Early Adverse Experiences

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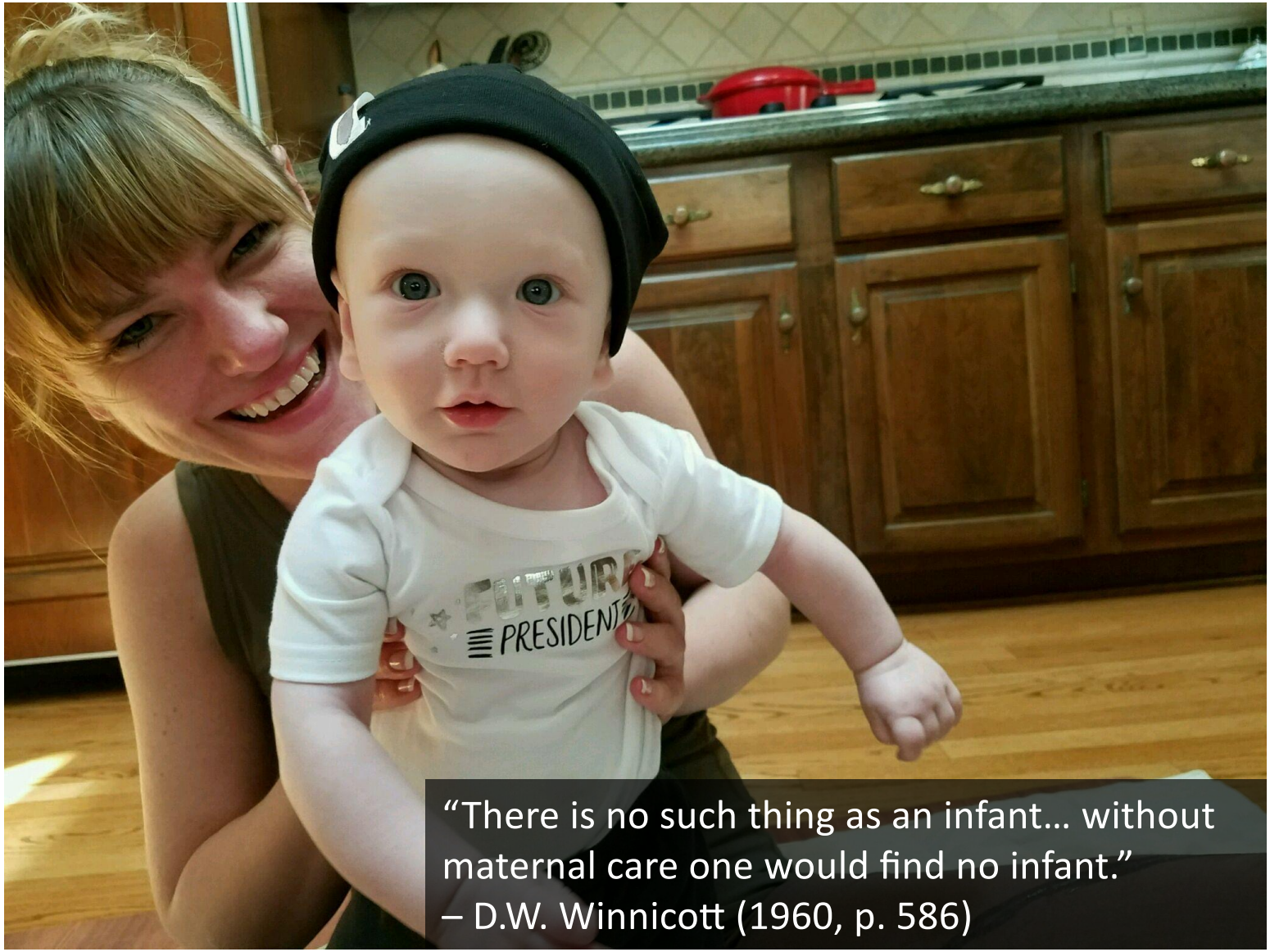
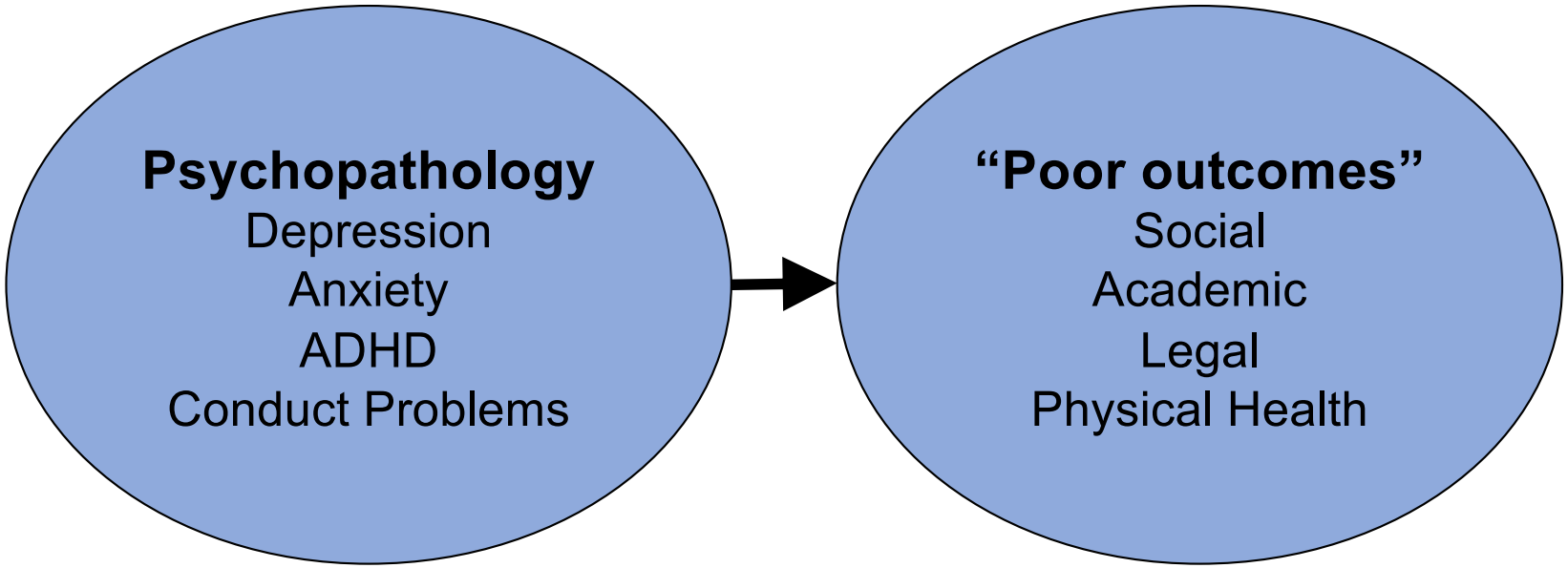
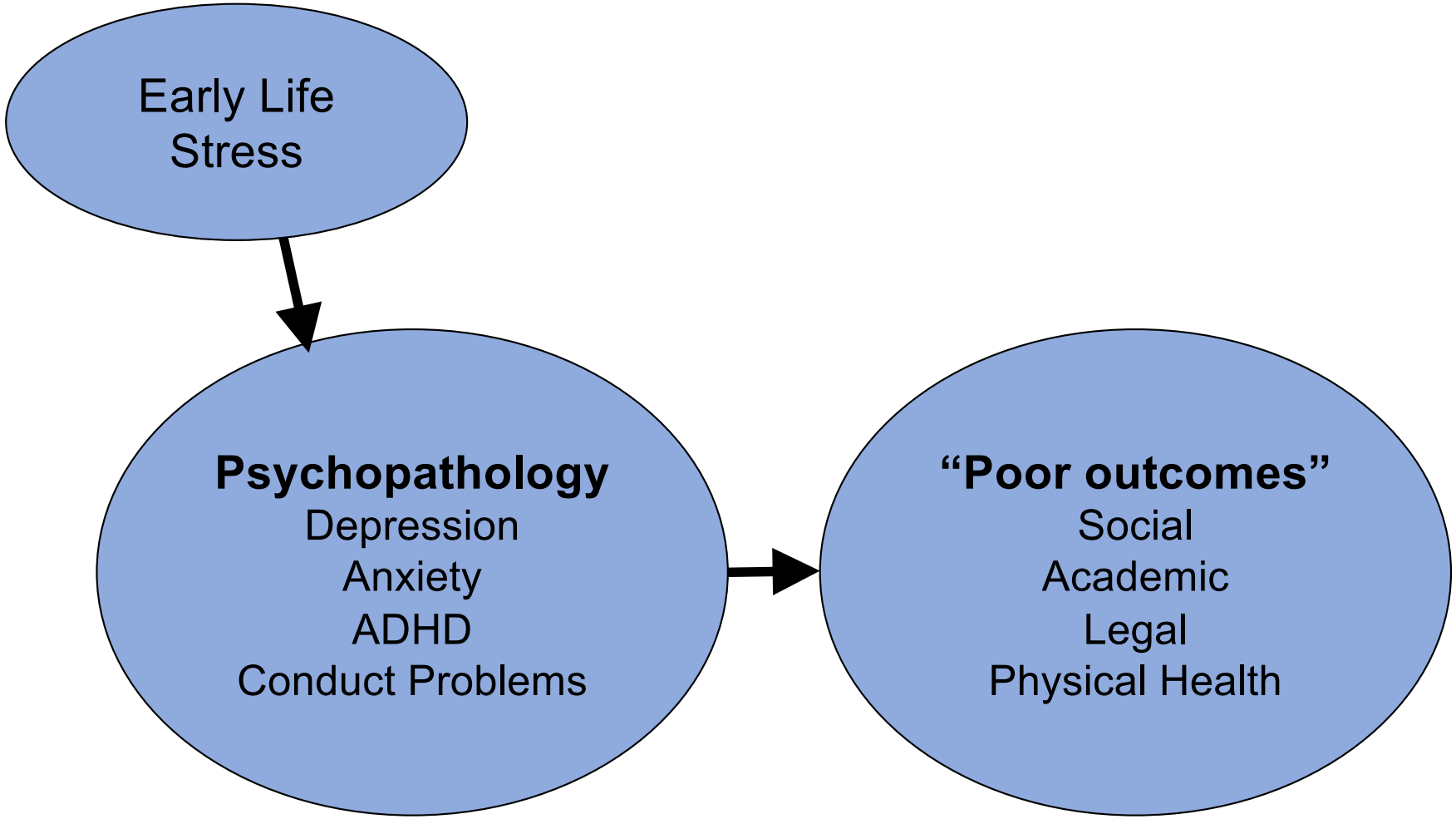
FUTURE
PRESIDENT



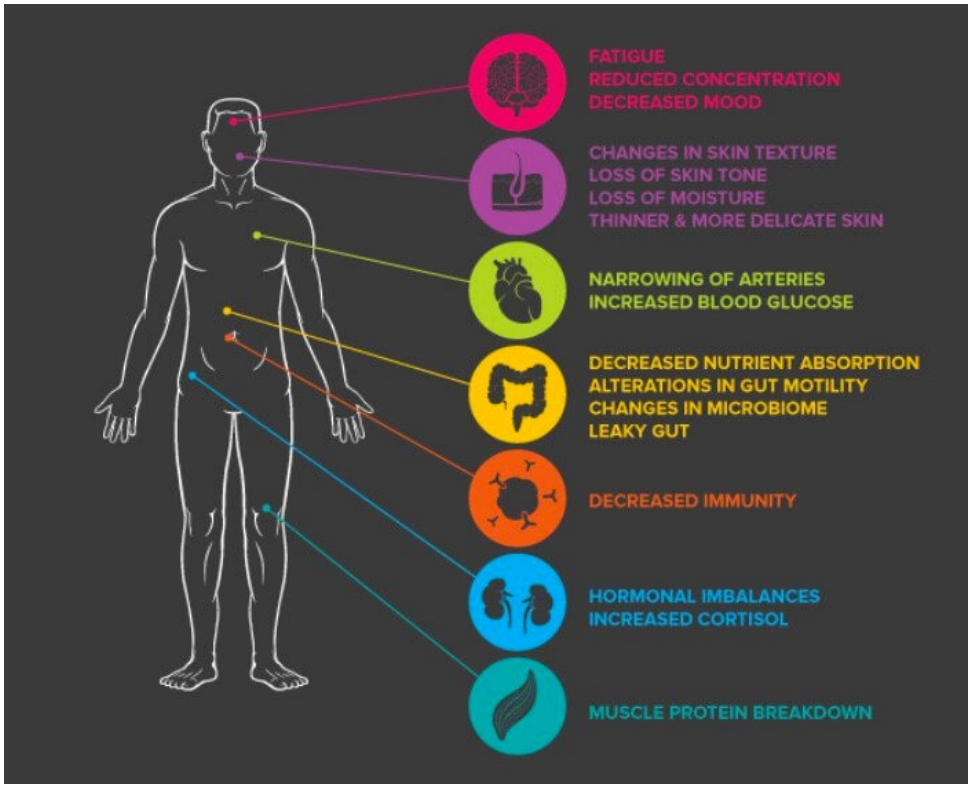
"There is no such thing as an infant… without maternal care one would find no infant."
– D.W. Winnicott (1960, p. 586)


Psychopathology
Depression
Anxiety
ADHD
Conduct Problems
“Poor outcomes”
Social
Academic
Legal
Physical Health

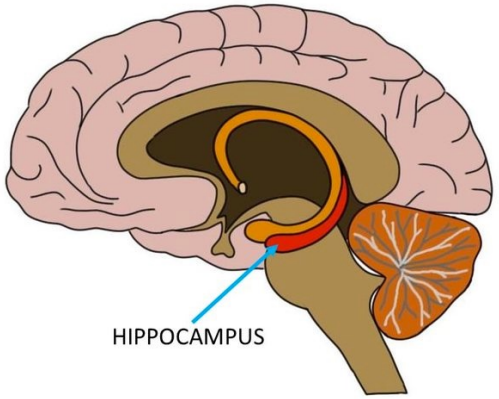

Early Life
Stress
Psychopathology
Depression
Anxiety
ADHD
Conduct Problems
“Poor outcomes”
Social
Academic
Legal
Physical Health

Stress Exposure

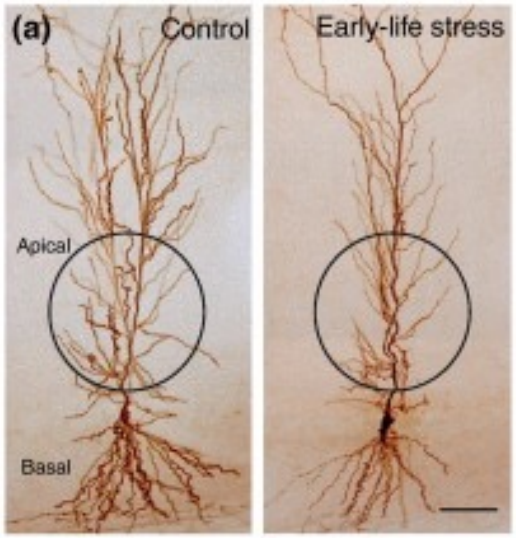
- Predicts negative mental and physical health
- Maladaptive effects on a host of organ systems



