Tout et al., 1999; Phillips et al., 2011; Watamura et al., 2003; Vermeer & van IJendoorn, 2006)
- Links with self-regulation/EF → Less clear



Contextual Risk, Self-Regulation, & Stress

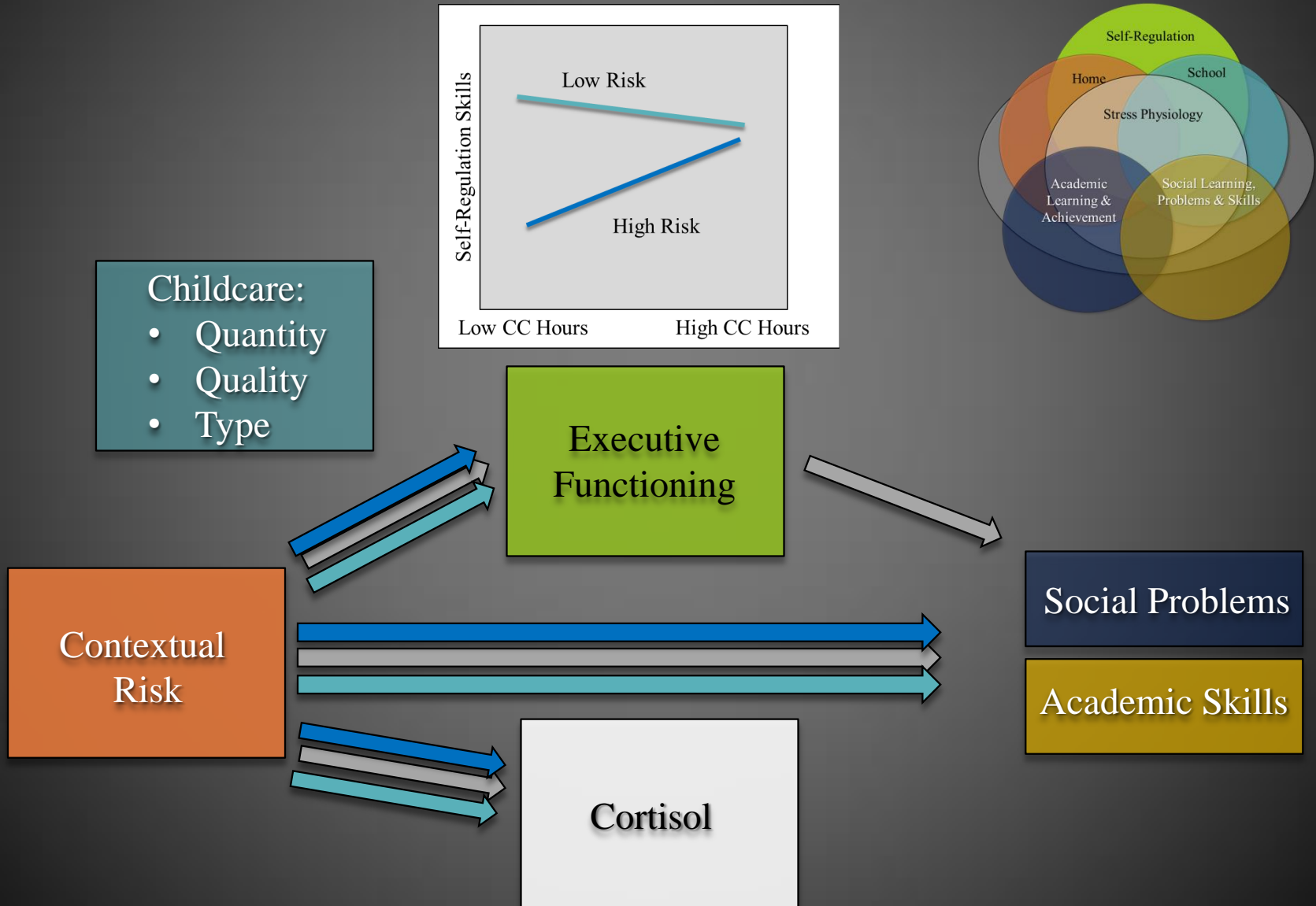
Early Childhood Across Contexts

Non-Parental Childcare (CC)

- 43% children in poverty attend regular non-parental care by nine months (Capizzano & Adams, 2003).
- Higher Risk Populations:
 - ↑ CC hours/ exposure, ↓ Behavior problems (maybe) (Côté et al., 2007 ; 2008; Votruba-Drzal et al., 2004)
 - Links with stress physiology → Less clear (though Rappolt-Schlictmann et al., 2009)
 - Links with self-regulation/EF → Less clear



Contextual Risk & Childcare → Self-Regulation & Stress Physiology

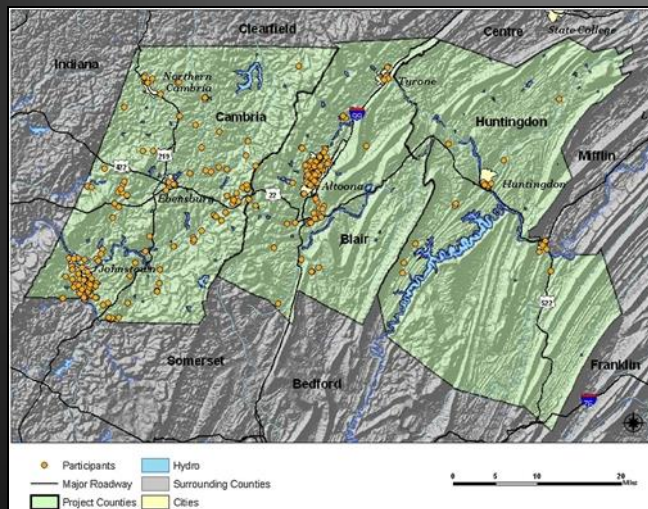


Contextual Risk, Childcare & Self-Regulation

The Family Life Project (FLP)

