

International Conference

21 MARCH • 2024

CHILD PROTECTION AND CARE REFORM IN THE CONTEXT OF MOLDOVA – EU ASSOCIATION AGENDA



2024 Theme: Ending the placement of young children in institutional care – from policy to action

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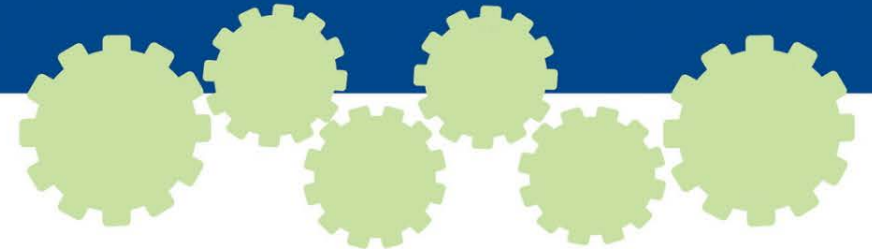


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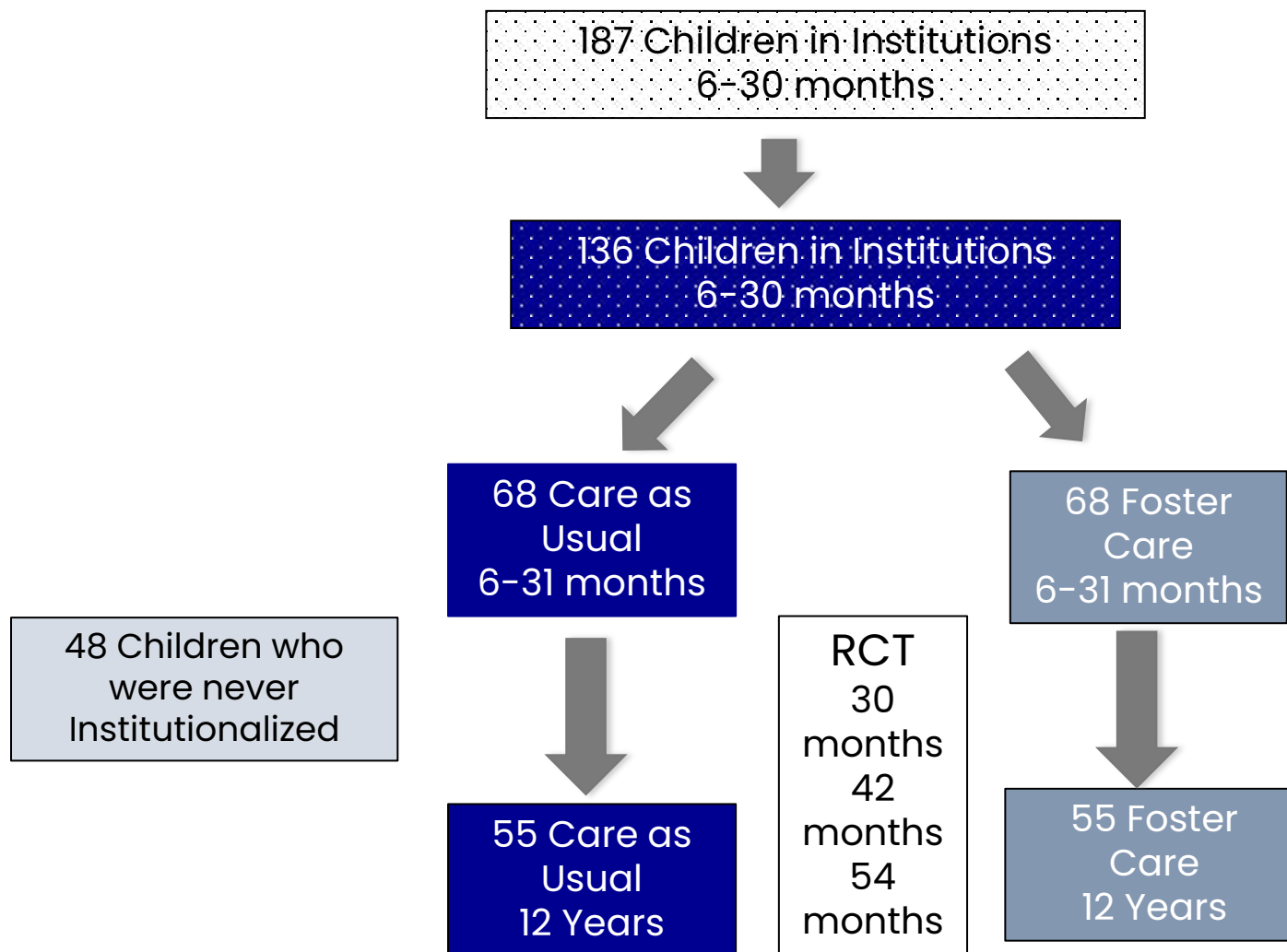


Brain, Cognitive, Emotional Reactivity, Attention and Stress Outcomes in BEIP

Nathan A. **FOX** Distinguished University Professor
University of Maryland, College Park



BEIP Study Design



Domains of Assessment in BEIP

- Physical Development
- Language
- **Cognition**
- **Brain Function**
- **Emotional reactivity**
- **Executive Functions**
- **Stress responsivity**
- Caregiving Environment
- Attachment
- Psychopathology
- Social competence
- Genetics

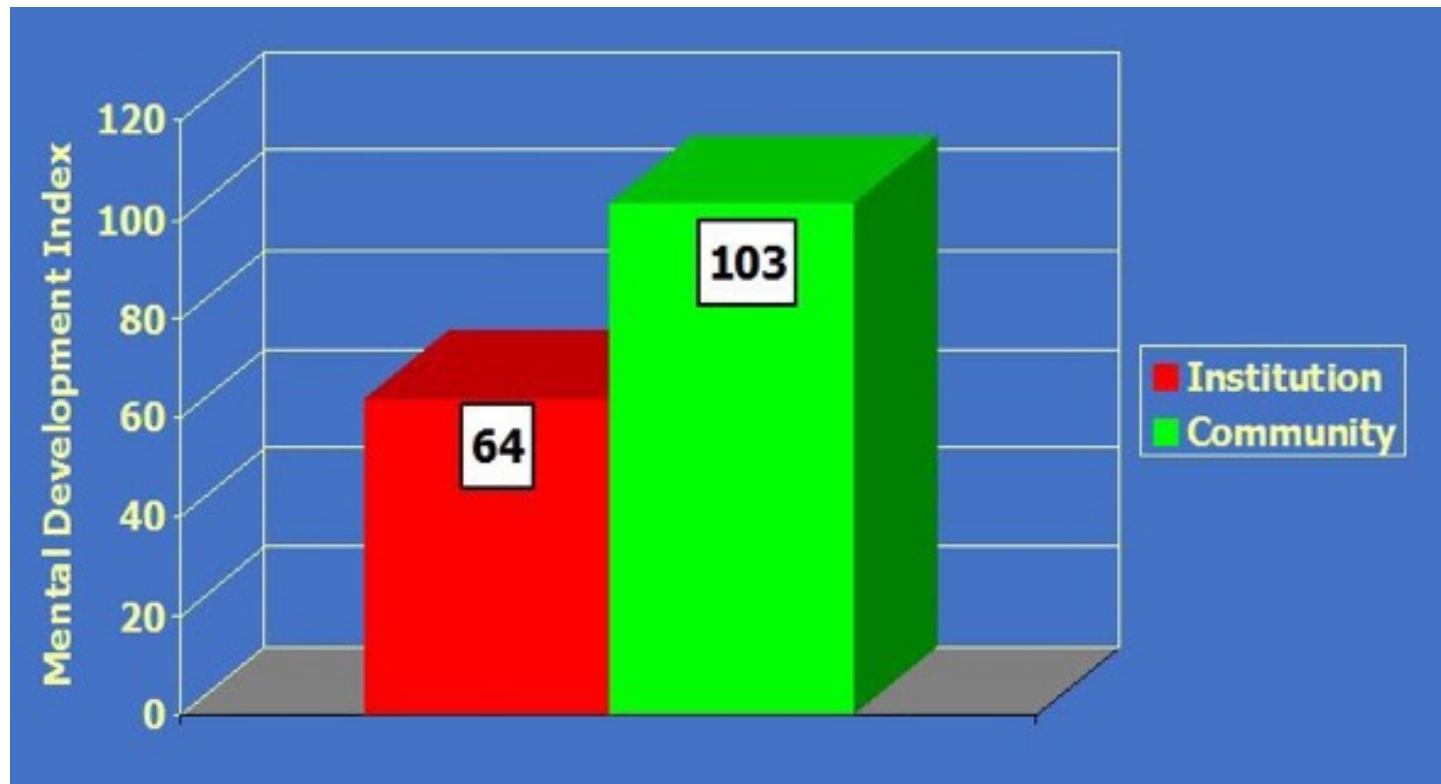
*Data derived from measures listed in **bold and underlined** will be discussed in this talk