Stress alters structure of the hippocampus



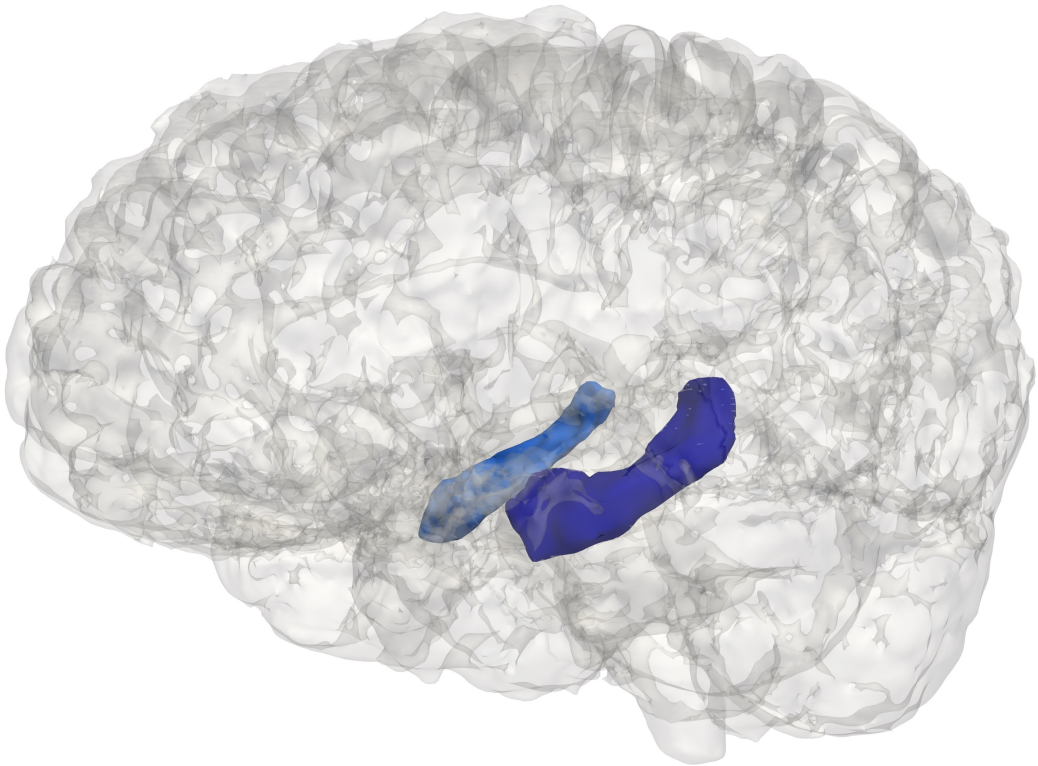
- Stress-induced changes take place at several levels
  - Shortening of dendrites
  - Loss of spine synapses
  - Suppression of the neurogenesis

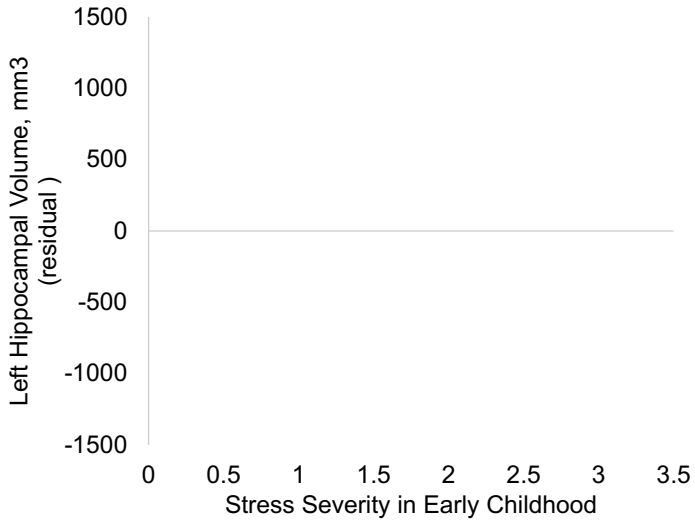


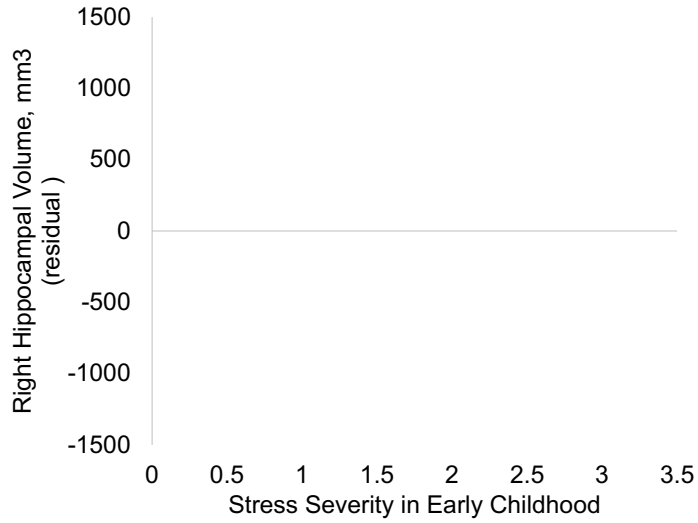
Maras & Baram (2012)

Stress Measurement

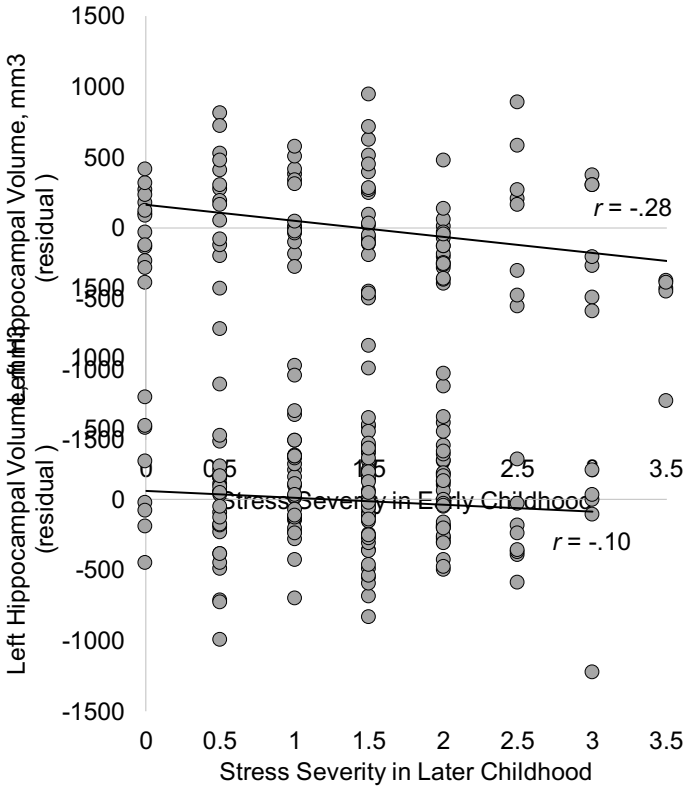
- Youth interviews on the Traumatic Events Screening Inventory
- Assessed 31 potentially traumatic events for children, including accidents, abuse, witnessing community and domestic violence
- Objective panel rated events individually and identified consensus (Scoring system developed by Adrian & Hammen, 1993; Rudolph & Hammen, 1999)
  - 0 = mild stress (e.g., witnessed a fight in the locker room)
  - 3.5 = severe stress (e.g., experienced sexual assault)
- Obtained age of onset for each stressors

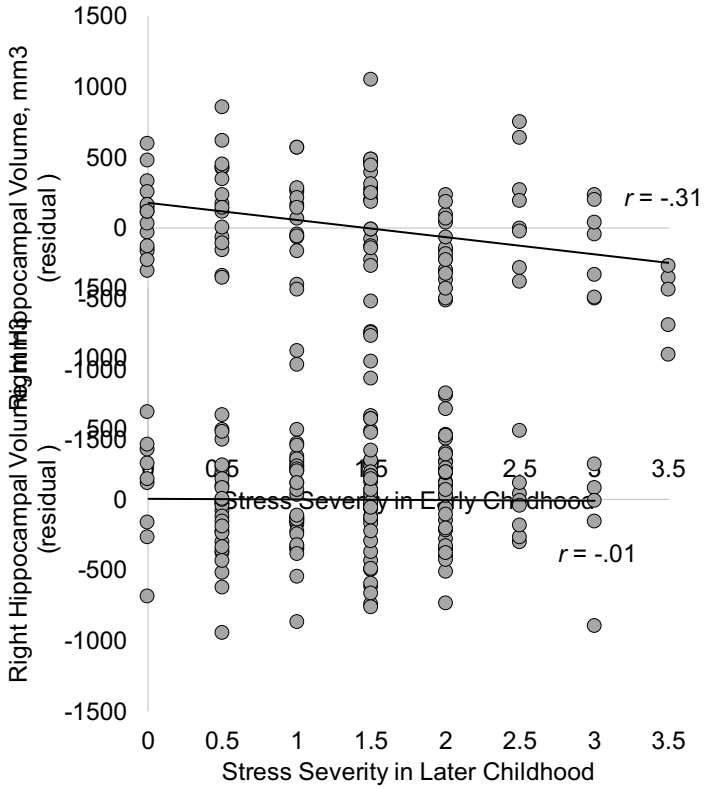






Humphreys et al. (2019) *Dev Science*





Humphreys et al. (2019) *Dev Science*

Deviations from the Ideal Environment

Harmful Input

Inadequate Input

Humphreys & Zeanah (2015) Neuropsychopharm.

Neural consequences

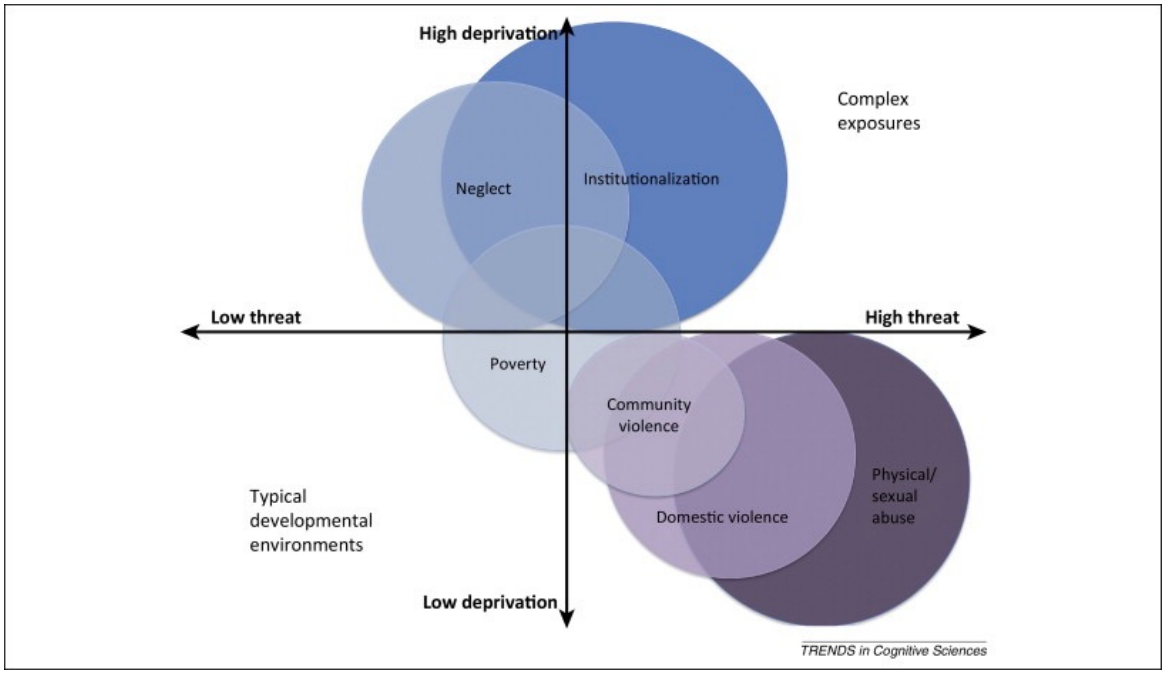
Threatening Input

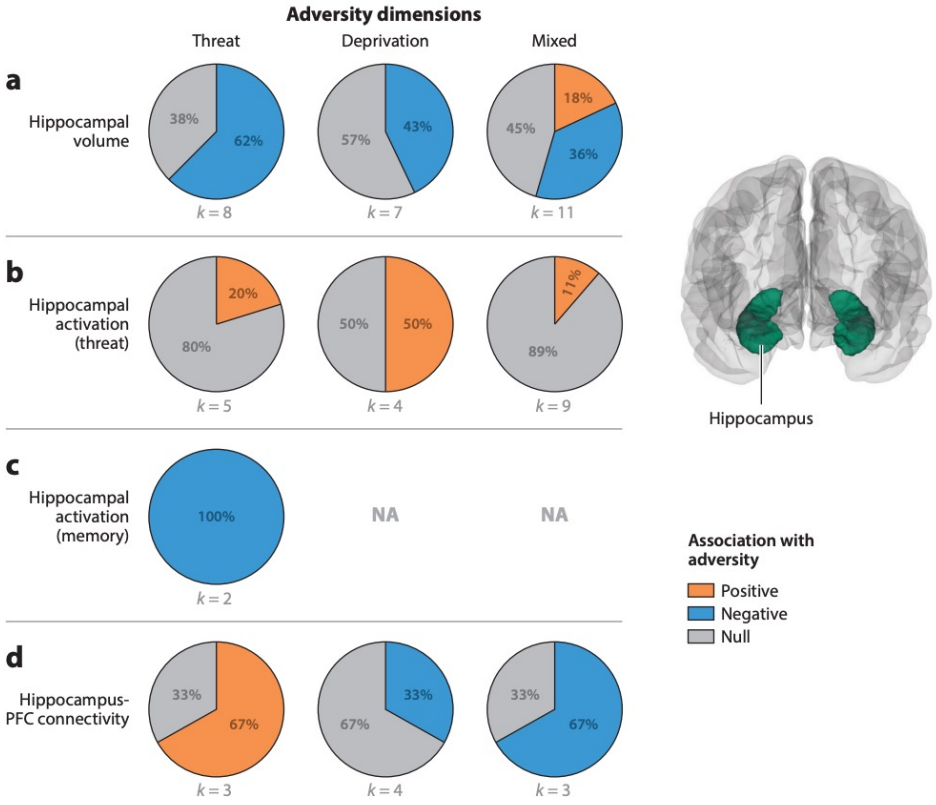
- Changes in neural circuits that underlie emotional learning

Inadequate Input

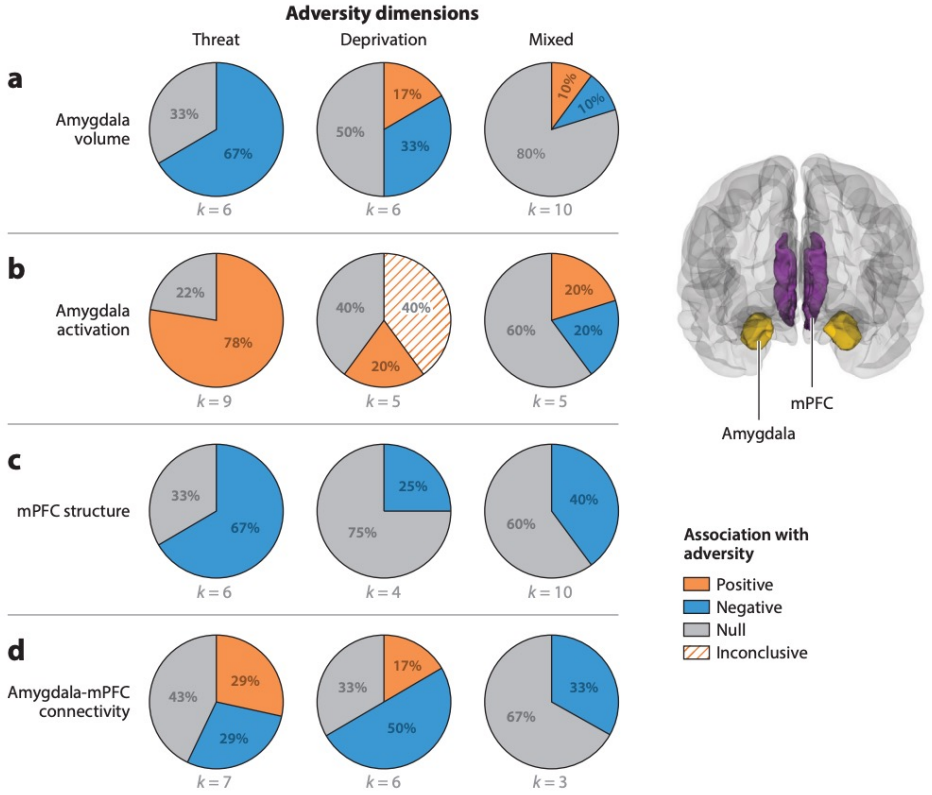
- Impacts synaptic proliferation
- Reductions in cortical thickness