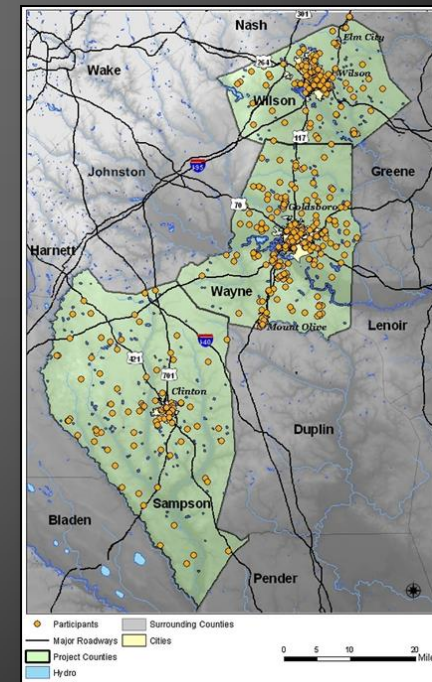


- Prospective, longitudinal study of 1,292 children from low-income families in rural contexts in PA and NC.
- Birth → Grade 8 (for now)



Federal Poverty Threshold	<200%	>200%
African American	490	29
Non-African American	512	201

Vernon-Feagans et al., 2013



Contextual Risk, Childcare & Self-Regulation

Main Substantive Predictors (7, 15, 24,36 months):

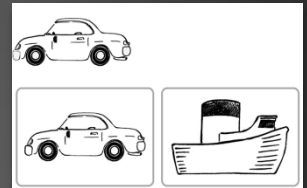
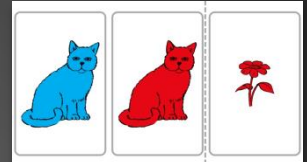
- *Household Chaos: Disorganization*
 - Composite of household density, noise, cleanliness, physical safety, family preparedness for visit, and daily hours of TV (Vernon-Feagans et al., 2012)
- *Childcare Variables:*
 - Childcare Quantity: Maternal report; hours per week in non-parental care (7-36 months)
 - Childcare Quality: CFA of observer ratings Caregiver Responsivity (HOME scale; 7-36 months)
 - Childcare Type: Spells in center-based care
- Aggregated as mean levels 7-36 months*



Contextual Risk, Childcare & Self-Regulation

Child Outcomes:

- Executive Functioning (48 mo): Latent factor across 6 EF tasks tapping inhibitory control, working memory and attention shifting.
- Social Problems (age 5): Latent factor across 4 teacher-rated scales tapping social and emotion regulation problems (SDQ (Boardman et al., 2005); Social Competence Scale (Dodge et al., 1994); TOCA-R (Werthamer-Larssen et al., 1991)).
- General Early Academic Skills (age 5): Latent factor comprising W scores from the Applied Problems, Quantitative Concepts, and Letter-Word Id scales of WJ-III (Woodcock et al., 2001)
- Receptive Vocabulary (age 5): PPVT-4 (Dunn & Dunn, 2007).