IQ

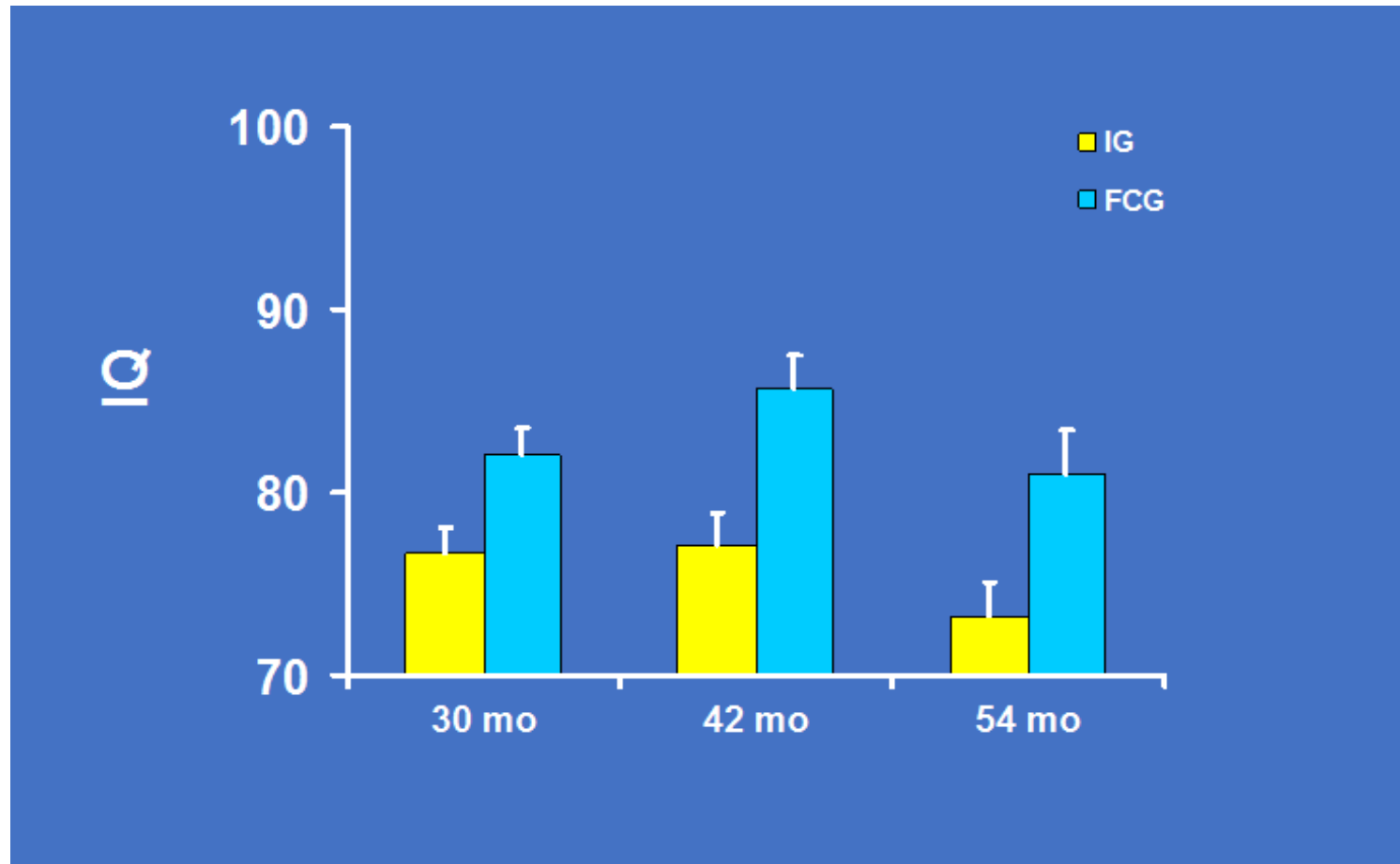
Bayley Scales of Infant Development (MDI) (at baseline)