Sheridan & McLaughlin, 2015





Association with adversity
- Positive
- Negative
- Null



Association with adversity
- Positive
- Negative
- Null
- Inconclusive

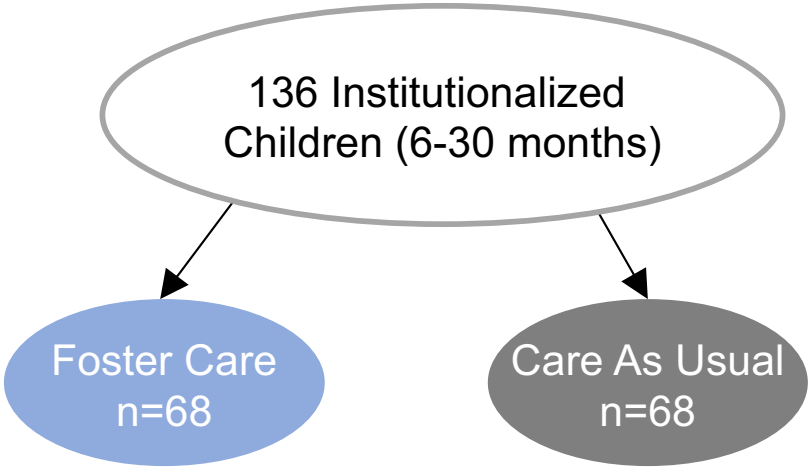
Neglect of Neglect

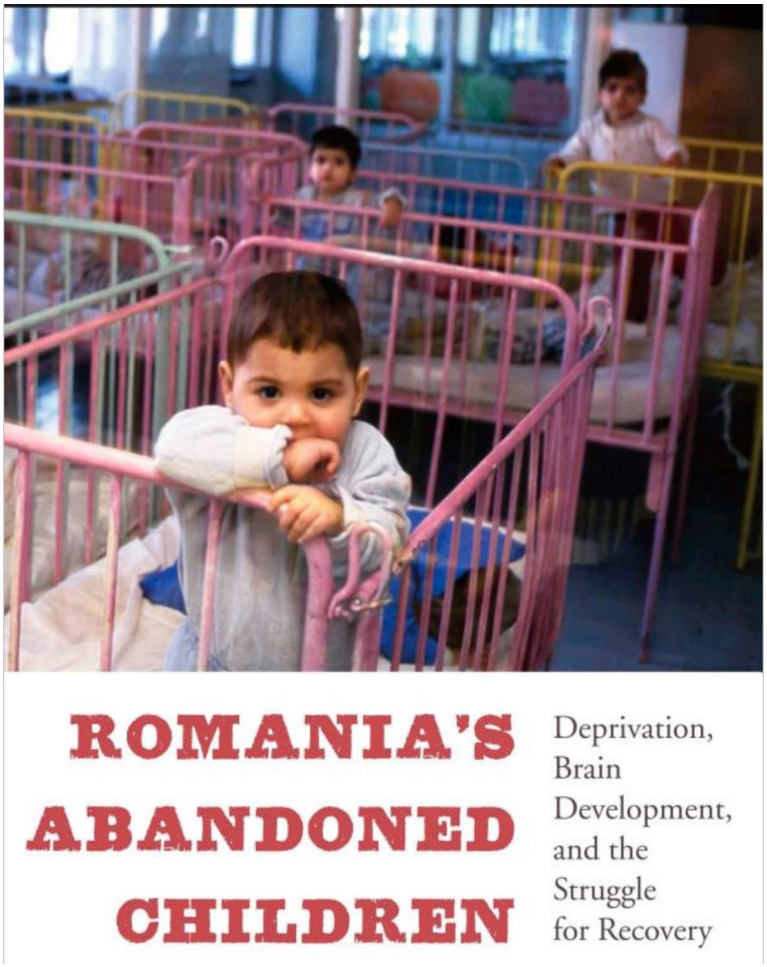
Nelson Fox Zeanah

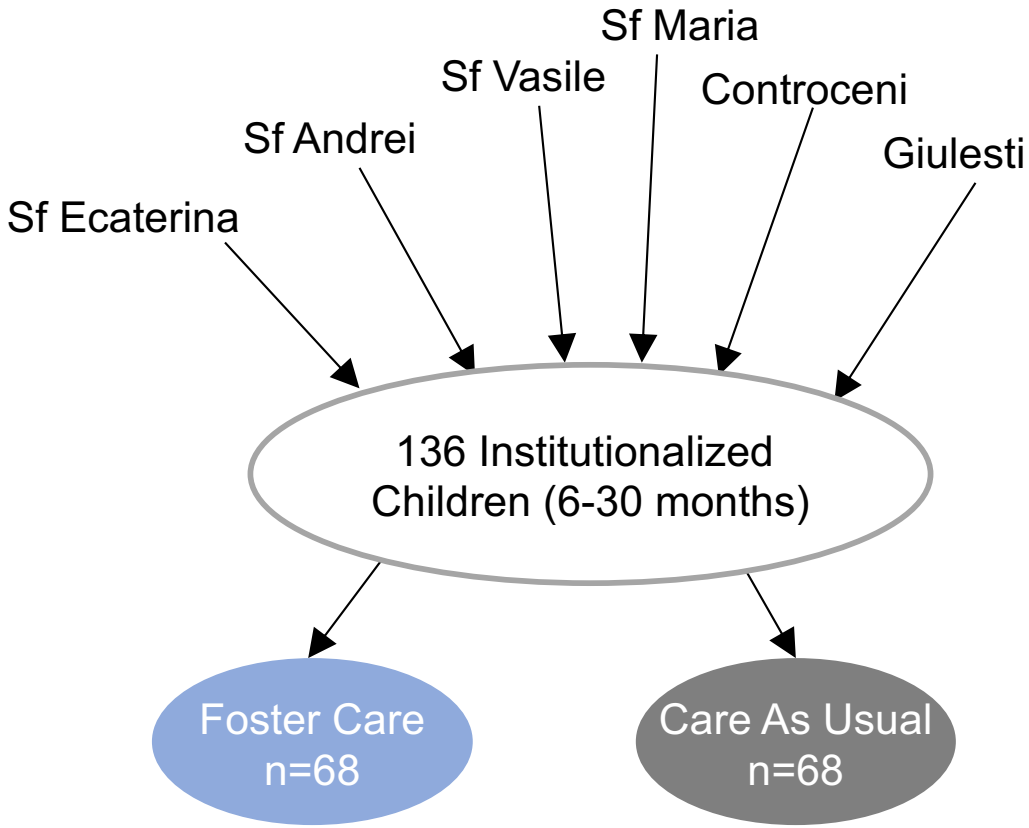
Children reared in institutions

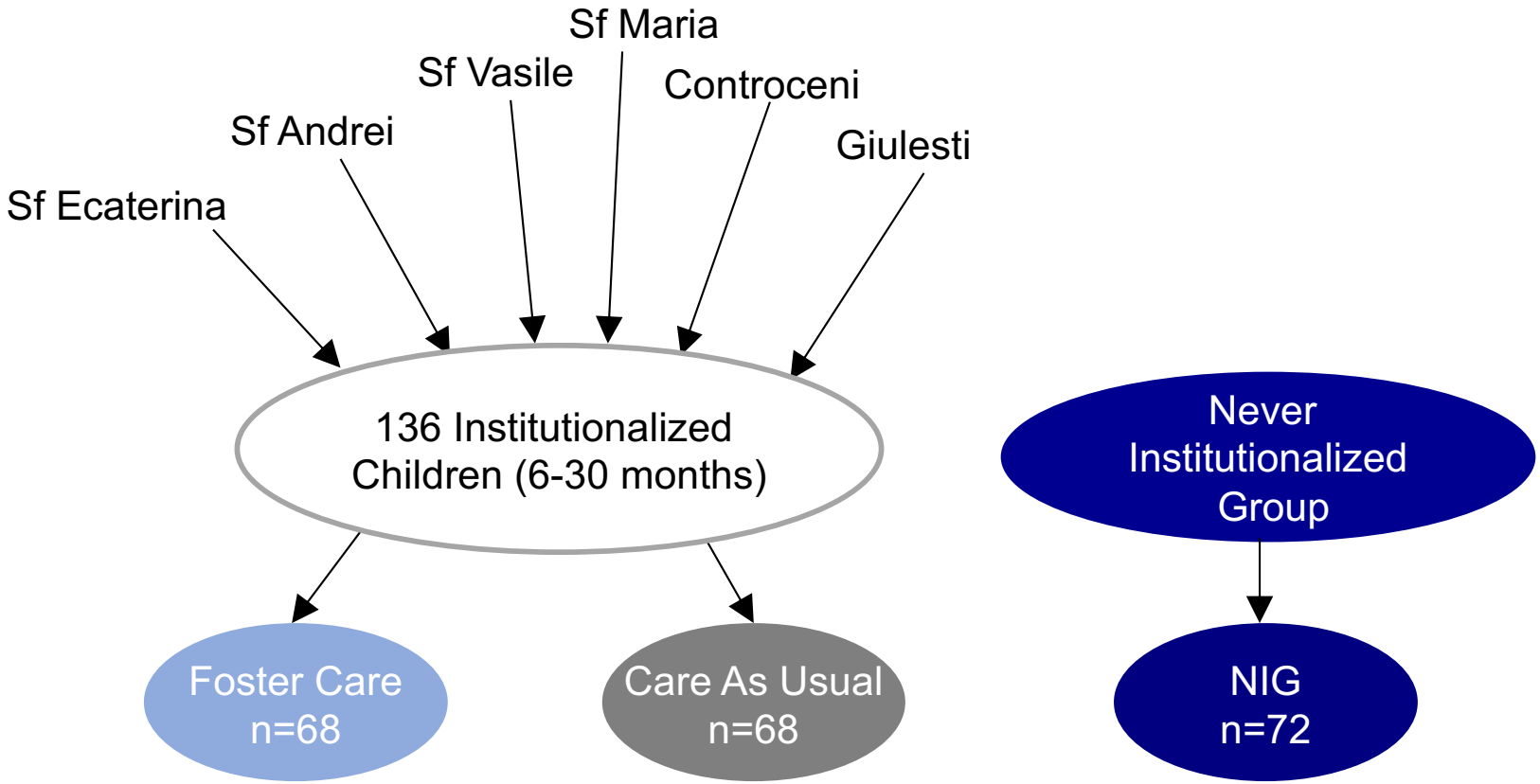
- Dramatically increased risk:
  - Growth delays
  - Disturbances of social relatedness and attachment
  - Psychopathology
  - Deficits in IQ and executive functions
  - Language delays
  - Motor abnormalities

Bucharest Early Intervention Project (BEIP)