Contextual Risk, Childcare & Self-Regulation

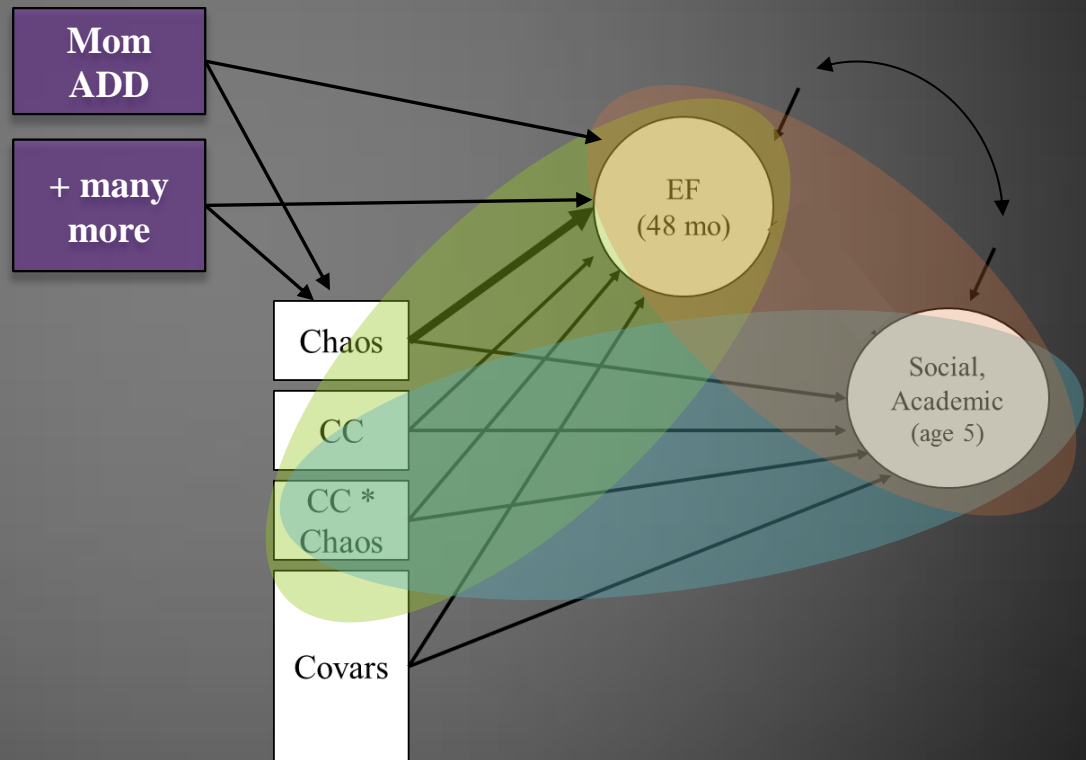
- *Analytic Plan: SEMs +*

- +: Inverse Generalized Propensity Score

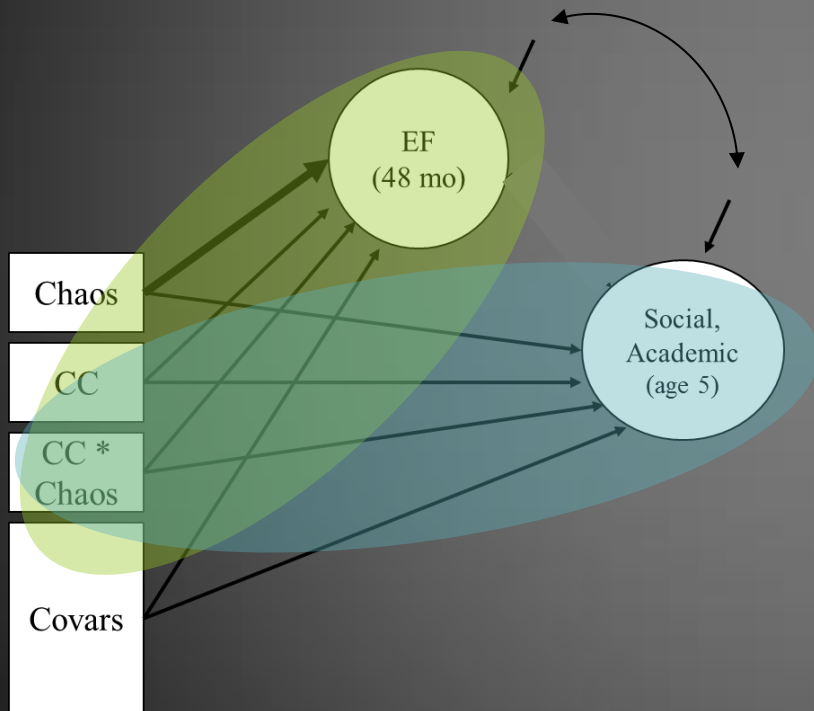
- Weighting (IPWT)

- *IPWT*: Creates ‘pseudo-population’ in which confounds are balanced across treatment units.

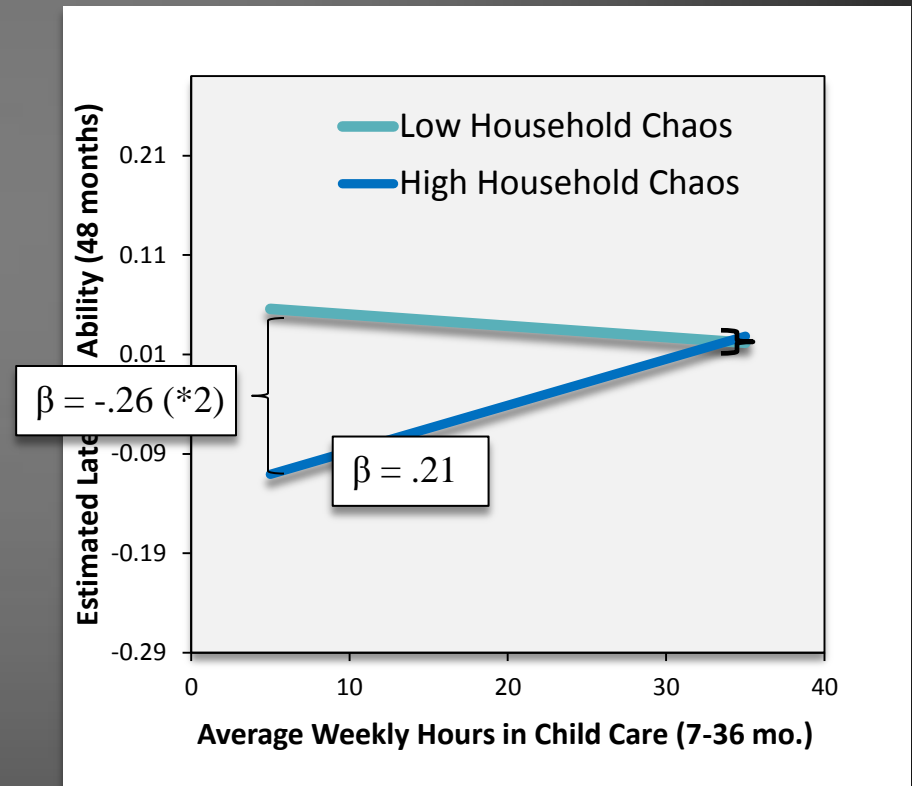
(Hirano & Imbens, 2004; Robins, 2000)