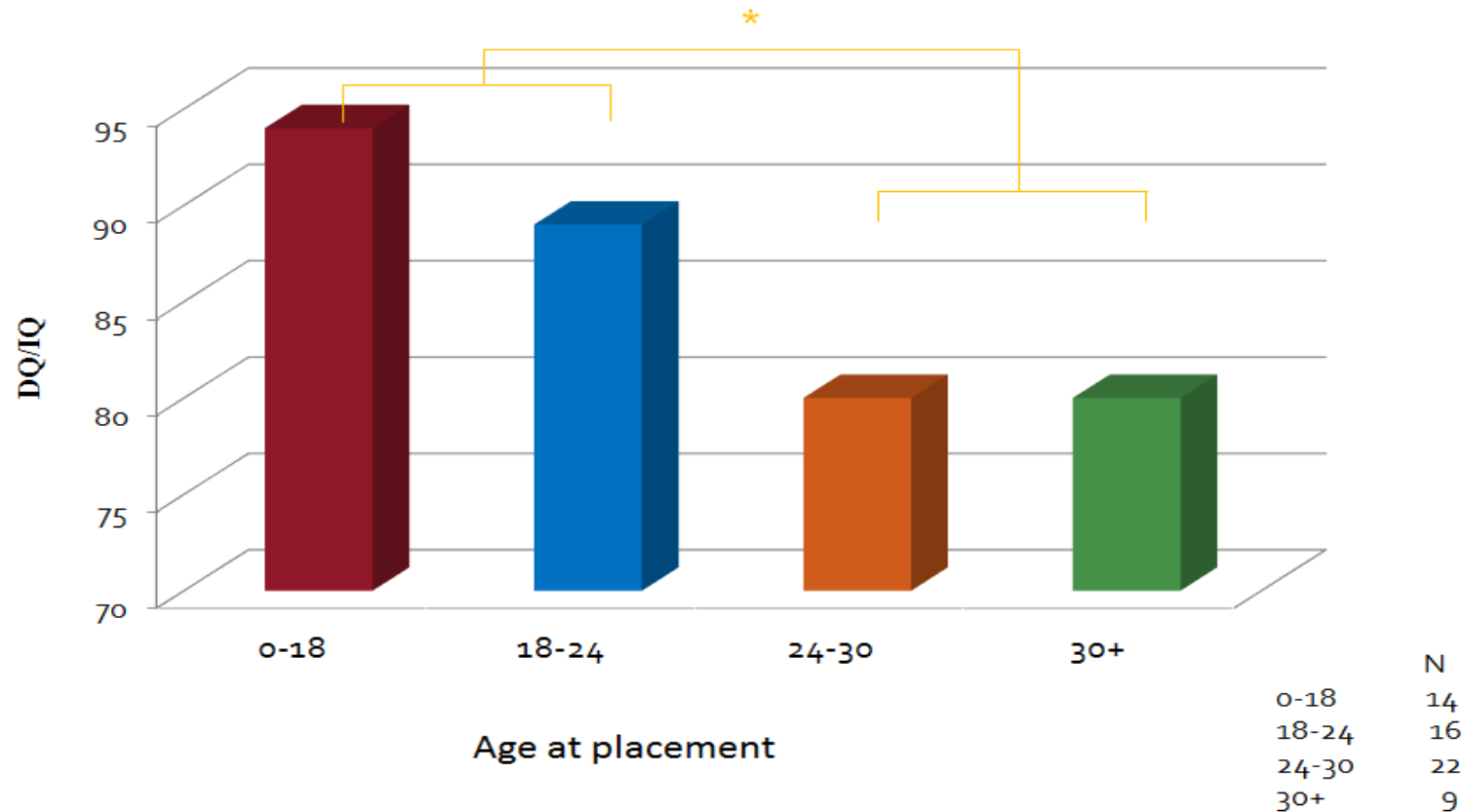
Smyke AT, Koga SF, Johnson DE, Fox NA, Marshall PJ, Nelson CA, Zeanah CH, & the BEIP Core Group (2007). *Journal of Child Psychology and Psychiatry*, 48, 210–218.



IQ Scores of Foster Care and Institutionalized Groups at Follow-up



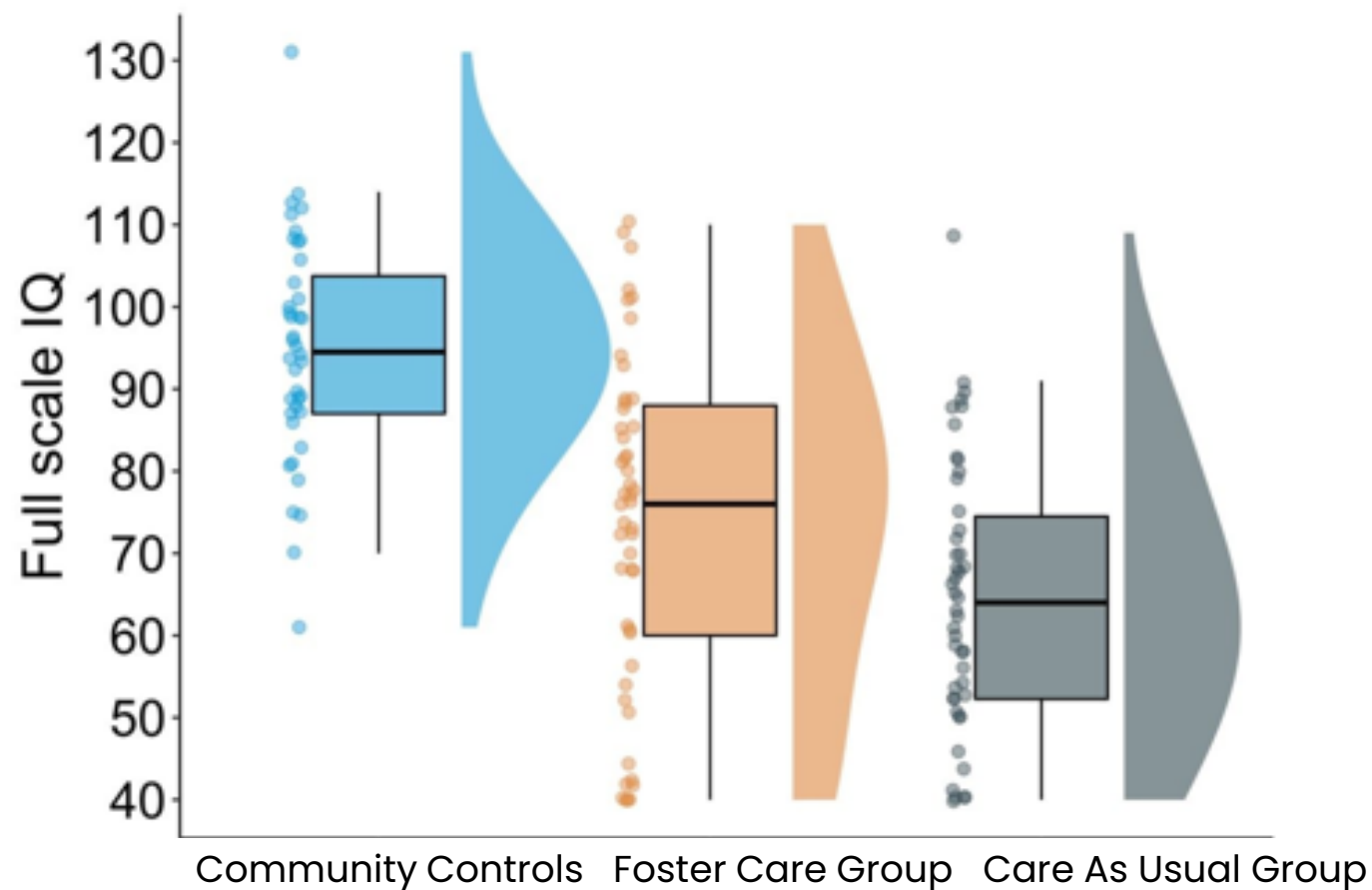
How does DQ/IQ differ for children in foster care as a function of age of entry



Nelson CA, Zeanah CH, Fox NA, Marshall PJ, Smyke AT, & Guthrie D (2007). Science, 318, 1937-1940



IQ at Age 18 years in BEIP



Humphreys et al, PNAS 2022



Summary of IQ findings

- ❖ Young children living in institutions are likely to exhibit significant delays in IQ
- ❖ Removal from institutions, particularly **prior to 24** months of age, and placement into families partially remediates IQ deficits
- ❖ Stability of family placement over age is an important factor in IQ outcomes
- ❖ Remarkably, 15 years after the intervention began there are still positive effects on IQ (although sensitive period no longer observed)