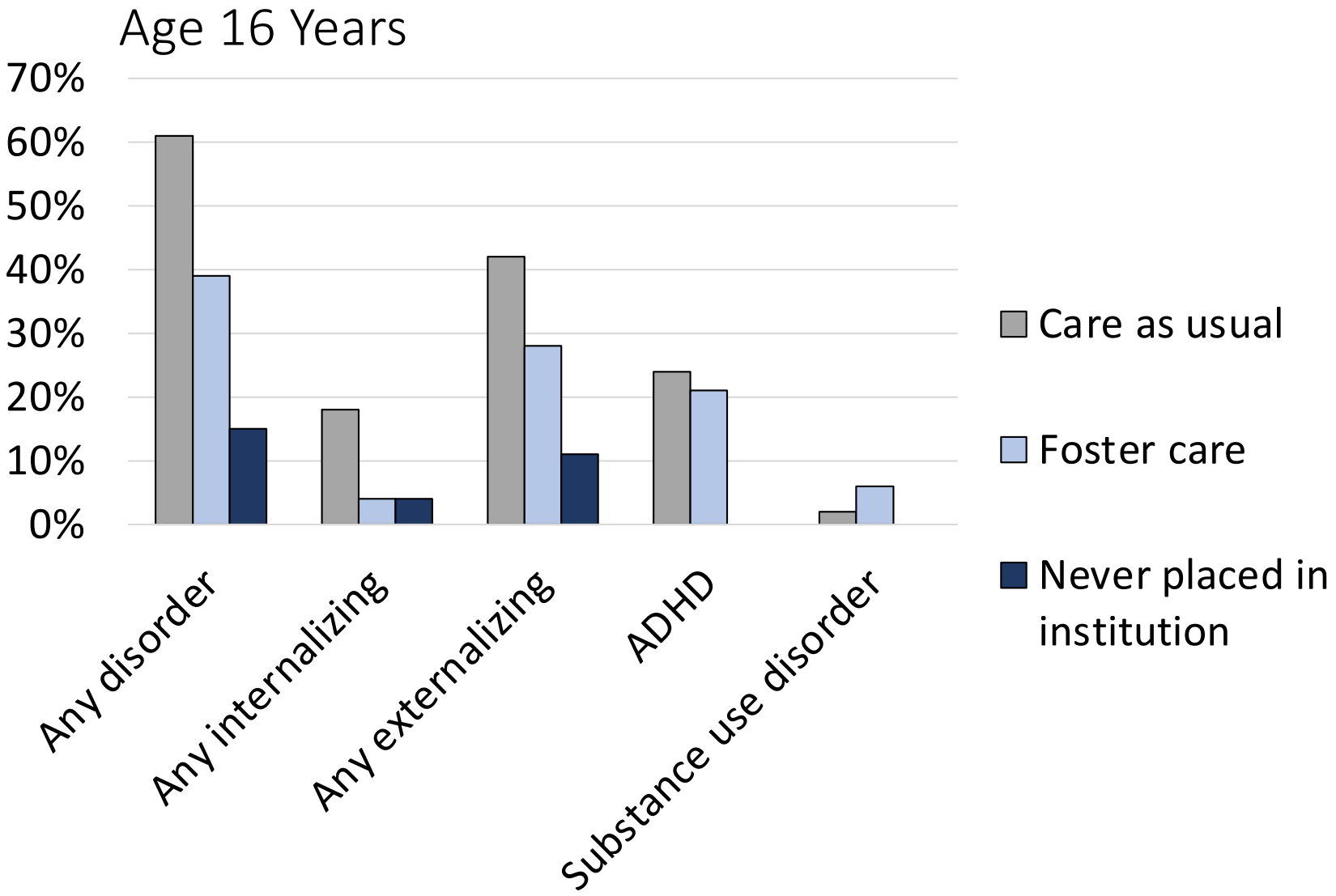




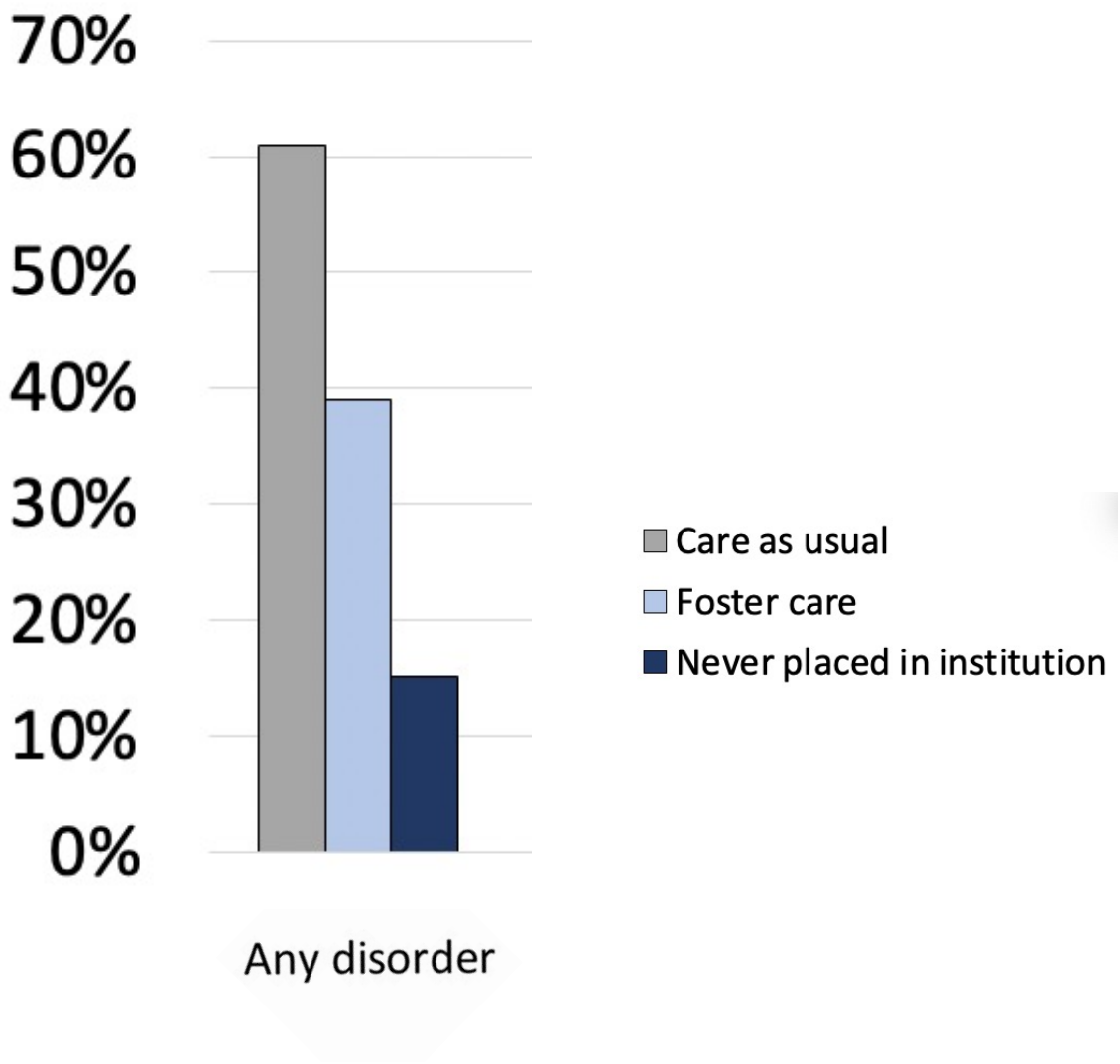

Sf Maria
Sf Vasile
Controceni
Sf Andrei
Giulesti
Sf Ecaterina
136 Institutionalized
Children (6-30 months)
Foster Care
n=68
Care As Usual
n=68



Assessments at Baseline, 30, 42, 54 months
Follow-ups at 8, 12, 16, and (now) 22 years

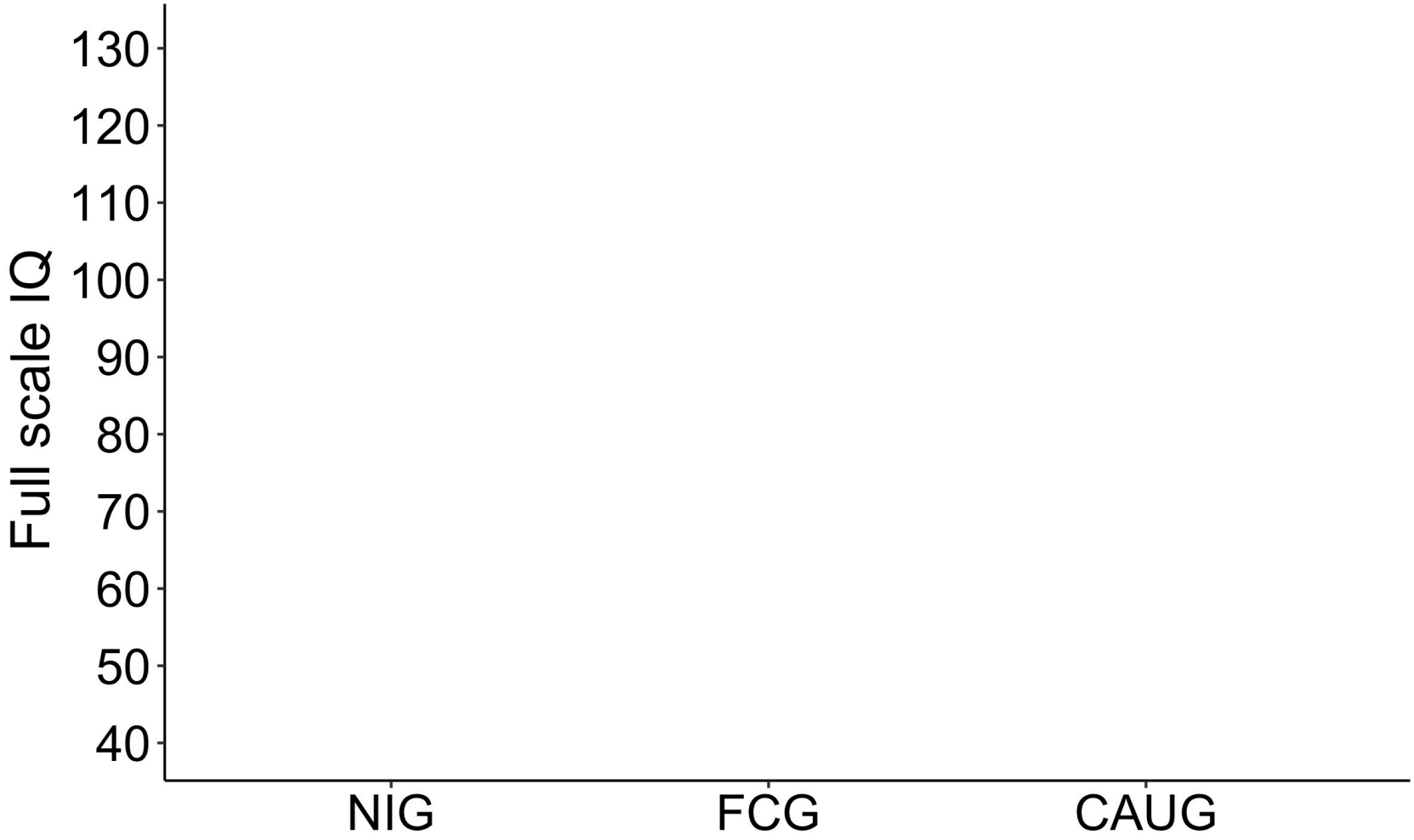


Humphreys et al. (2020) *JCCP*

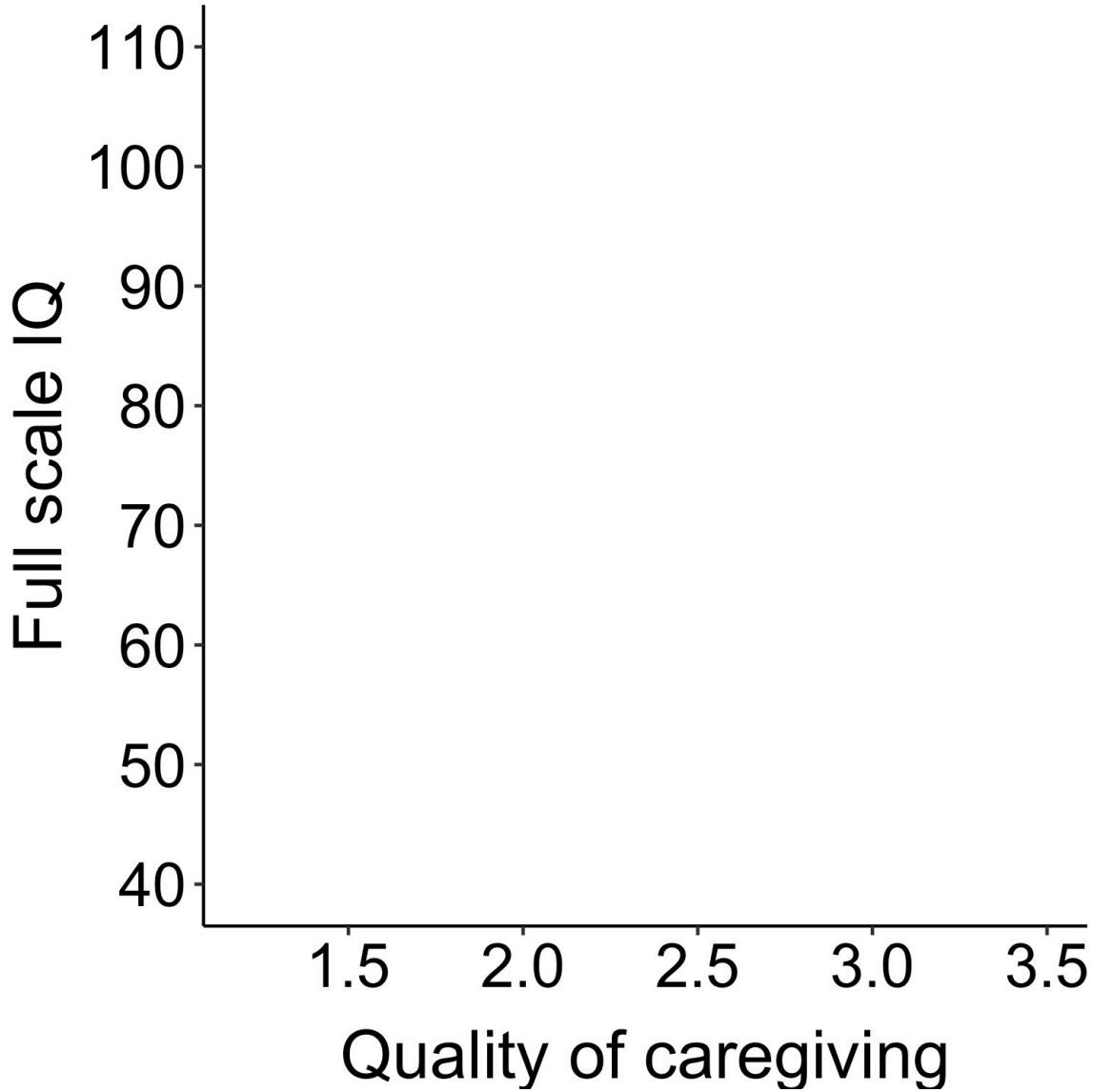


Humphreys et al. (2020) *JCCP*


Cognitive Ability (IQ)
Assessed at Age 18 Years



Humphreys et al. (under review)



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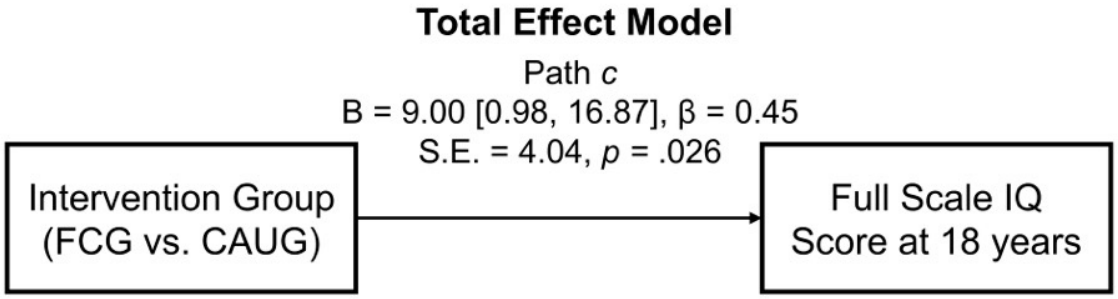
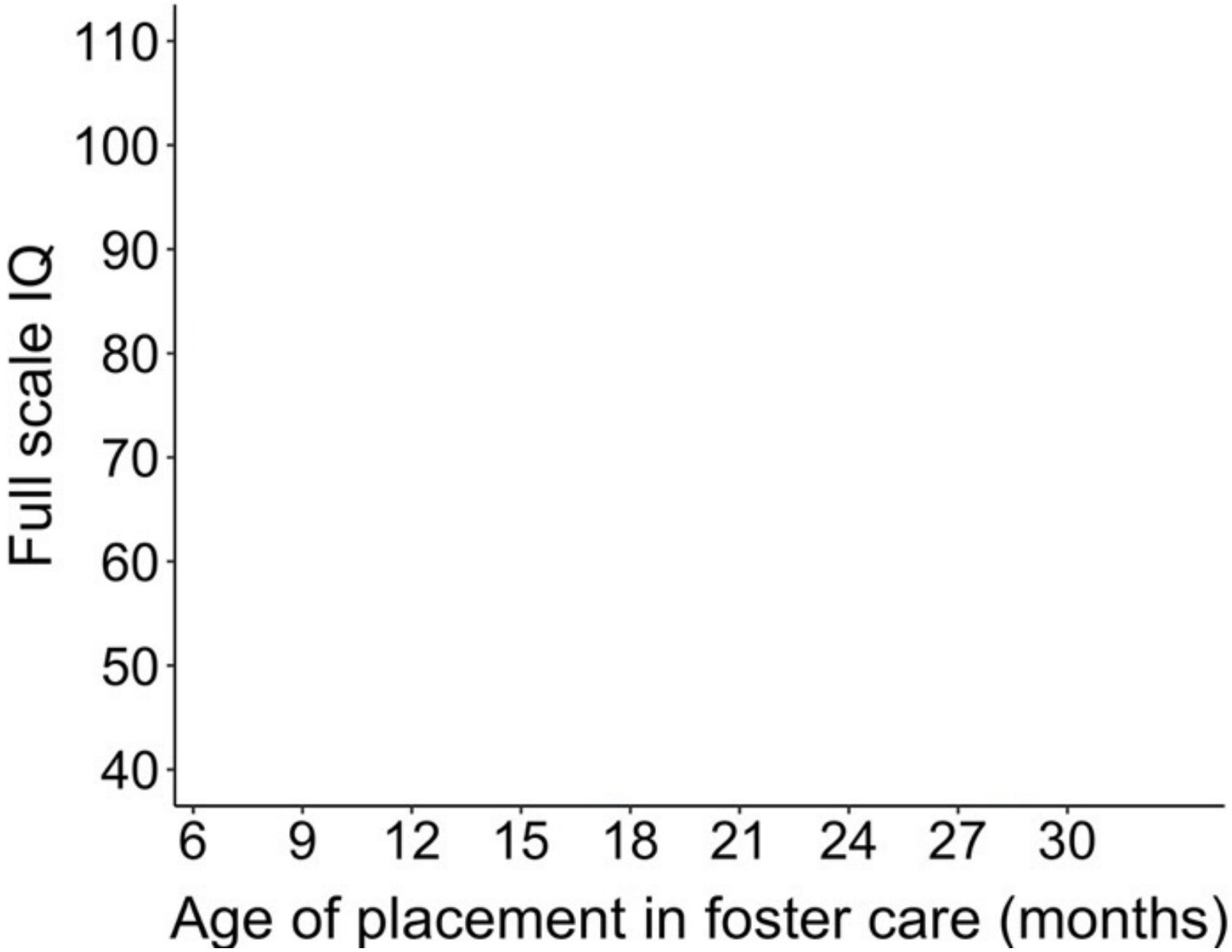