Contextual Risk, Childcare & Self-Regulation



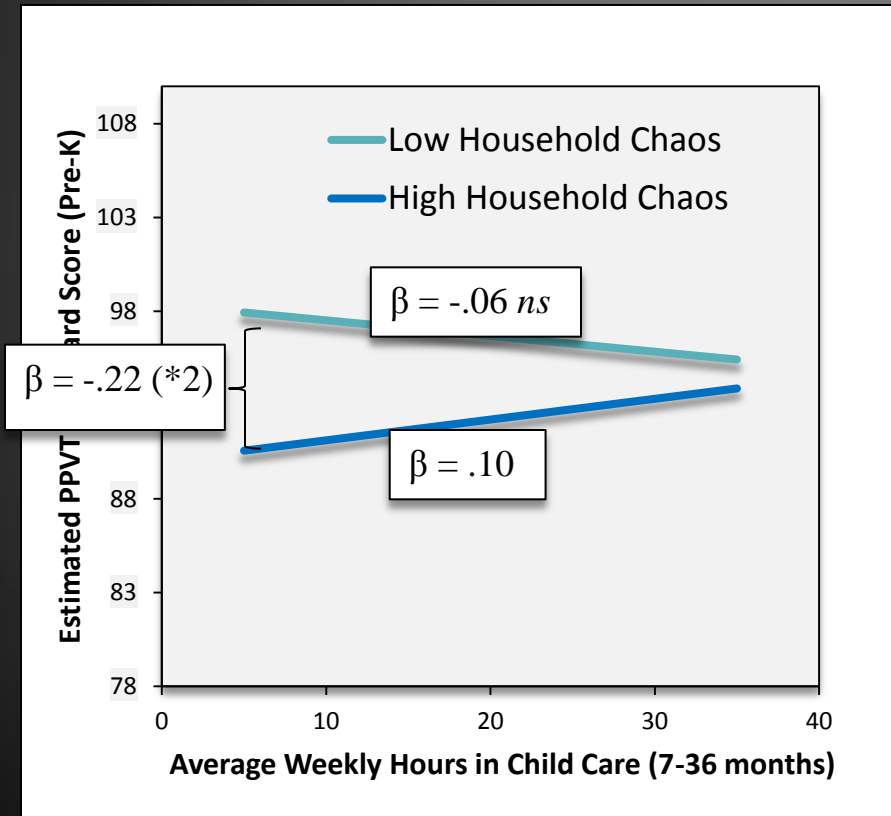
Executive Functioning (48 mo.)