Assessment of Emotional Behavior



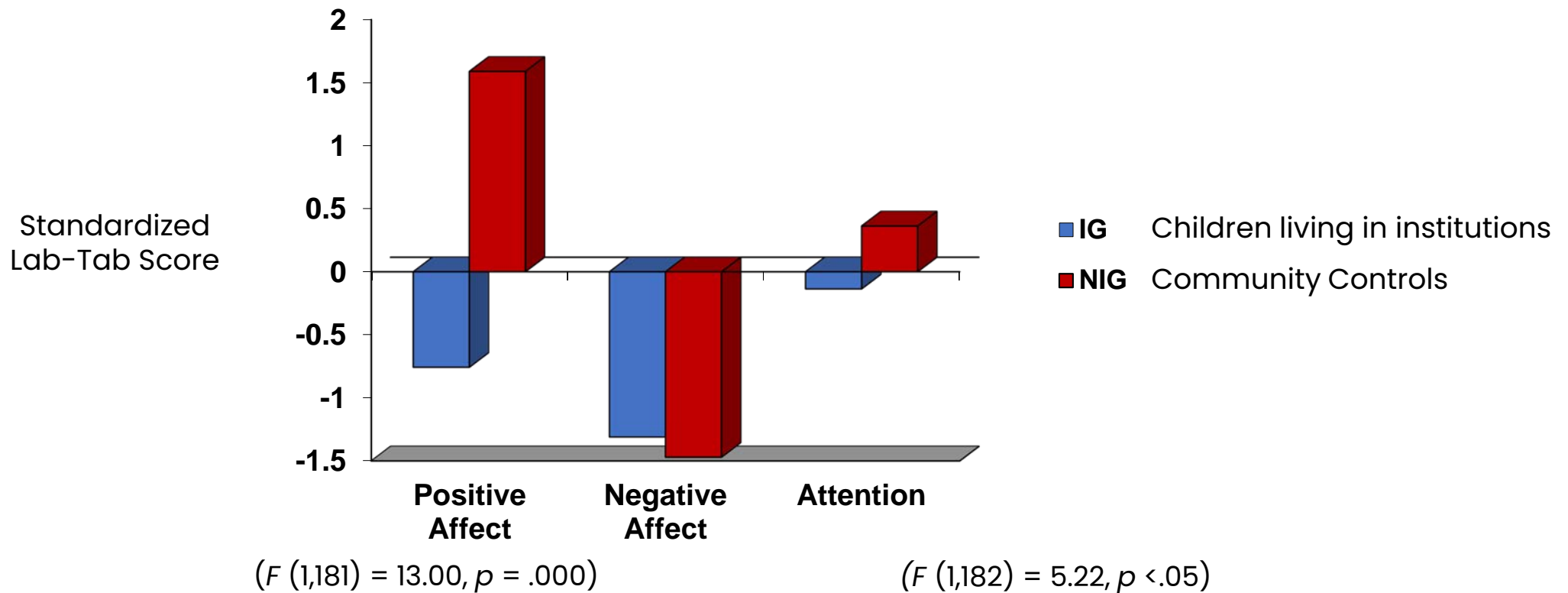
Assessment of Emotional Behavior

Assessment of Emotional Behavior was completed by coding individual behaviors and creating composites across the two episodes.

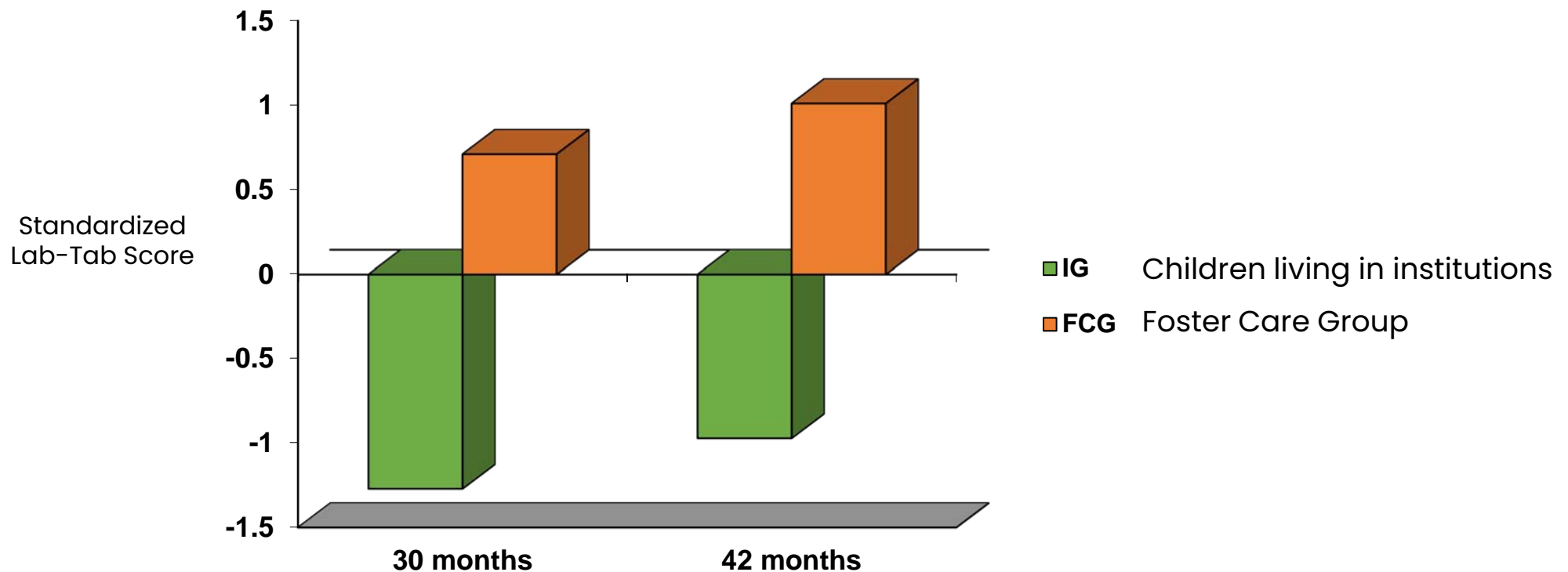
- Positive affect (smiling, laughing)
- Negative affect (distress, crying)
- Attention (gaze)



At Baseline, there were differences between children living in institutions and children living in the community