Total Effect Model
Path c
B = 9.00 [0.98, 16.87], β = 0.45
S.E. = 4.04, p = .026
Intervention Group
(FCG vs. CAUG)
Full Scale IQ
Score at 18 years



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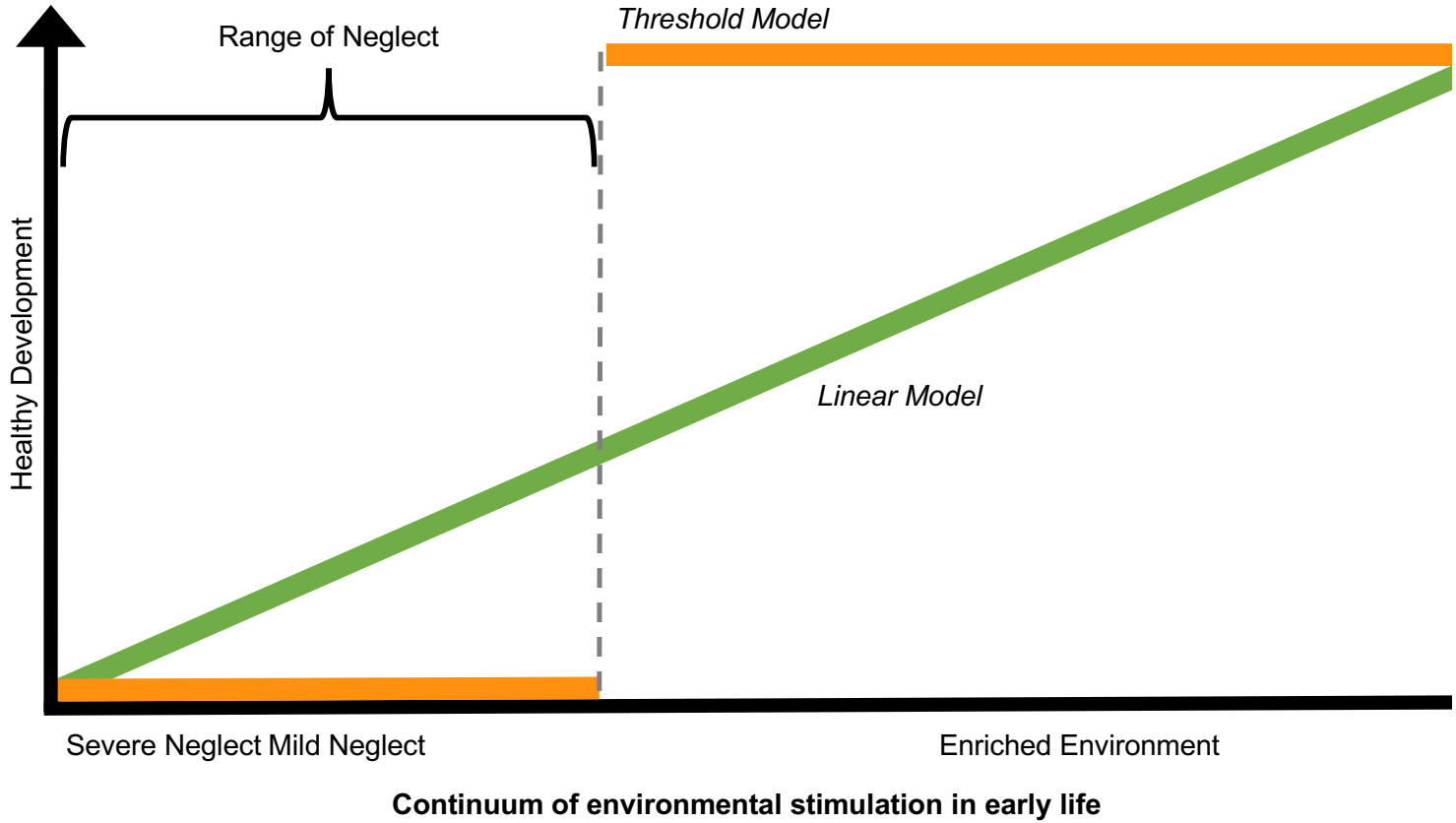
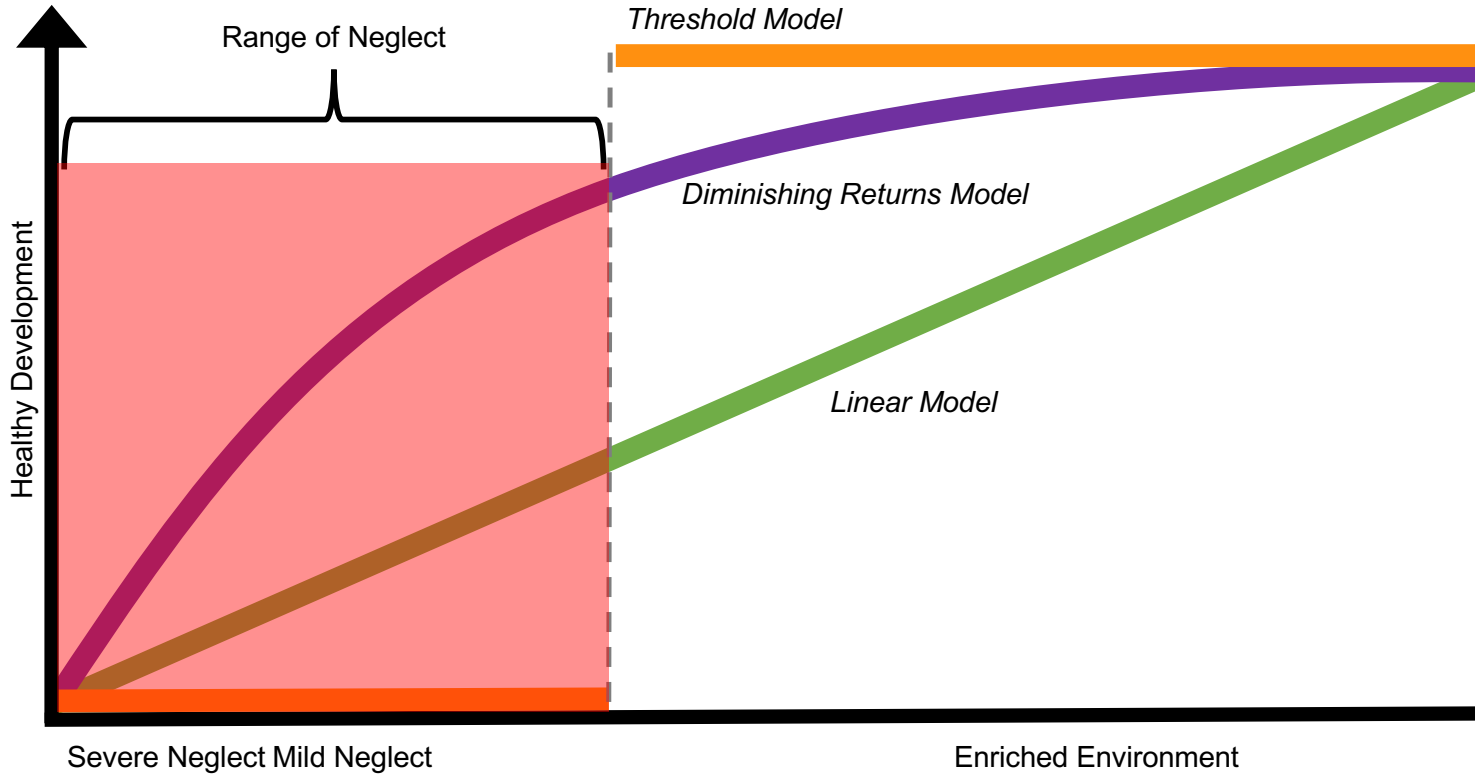
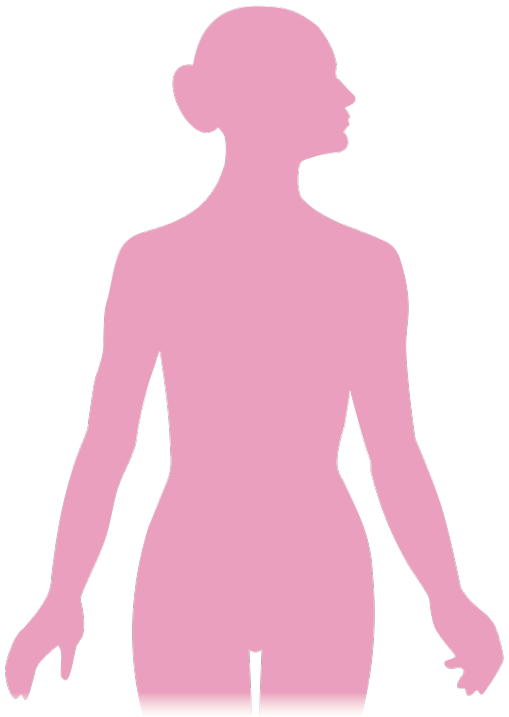
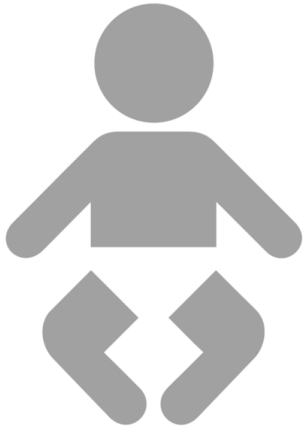