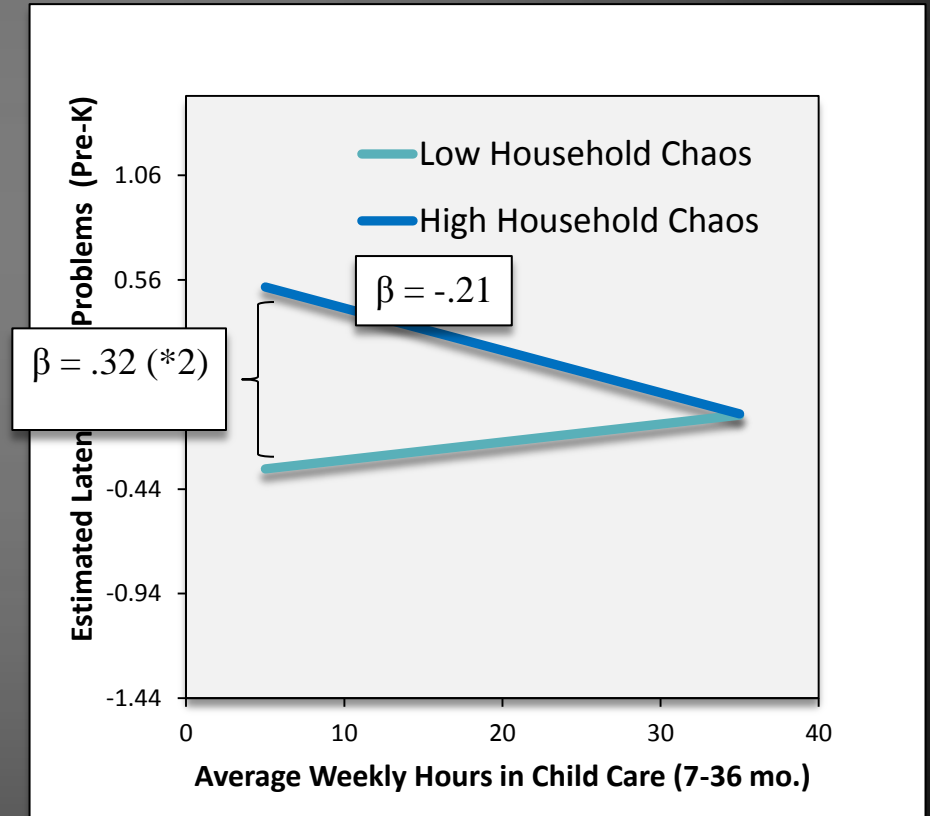
Note: y axis = 2 standard deviations

Contextual Risk, Childcare & Self-Regulation

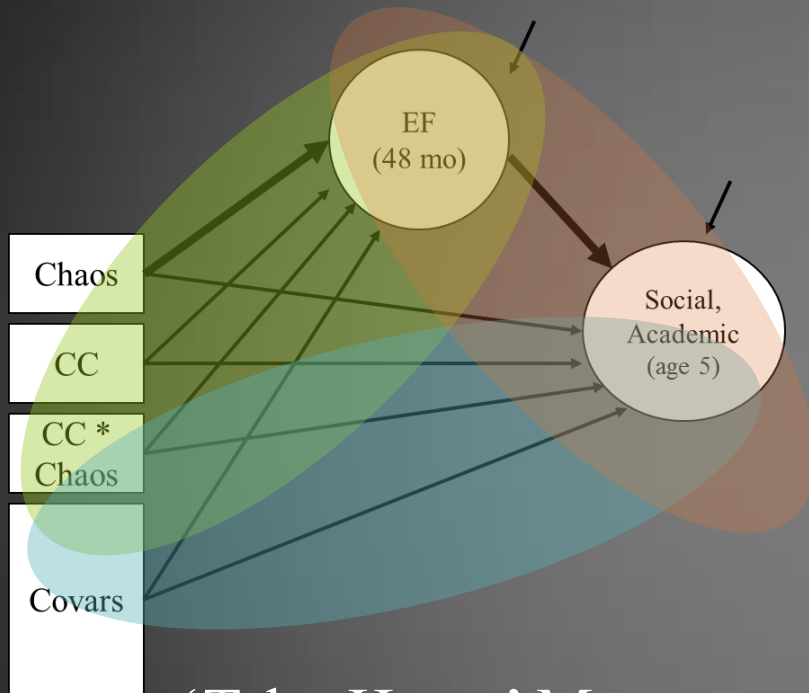
Receptive Vocabulary (age 5)



Social Problems (age 5)



Contextual Risk, Childcare & Self-Regulation



Conditional indirect relations between chaos and age-5 outcomes by childcare hours

	PPVT	WJIII	Social Prob.
Direct	β	β	β
EF	0.60	0.63	-0.34
Conditional Indirect			
Chaos-->EF (5 Hours CC p/ wk)	-0.14	-0.11	0.08
Chaos-->EF (35 Hours CC p/wk)	ns	ns	ns

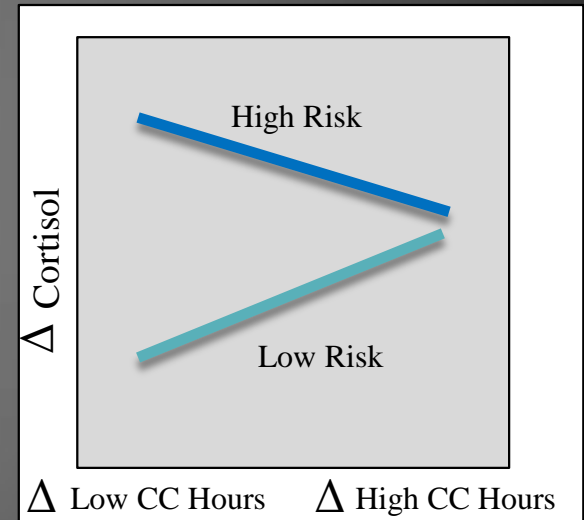
‘Take-Home’ Messages:

- (1) Suggests greater CC exposure may mitigate negative effects of chaotic home environments on EF and social and academic problems.
- (2) Conditional effects of chaos on children’s social and academic problems may manifest via link between chaos and EF.

Contextual Risk, Childcare & Stress Physiology

Are similar interactive effects between contextual risk and childcare evident for physiological stress?

- Between-Children (Berry et al., 2014)
- Within-Children (Berry et al., 2016)
 - Internal validity
 - Developmental differences



Contextual Risk, Childcare & Stress Physiology

Outcome (6, 15, 24, 48 months):

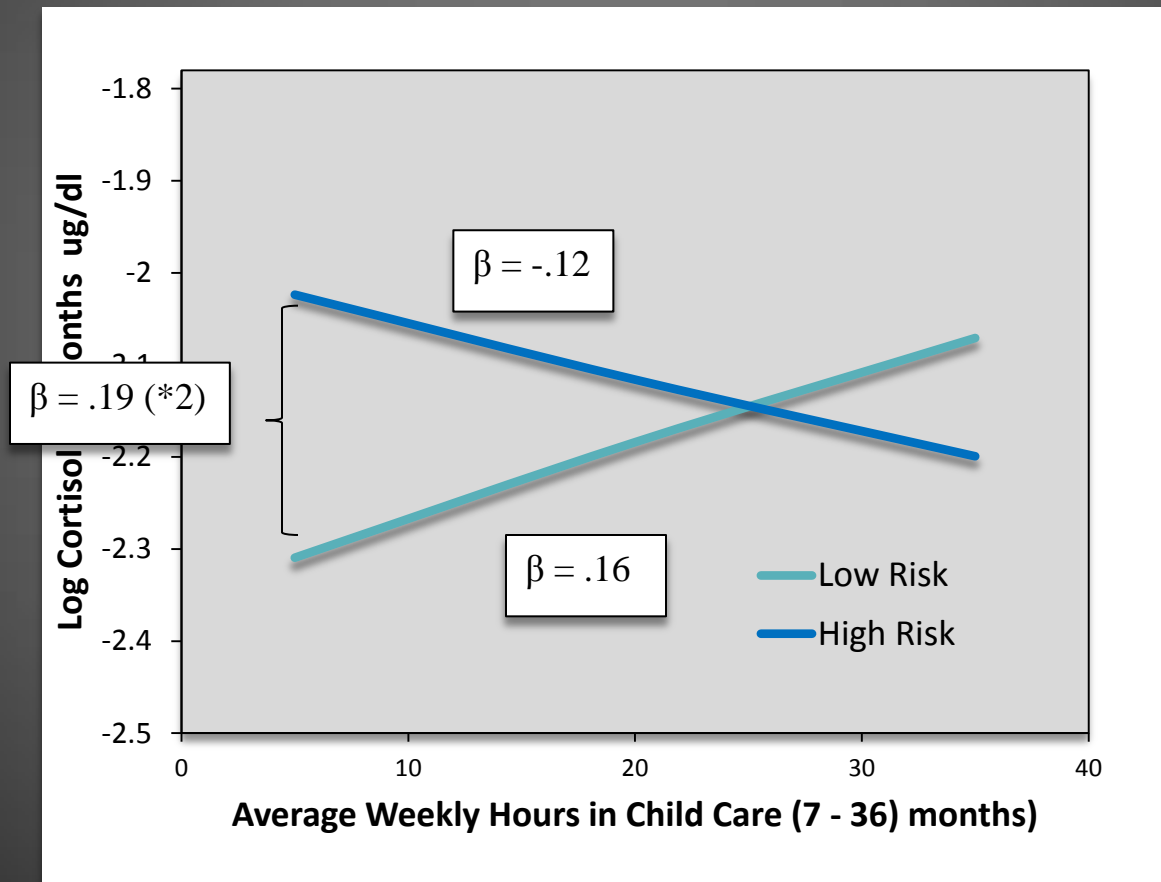
- ‘*Resting*’ salivary cortisol (log transformed)
- Modal time: 10:00 AM; variation adjusted