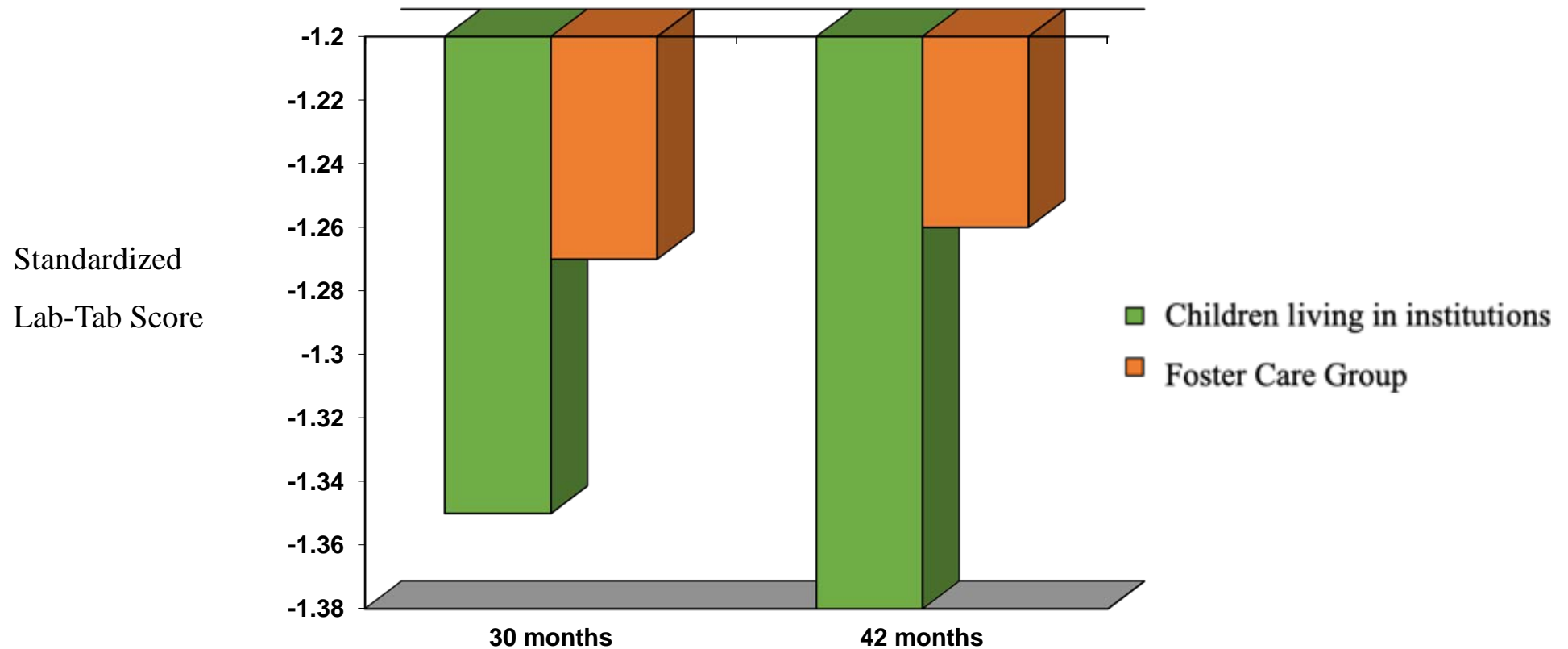
Children placed into Foster Care Group displayed heightened Positive Affect at follow up



$$F(1, 99) = 18.55, p = .000$$



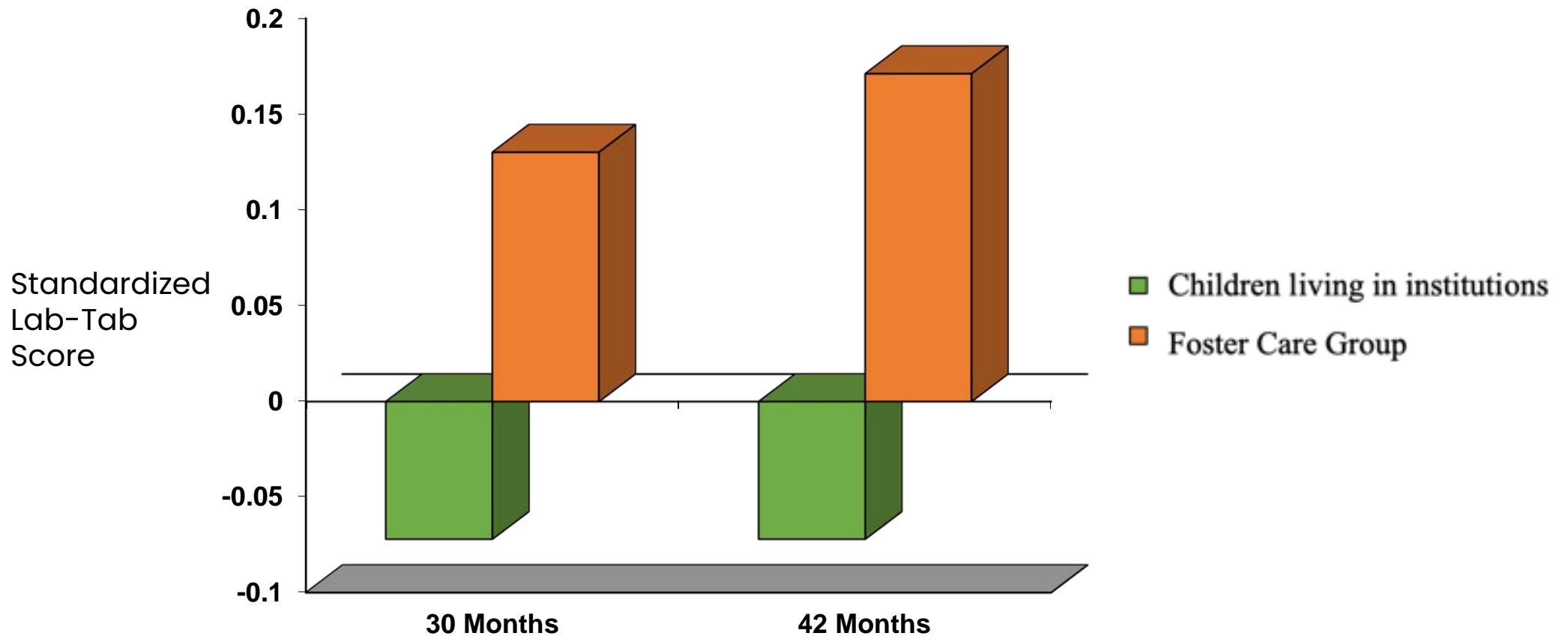
Children placed into Foster Care displayed less Negative Affect at follow up