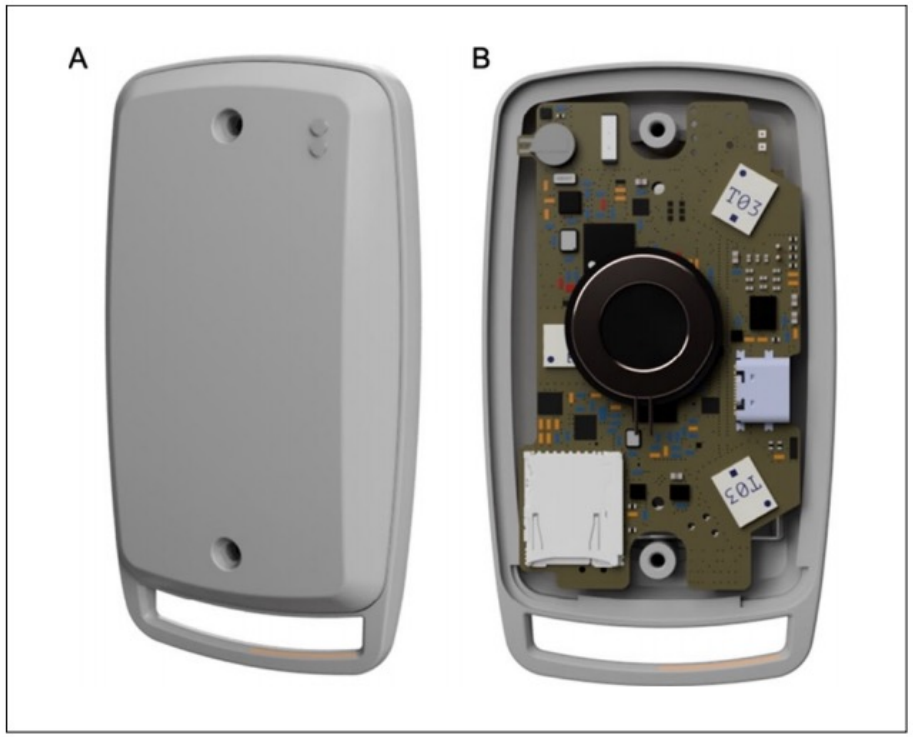
Humphreys, King, & Gotlib (2018) *HIMH*



Humphreys, King, & Gotlib (2018) *HIMH*







JACOBS FOUNDATION

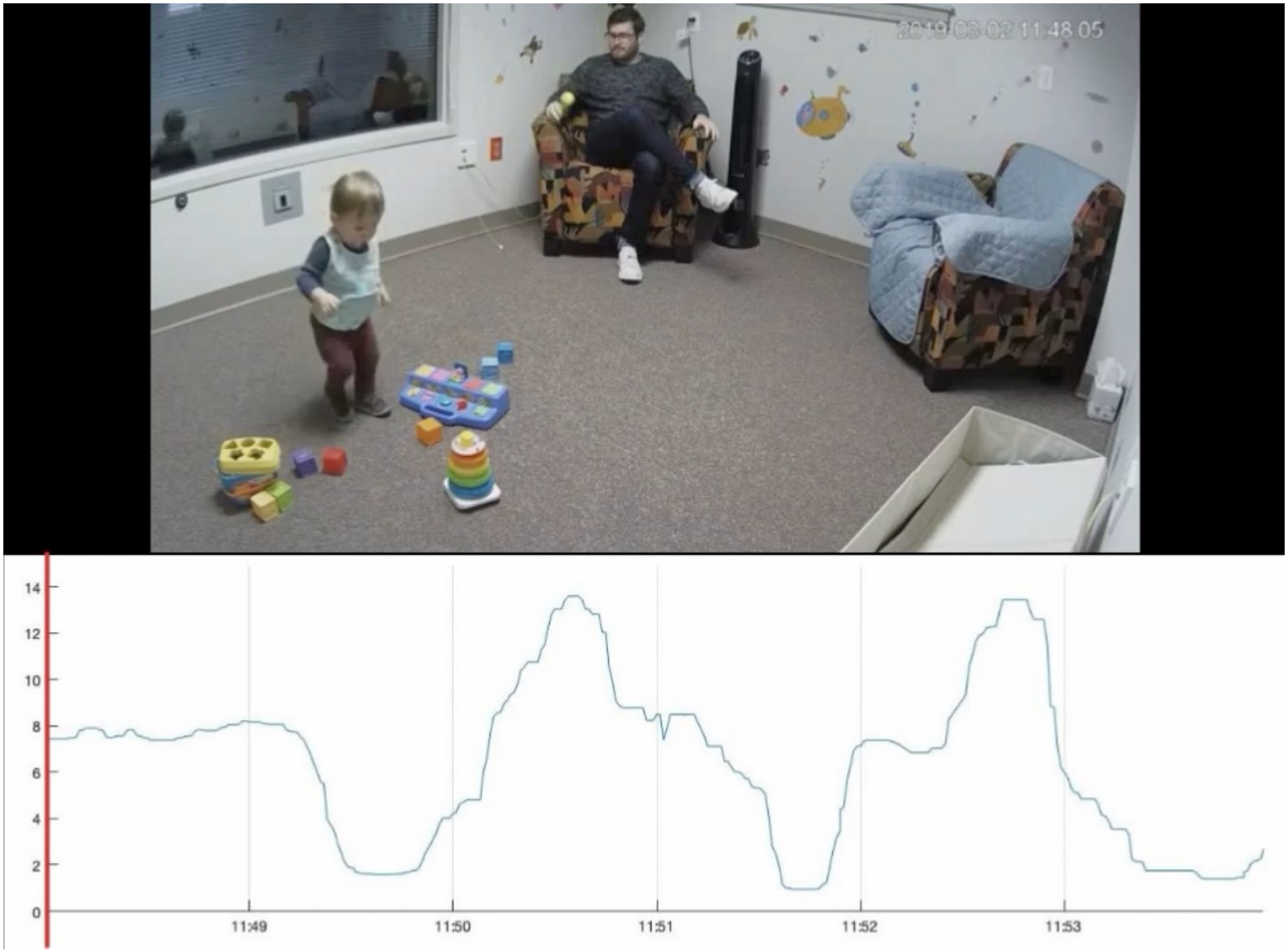
Our Promise to Youth


Virginia Salo


Pat Pannuto


Andreas Biri


Will Hedgecock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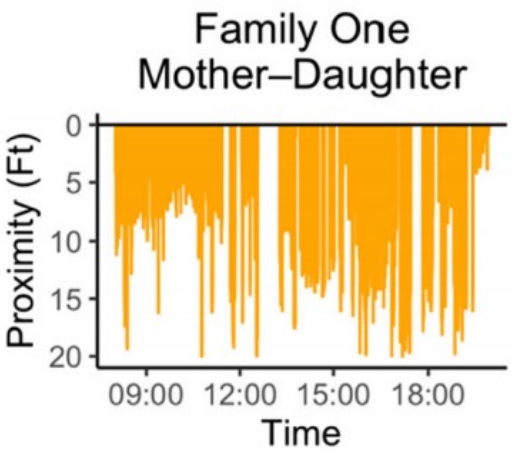
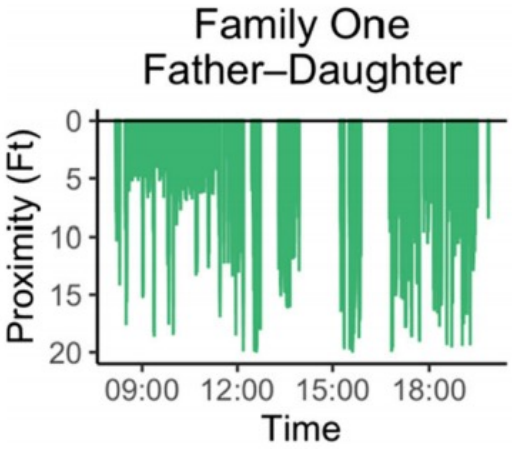
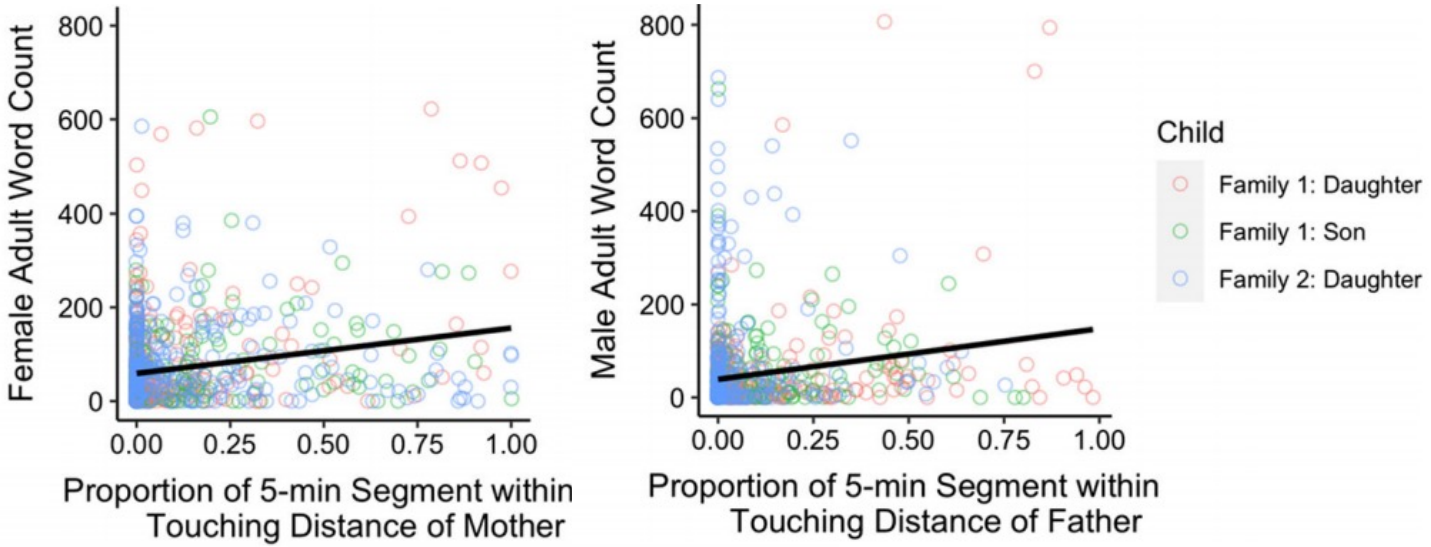
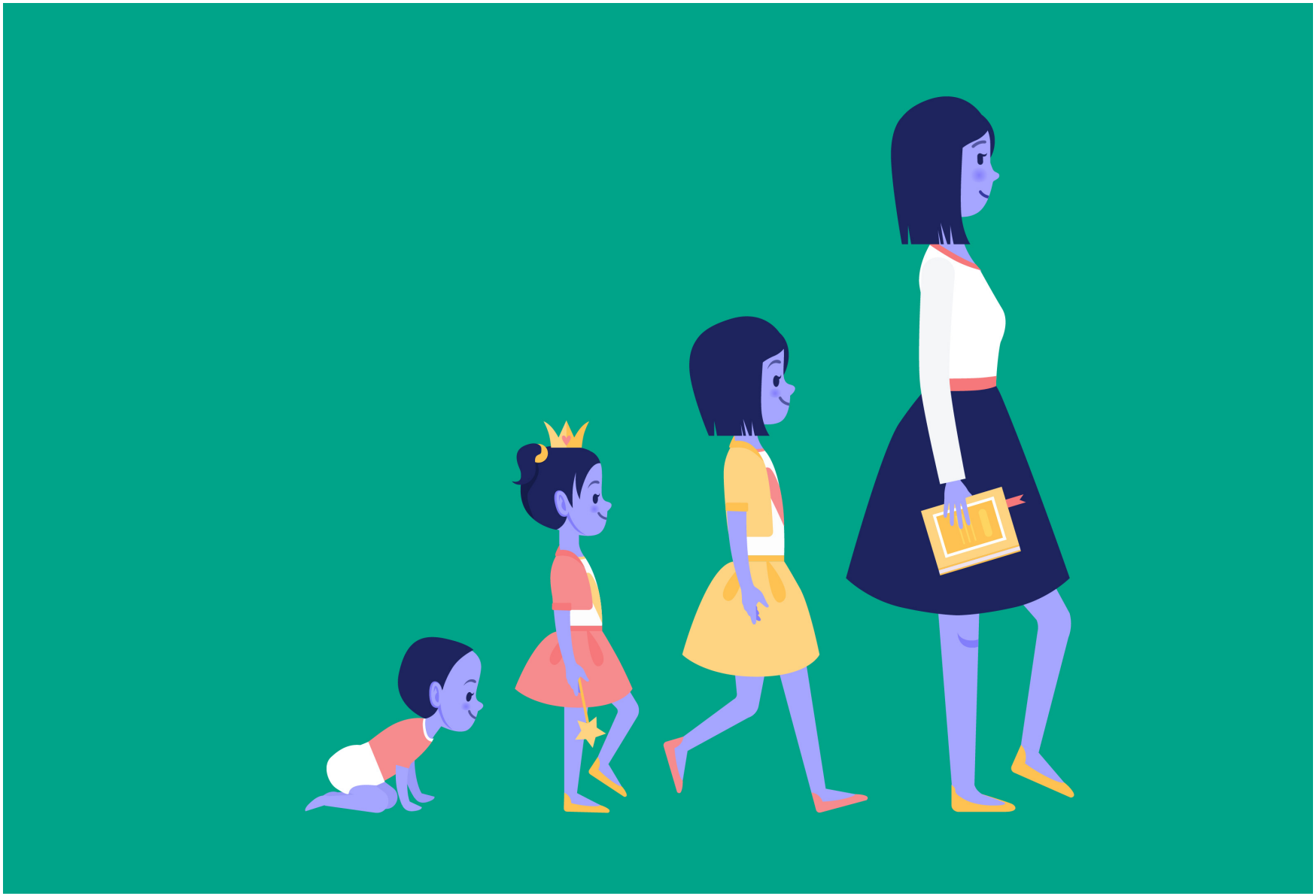
11:53





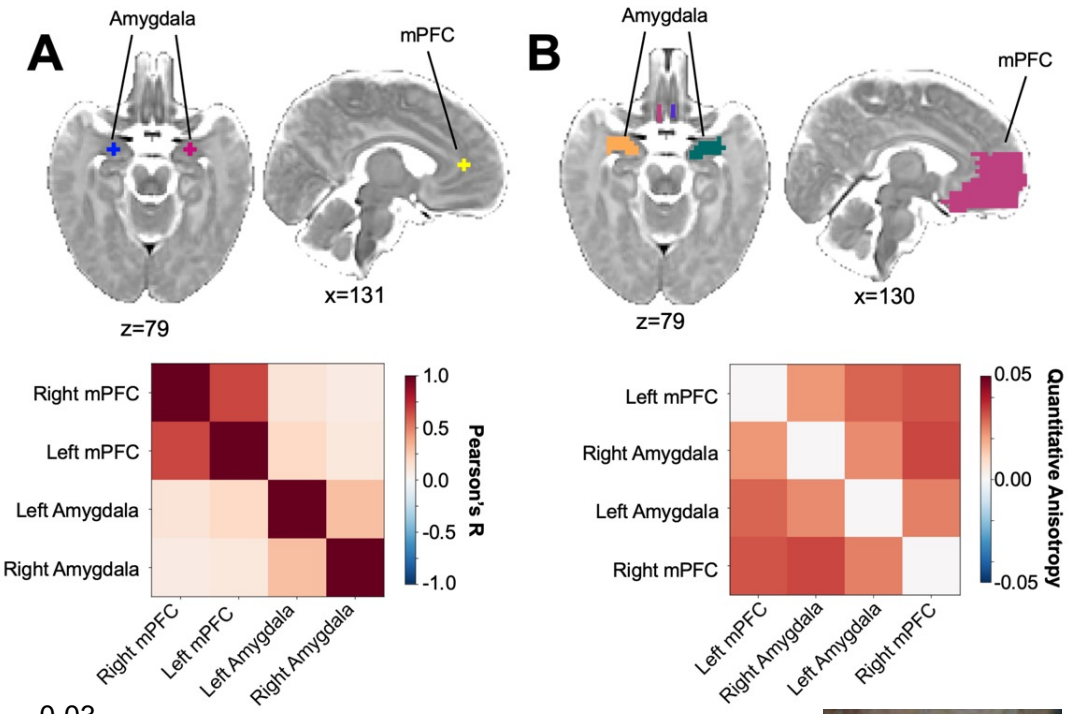


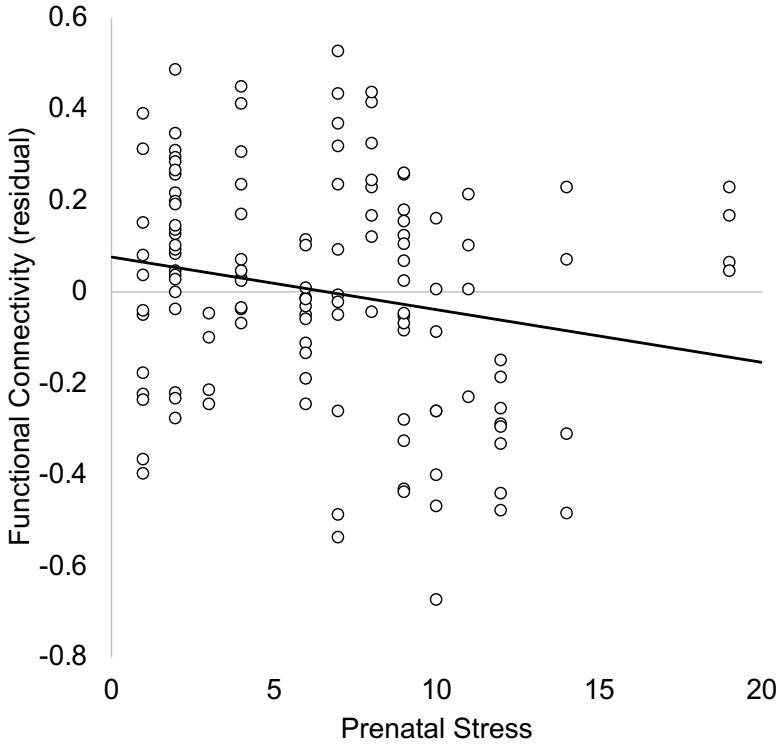
Salo …Humphreys (2021) Behav Res Meth

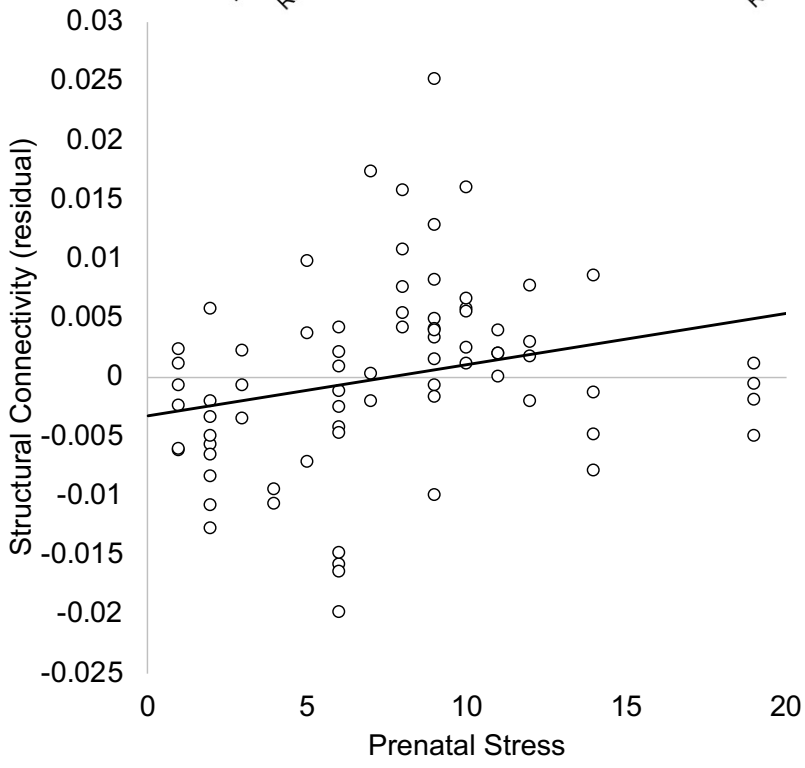


Harnessing brain plasticity

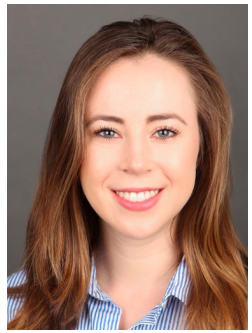
Prenatal stress and MRI scans with newborn infants