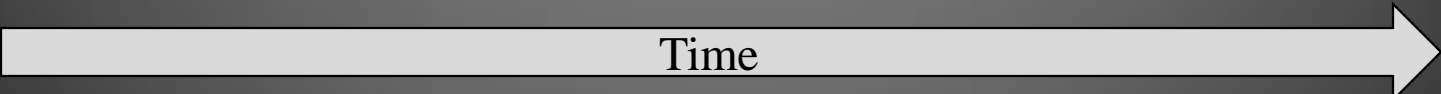
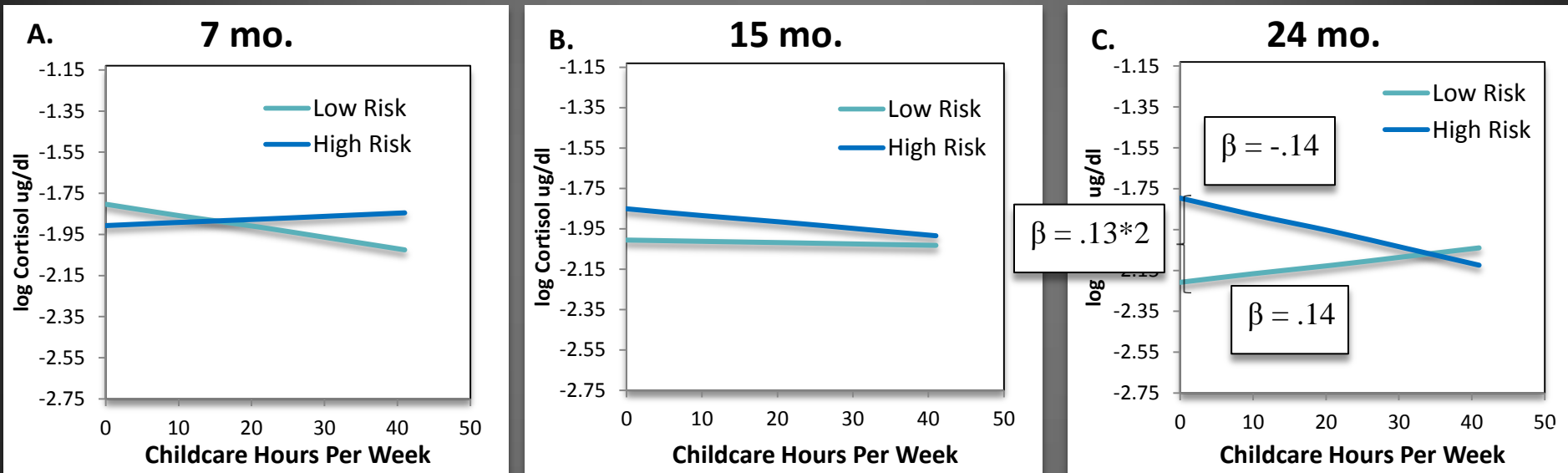
Main Predictors (6, 15, 24, 36 months):

- *Cumulative Contextual Risk: PCA-weighted composite of income, education, partnered, employed, occupational prestige, household density, neighborhood noise & safety)*
- *Childcare Variables: Same + Peer exposure*