$F(1, 102) = 1.70, p = n.s.$



Children placed into Foster Care displayed greater Attention at follow-up



$F(1, 102) = 9.73, p < .01$



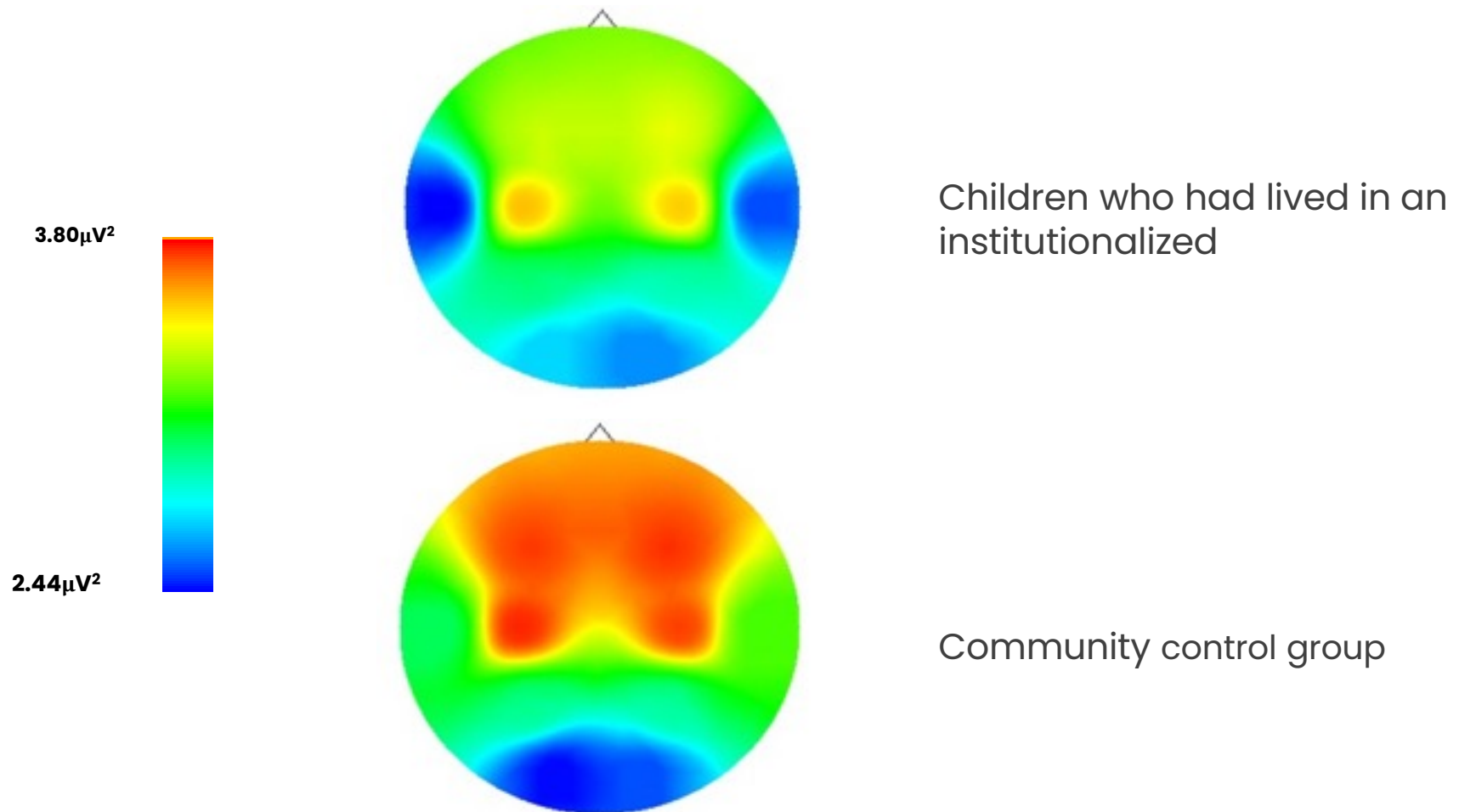
We also assessed brain activity and brain structure in BEIP

- ❖ Assume that the behavioral phenotype of the children in institution reflects alterations in underlying neural substrate; thus,

...turned to EEG and MRI



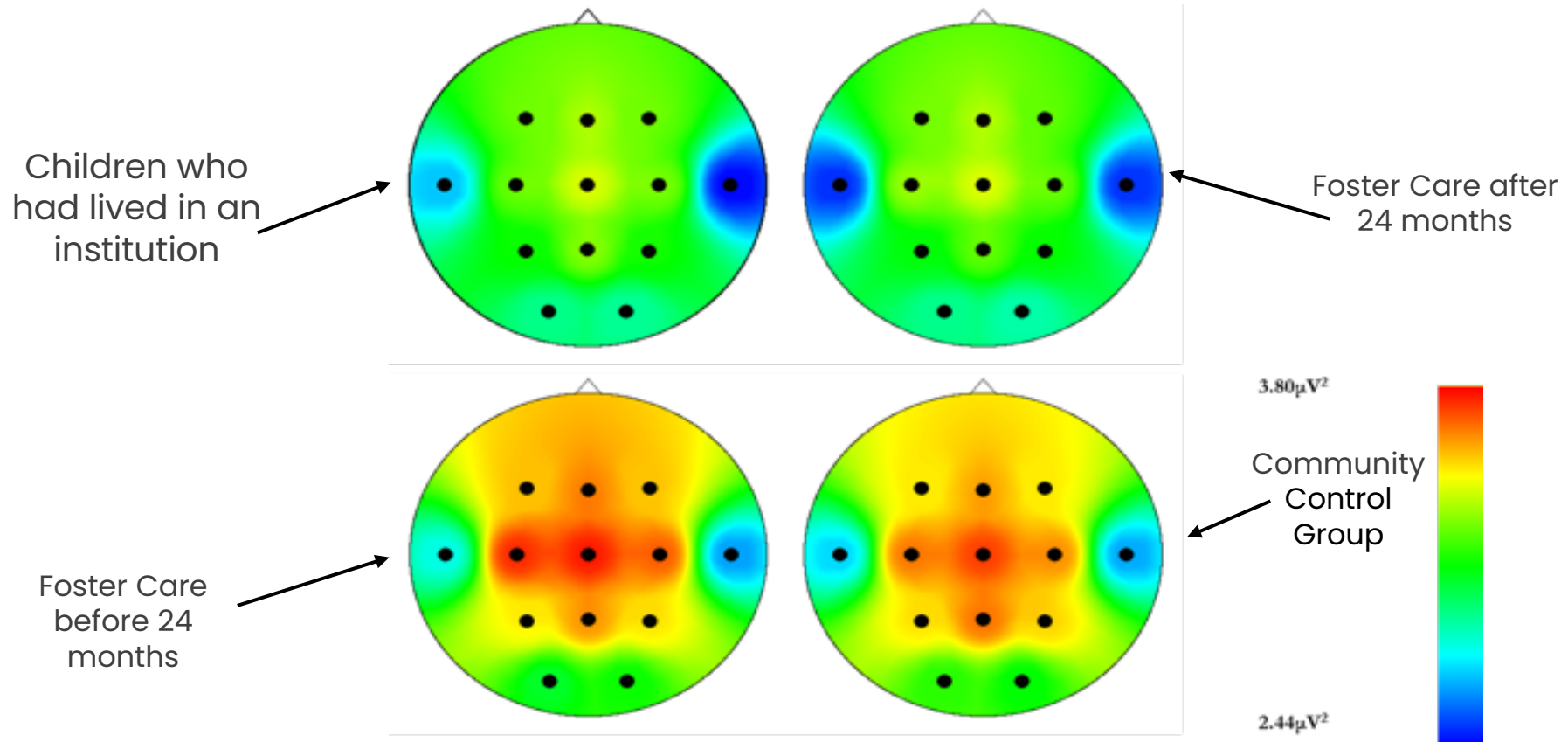
EEG activity at baseline



Marshall PJ, Fox NA, & the Bucharest Early Intervention Project Core Group (2004). *Journal of Cognitive Neuroscience*, 16, 1327-1338.