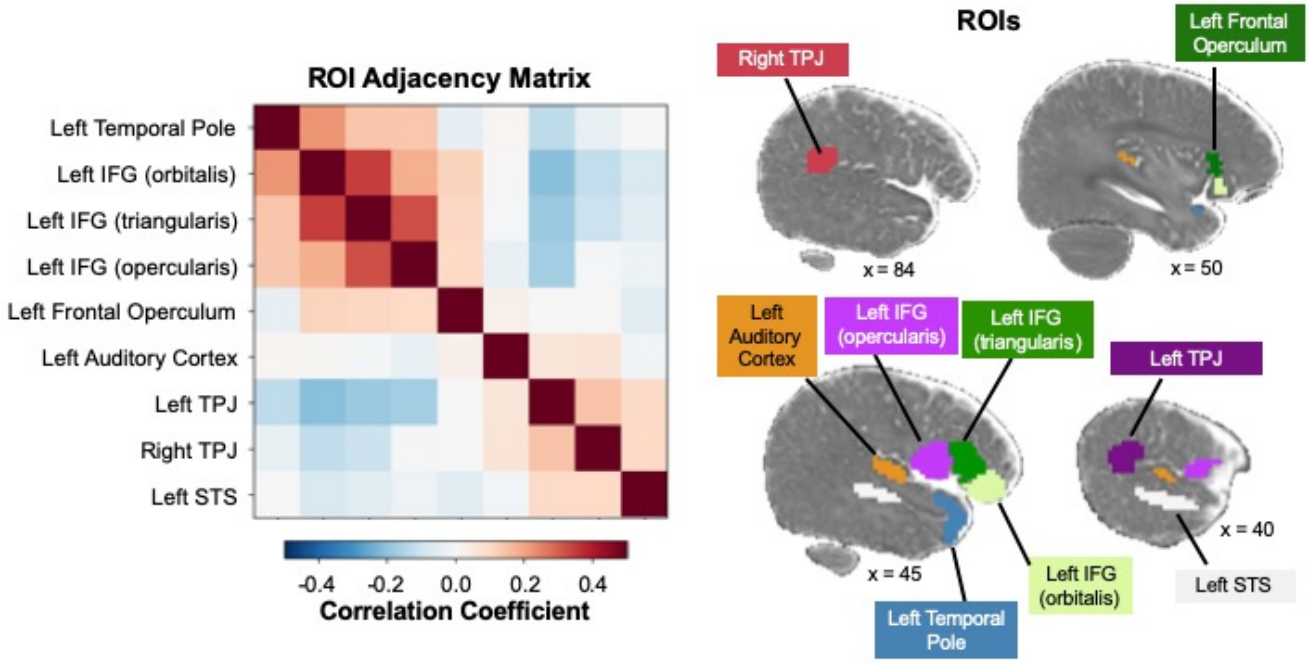
M. Cat Camacho



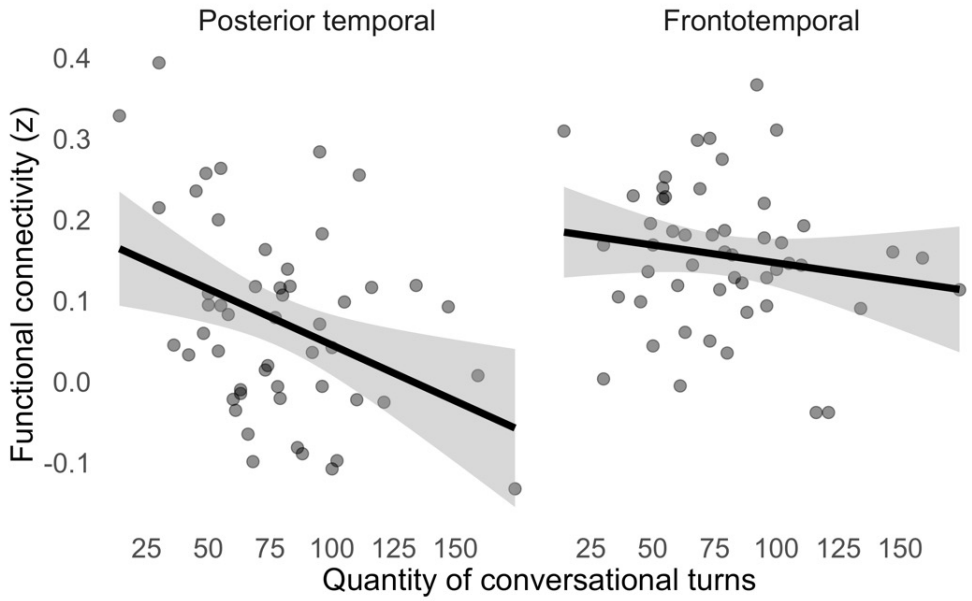
Marissa Roth

Humphreys et al. (2020) *Dev Cog Neuro*

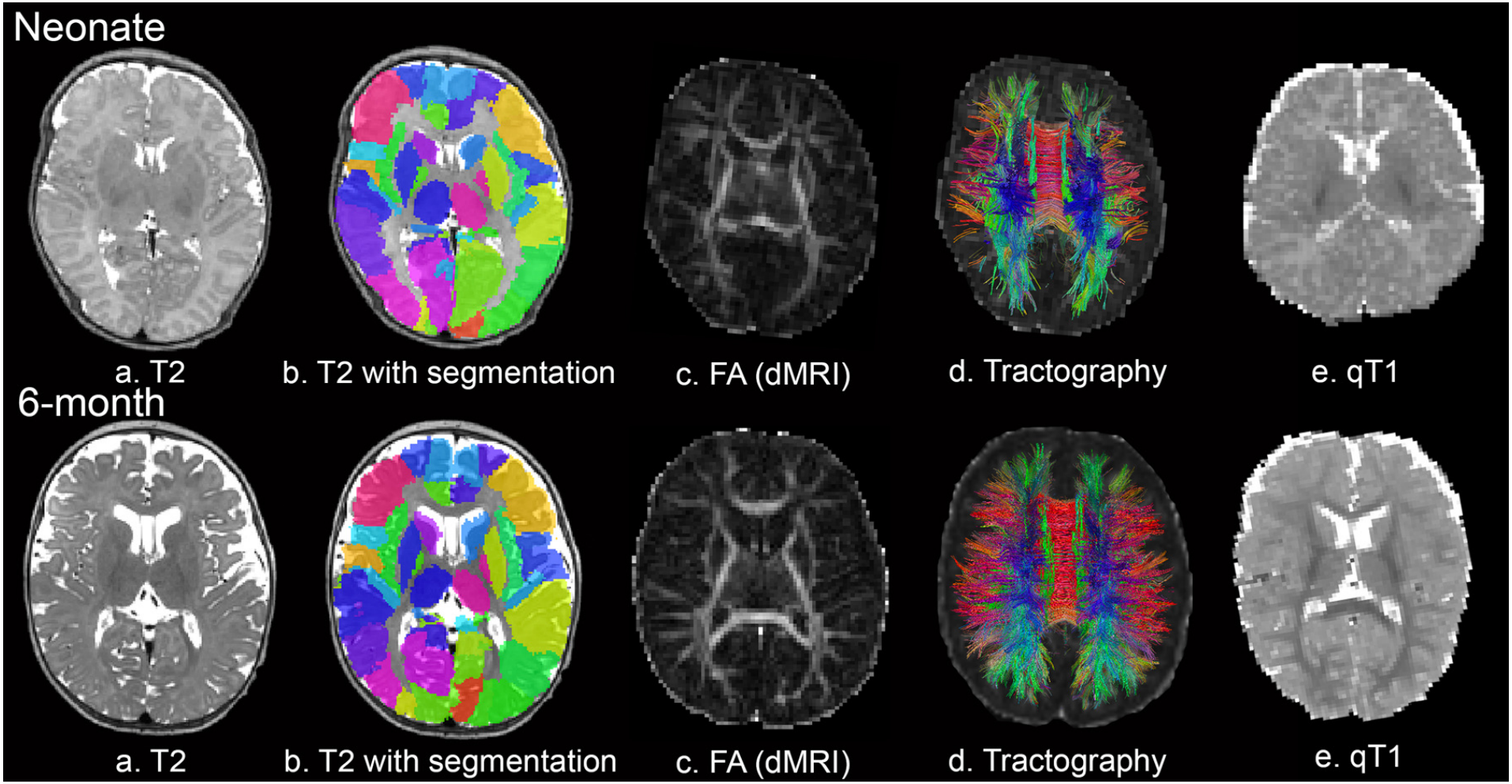
Identification of language networks in sleeping infants



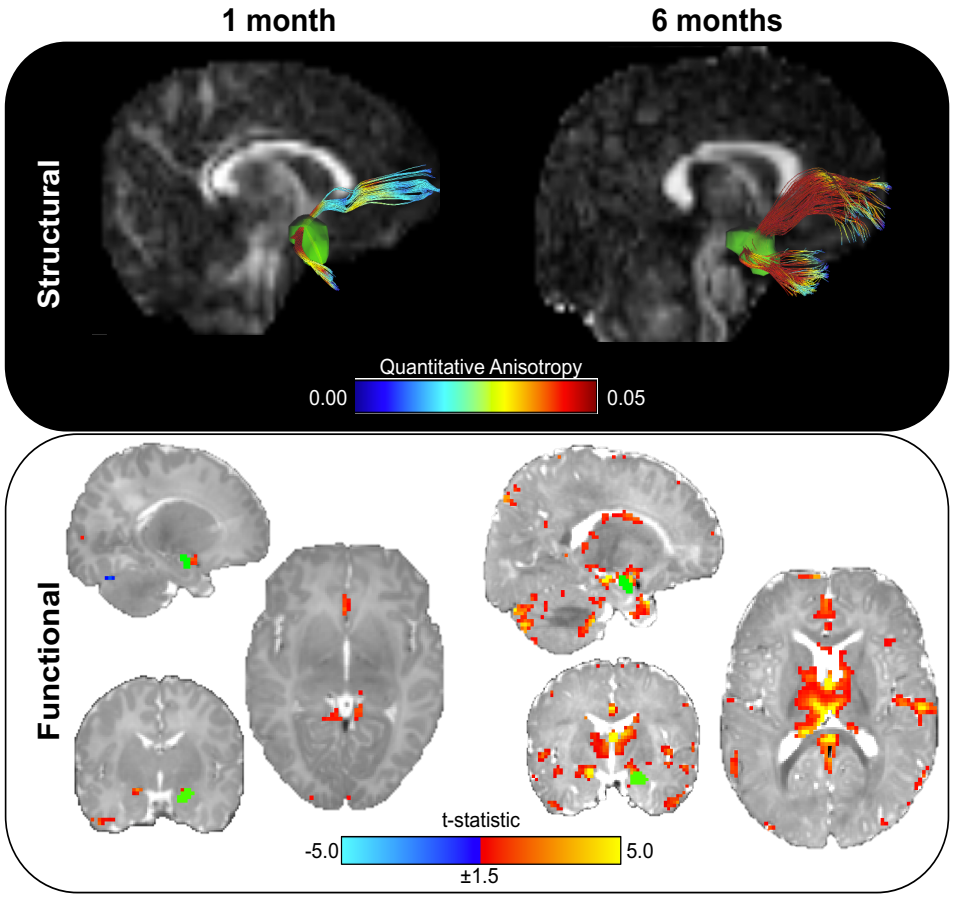
The quantity of conversational turns is negatively associated with resting-state connectivity in the posterior temporal language network



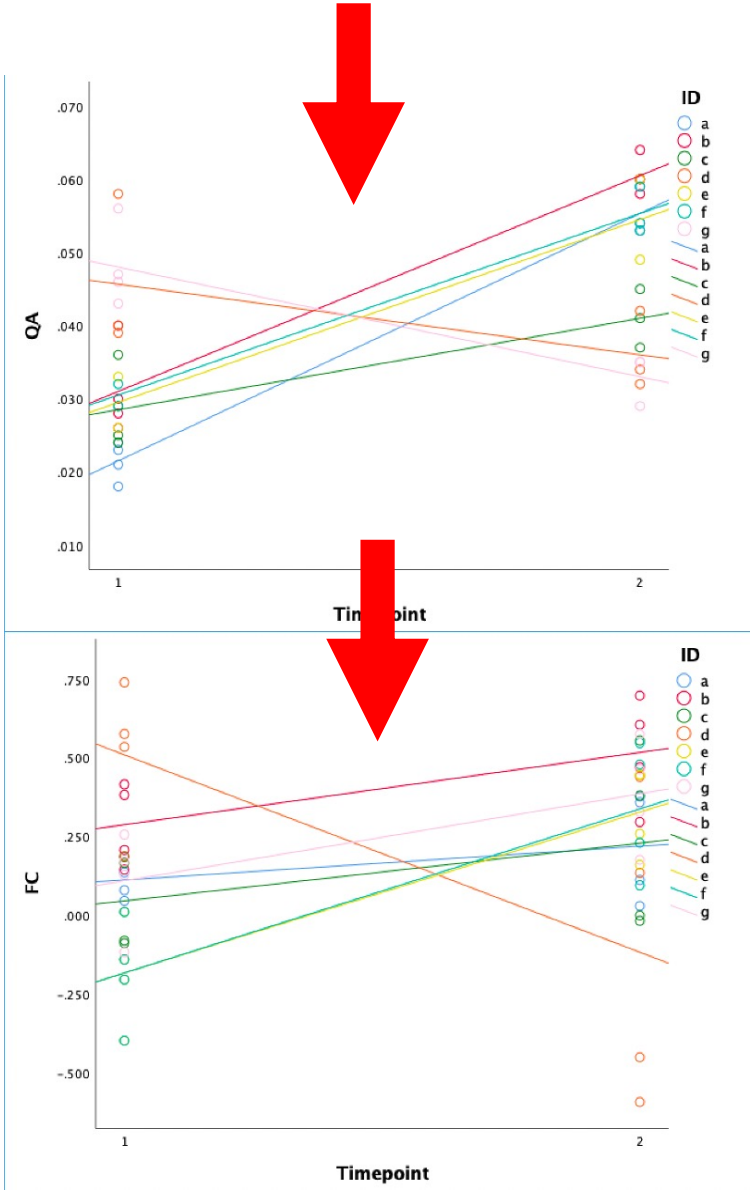
King et al. (2021) *J Neuro*



Example images from neonate and 6-month scan. a. T2-weighted; b. T2-weighted with segmentation from iBEAT overlaid; c. Fractional anisotropy (FA) from Diffusion-weighted MRI; d. Tractography using Camino; e. T1-weighted Quantitative MRI (qT1).



Representative patterns of amygdala structural connectivity via the uncinate fasciculus (top) and functional connectivity with the rest of the brain (bottom) from the same infant scanned at one month and 6 months of age



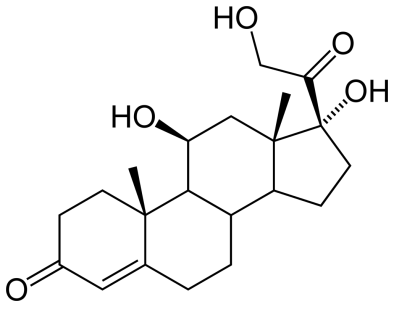
Spaghetti plots of amygdala–mPFC connectivity in 7 infants with complete diffusion and rsfMRI scans at newborn and 6-months assessments.