Contextual Risk, Childcare & Stress Physiology

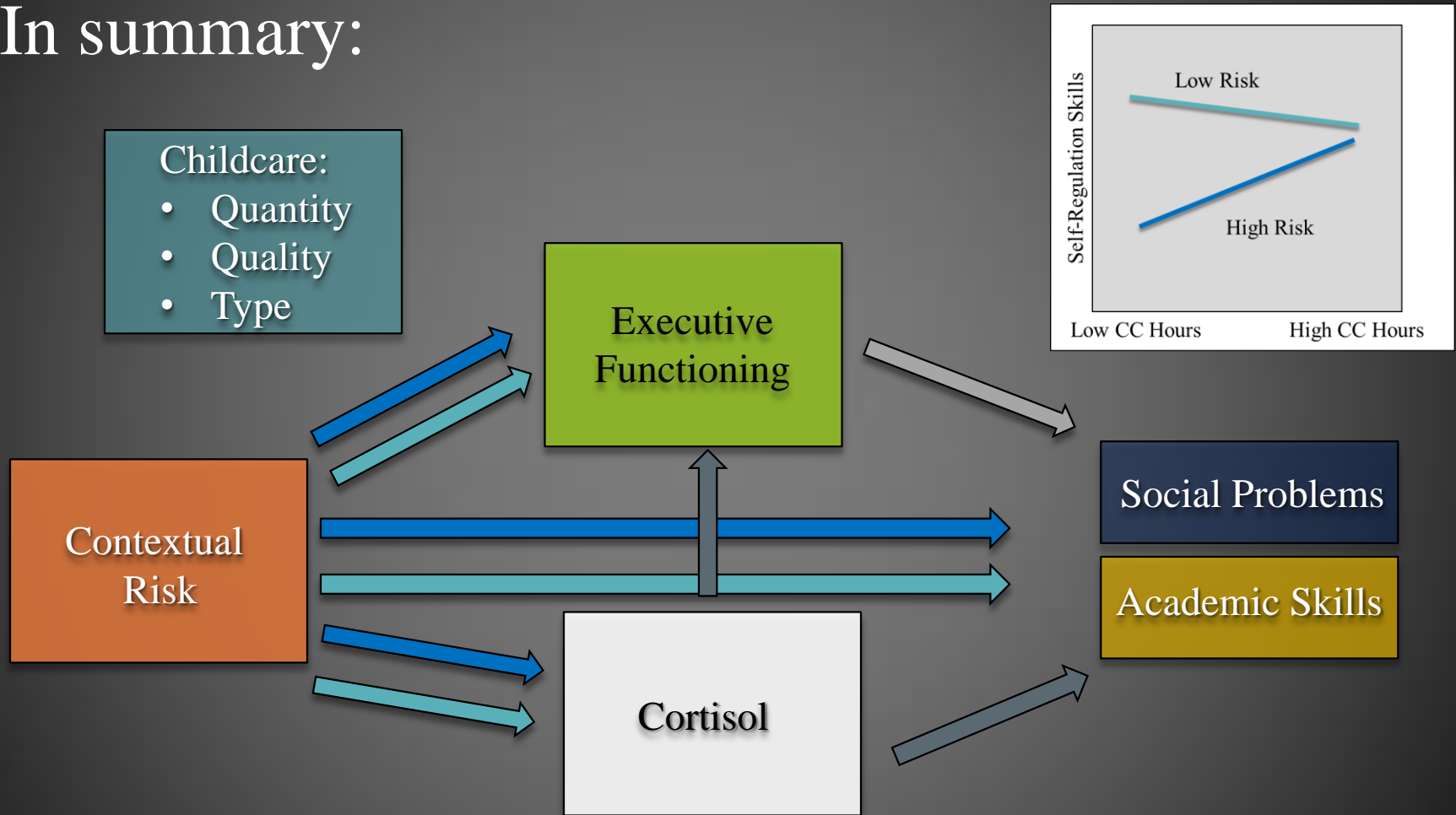


Contextual Risk, Childcare & Stress Physiology



Contextual Risk & Childcare → Self-Regulation & Stress Physiology

In summary:



Not in any straight-forward linear sense...
But should we expect linear functions?

Stress Physiology & EF

Stress & EF: Developmental ‘Inoculating’ Effects?



(Parker et al., 2006;
Lyon, Parker, & Schatzberg, 2010;
Parker & Maestripieri, 2011)



(Fox et al., 2001)

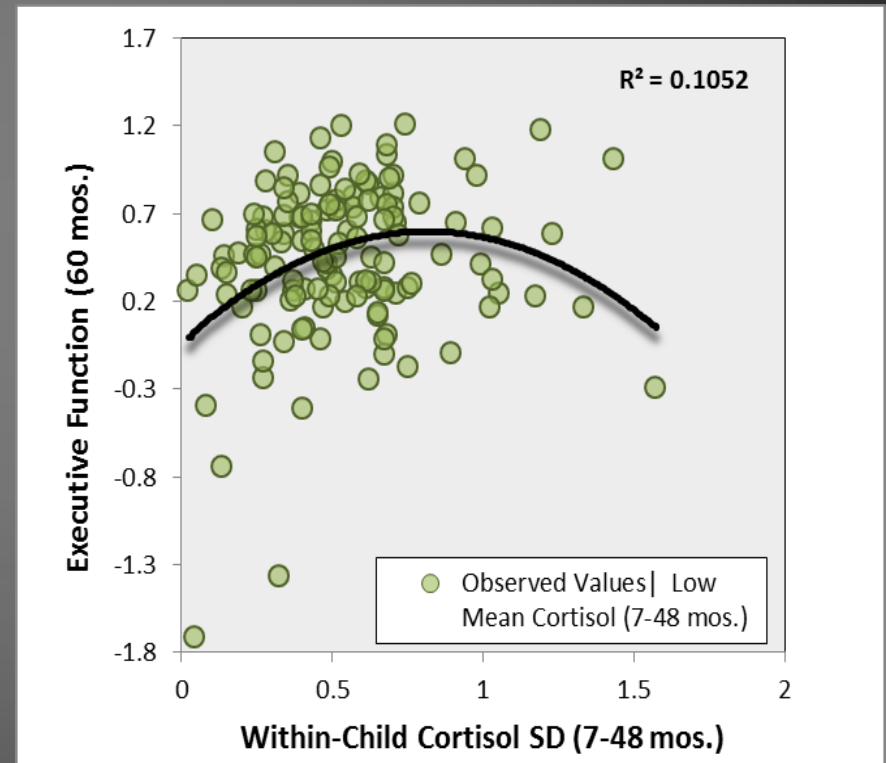
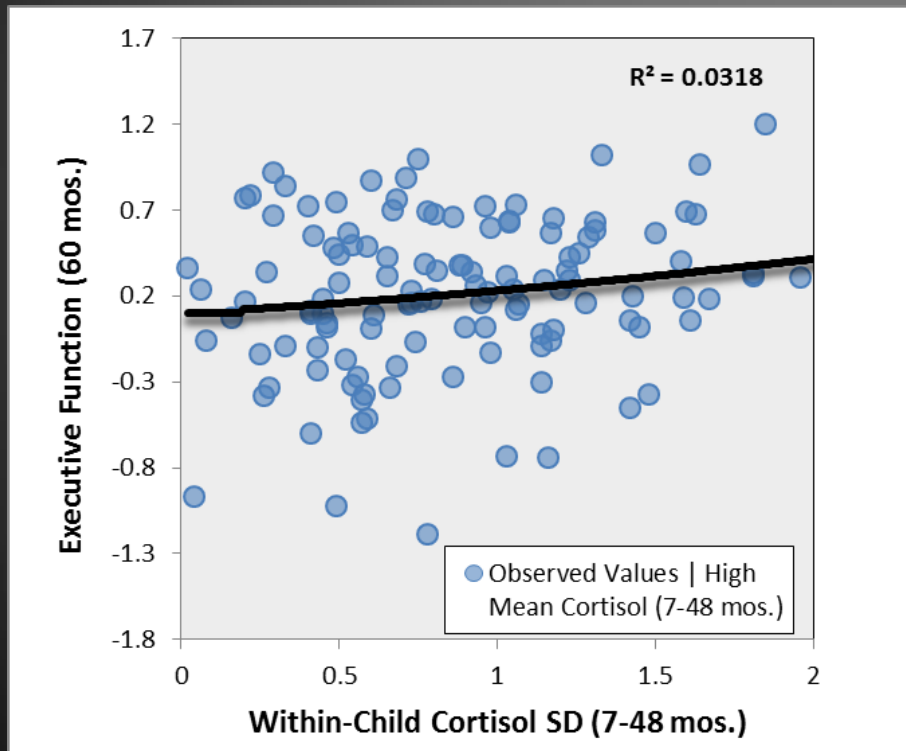