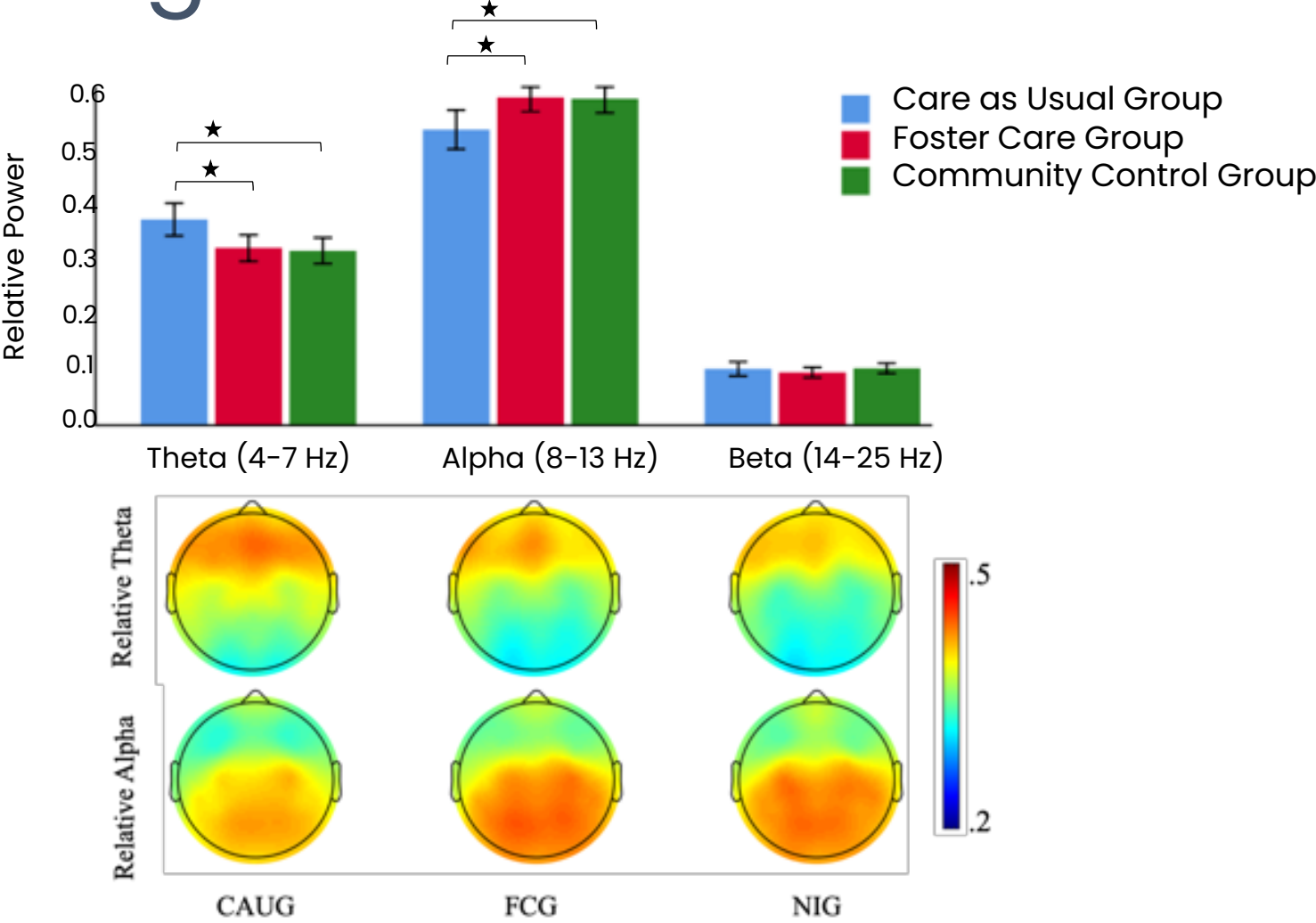
Does brain activity (EEG) change as a function of intervention and timing?



Vanderwert RE, Marshall PJ, Nelson CA, Zeanah CH, & Fox NA (2010). PLoSOne, 5(7): 1-5.



EEG at age 16 in BEIP



Mean relative power (top) in theta, alpha and beta frequency band for the care-as-usual group (CAUG), foster care group (FCG) and never-institutionalized group (NIG). Error bars indicate +/- 2 standard error. *p < 0.05. Topographic maps (bottom) display distribution of relative theta and alpha power across the scalp for the CAUG, FCG and NIG