Implications

Experiences of threat and neglect are associated with brain and behavior outcomes even much later in development

Early life is a period of increased vulnerability (and opportunity)

Positive caregiving experiences mitigate effects of adversity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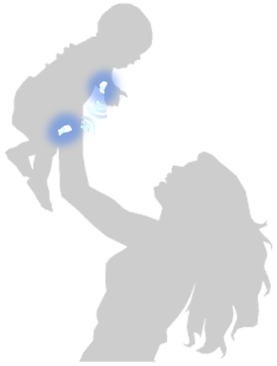
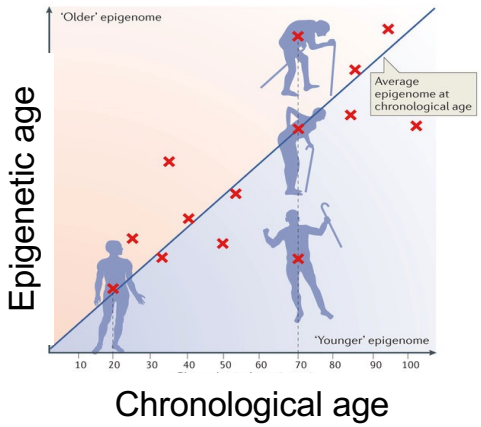
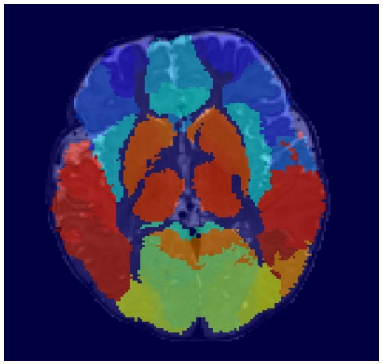
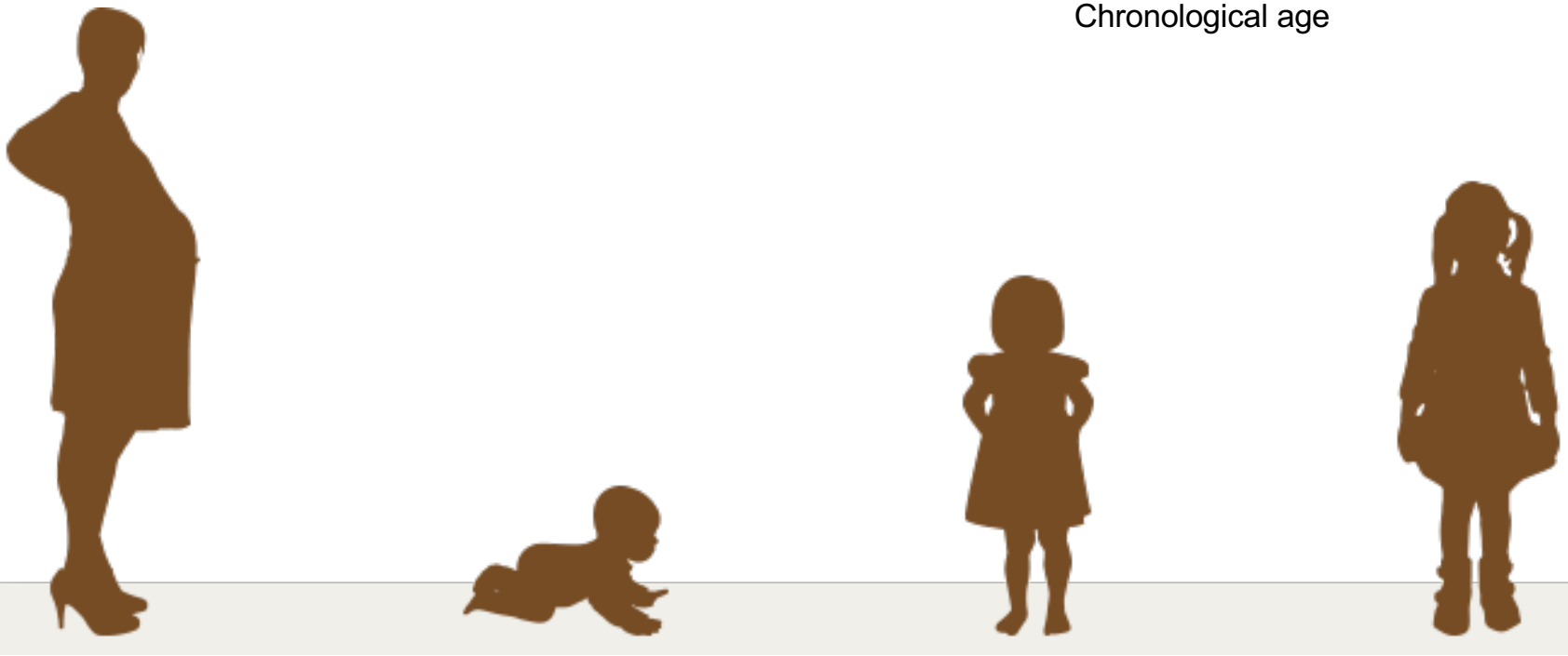



LENA

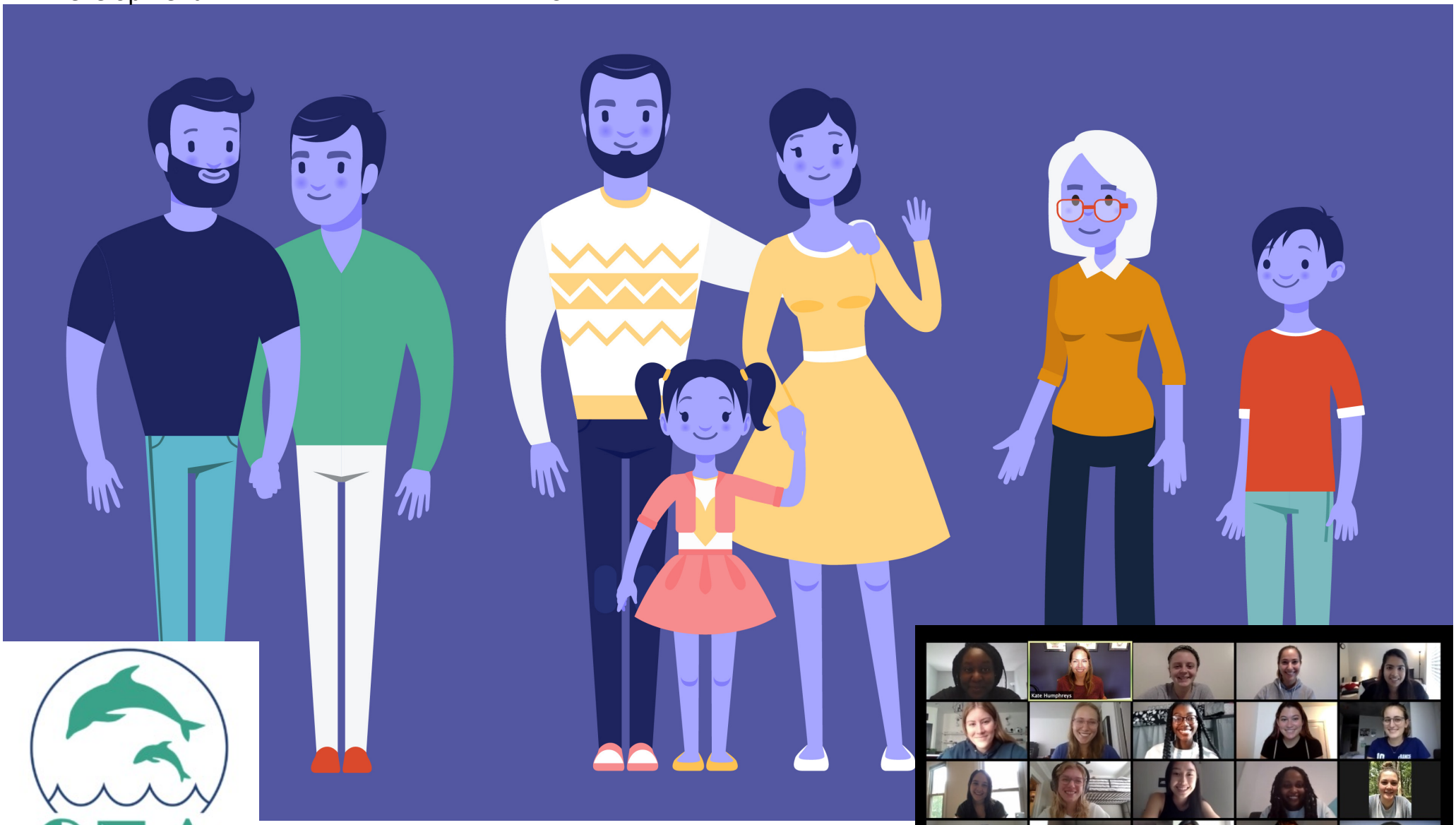

'Older' epigenome
Average epigenome at chronological age
'Younger' epigenome
Epigenetic age
10
20
30
40
50
60
70
80
90
100
Chronological age





Funders of our research:

- National Institute of Mental Health
- National Institute of Child Health and Development
- National Science Foundation
- Jacobs Foundation
- Vanderbilt Kennedy Center
- VICTR
- Caplan Foundation
- Brain and Behavior Research Foundation



SEA

STRESS AND EARLY ADVERSITY LABORATORY

VUseaLab.com

In the Stress and Early Adversity (SEA) Lab at Vanderbilt University (directed by Dr. Kathryn L. Humphreys), we study how children's experiences are associated with development. If you are interested in learning more about our studies, please check out our current projects!

Donate to our research

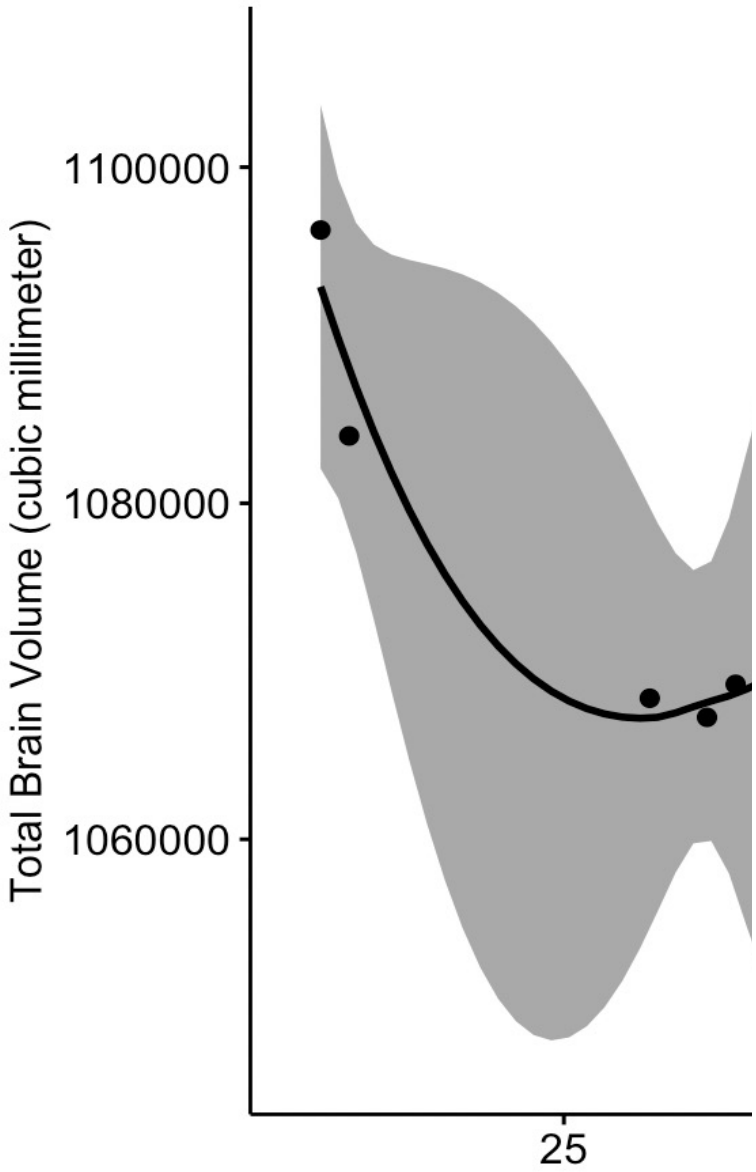
DONATE NOW

Our lab accepts donor support to help us with our mission to understand and improve children's experiences. As a donor, you will enable researchers to conduct cutting-edge research that helps us to better understand and support children and families.

While you are welcome to donate anonymously, Dr. Humphreys encourages potential donors to connect with her to ensure your donation goes to the project most aligned with your mission.

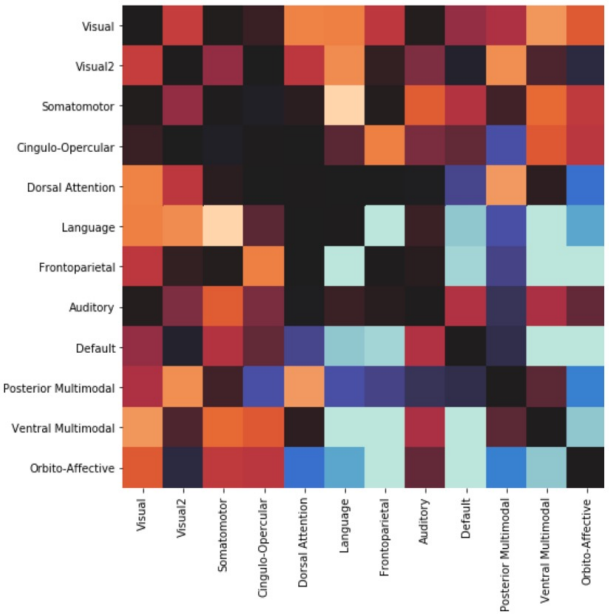
Social Cognitive and Affective Neuroscience

Cárdenas, E. F., Kujawa, A., & Humphreys, K. L. (2020). Neurobiological changes during the peripartum period: Implications for health and behavior. *Social Cognitive Affective Neuroscience.*

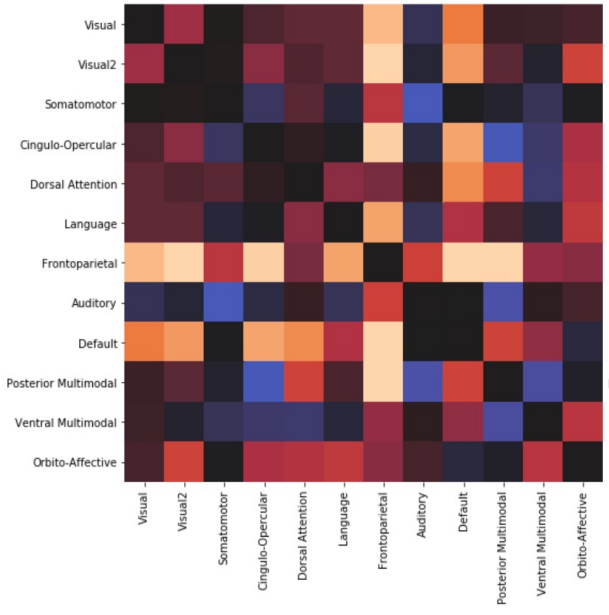

Total Brain Volume (cubic millimeter)
1100000
1080000
1060000
25

Connectivity Analysis Results

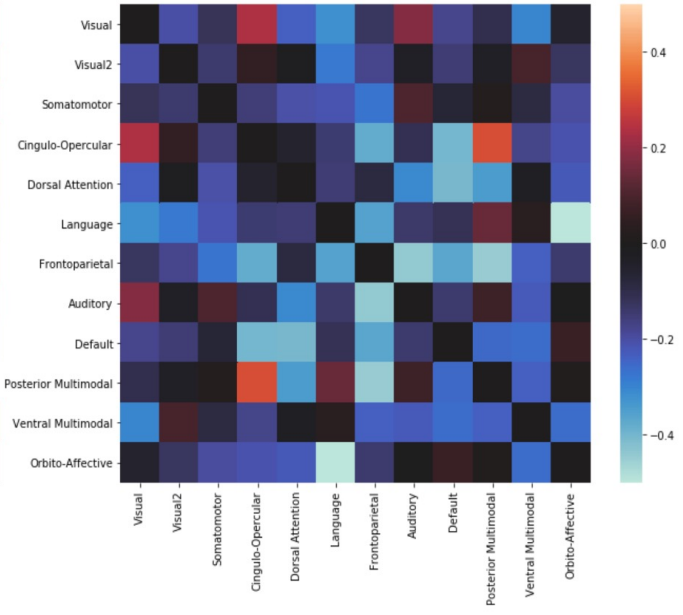
Early (8 & 10 wks) to Late (31, 35, & 37 wks) Pregnancy



Early (6 & 8 mo) to Late (12 & 15 mo) Postpartum



Changes from Late Pregnancy to Early Postpartum



Trajectories of Neurobiological Change During Pregnancy