(Gunnar et al., 2010)

Are moderate physiological ‘ups and downs’ of stress in early childhood predictive of optimal self-regulation, *when typical (e.g., average) stress levels are low?*

Stress Physiology & EF

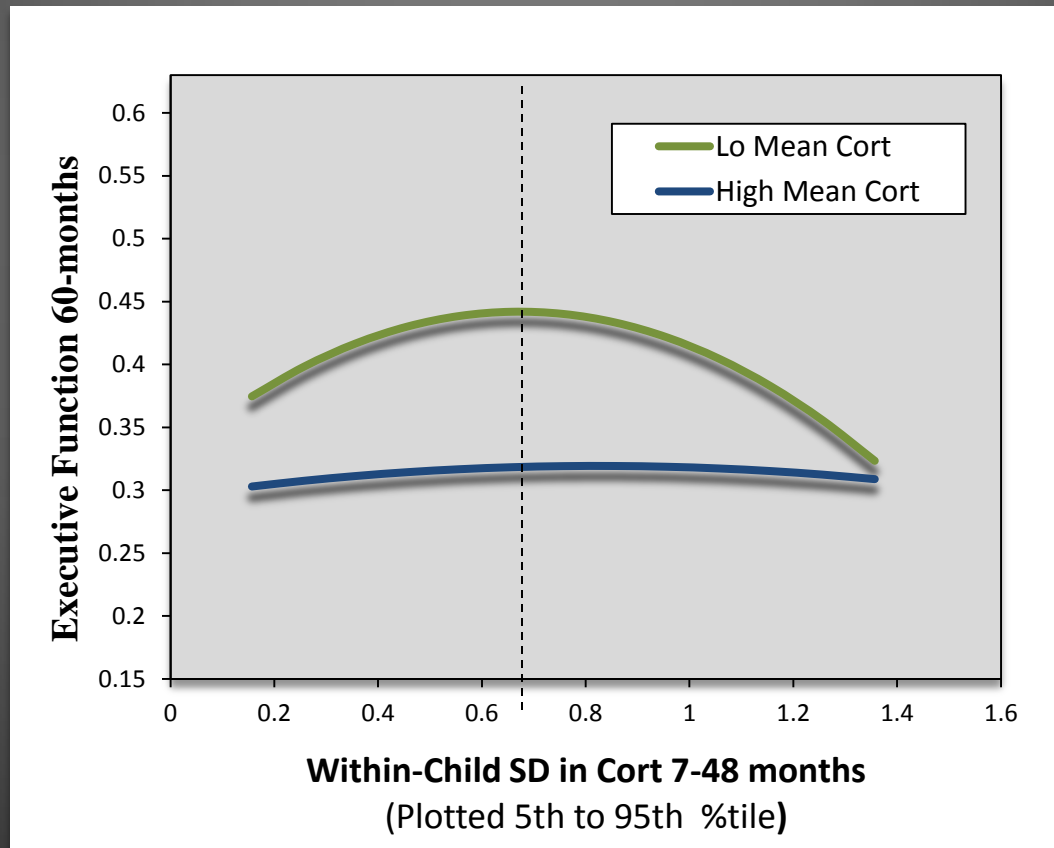
Stress & EF: Developmental 'Inoculating' Effects?



Stress Physiology & EF

FIML Regression; Robust Regression, Quantile Regression

- Why care?: Various ways of adjusting for oddities (e.g., leverage & influence)



Some Tentative Conclusions

- Considering the intersection of children's experiences at home and child care are likely critical to understanding the effect of either
- Child care exposure may mitigate the negative relation between family risk and a broad array of child outcomes—physiological, behavioral, and cognitive
- Executive functioning may be an important mediator
- Childcare mechanism remains unclear
- Unclear whether these processes are explained by effects on stress physiology

Thank You.

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