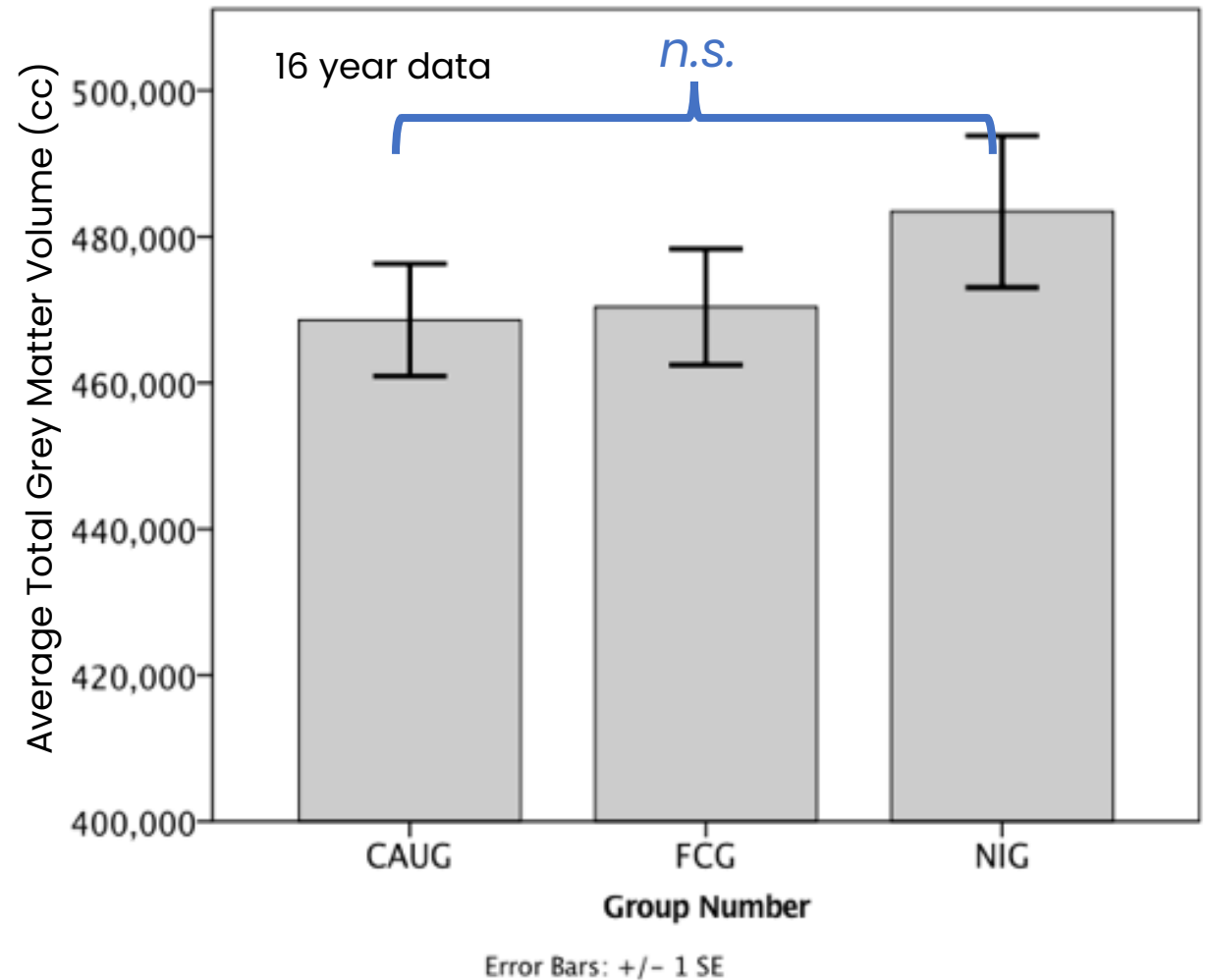
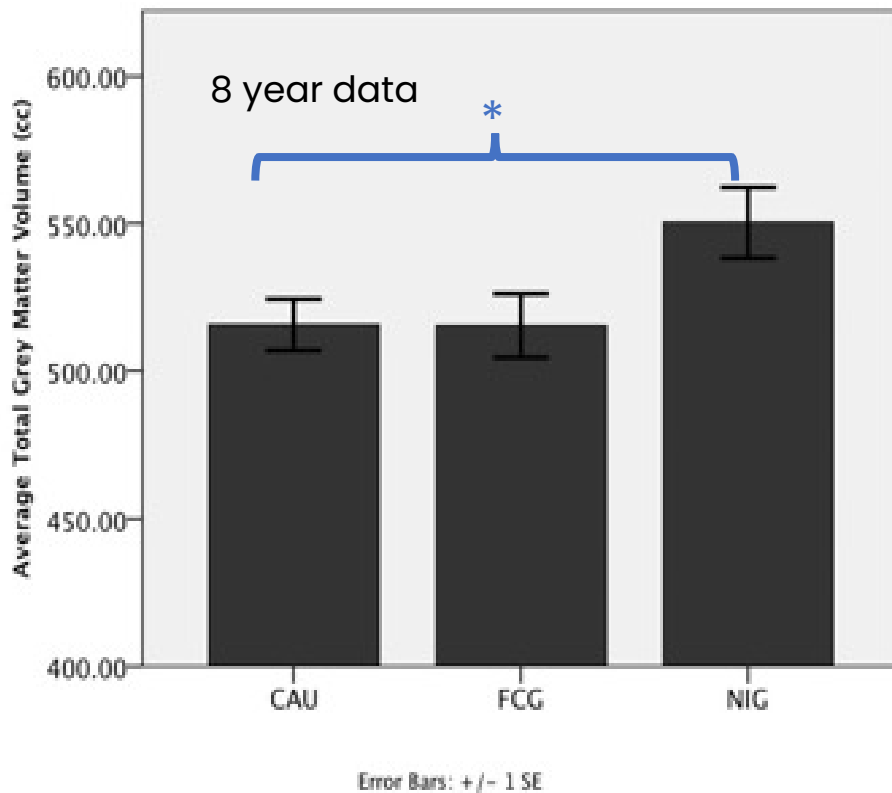
What about brain structure?



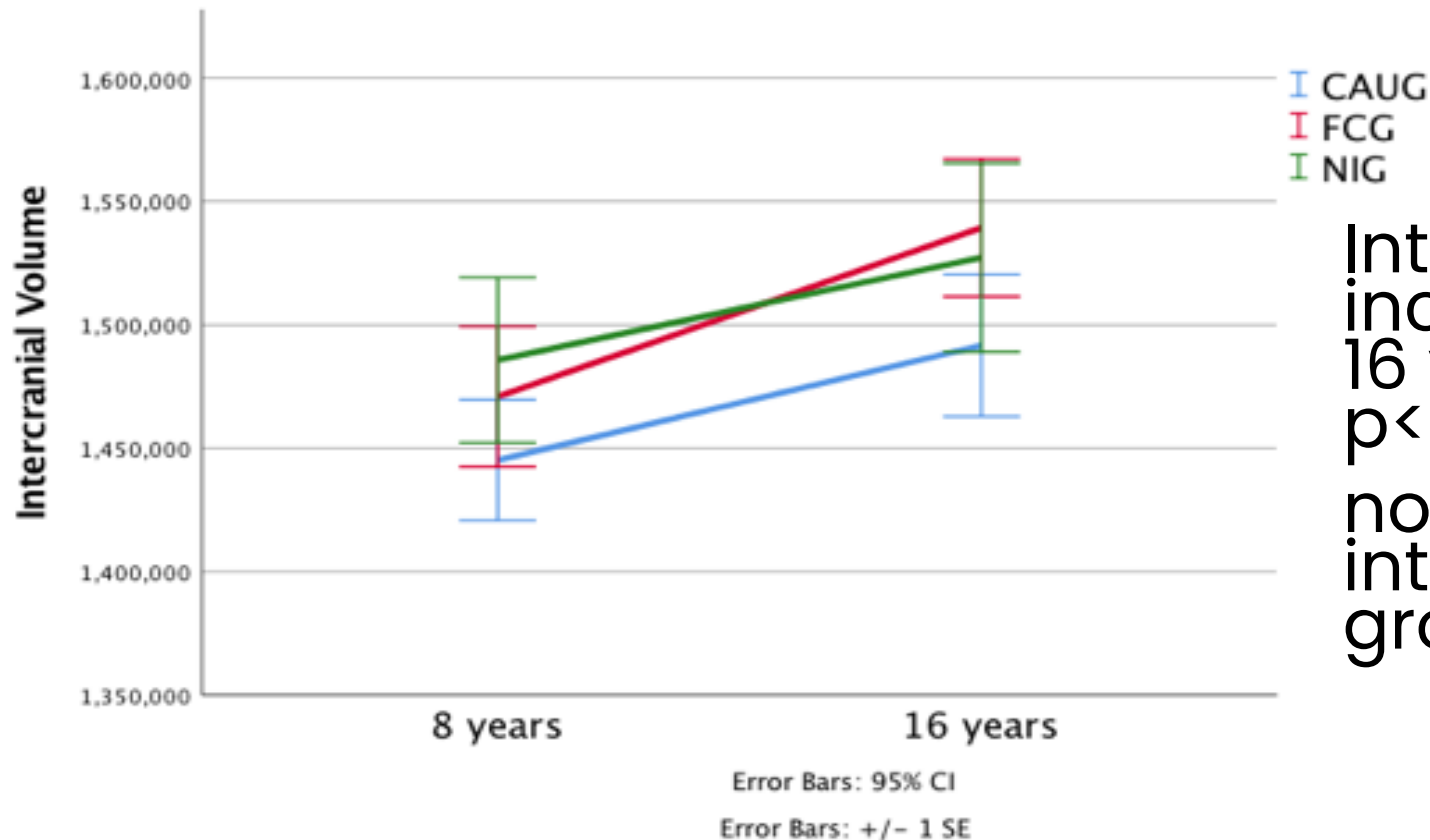
Magnetic Resonance Imaging (MRI) performed at 8-10 years and repeated at age 16



Average cortical grey mater volume



Are we seeing expected change across time (intercranial volume – head size)?

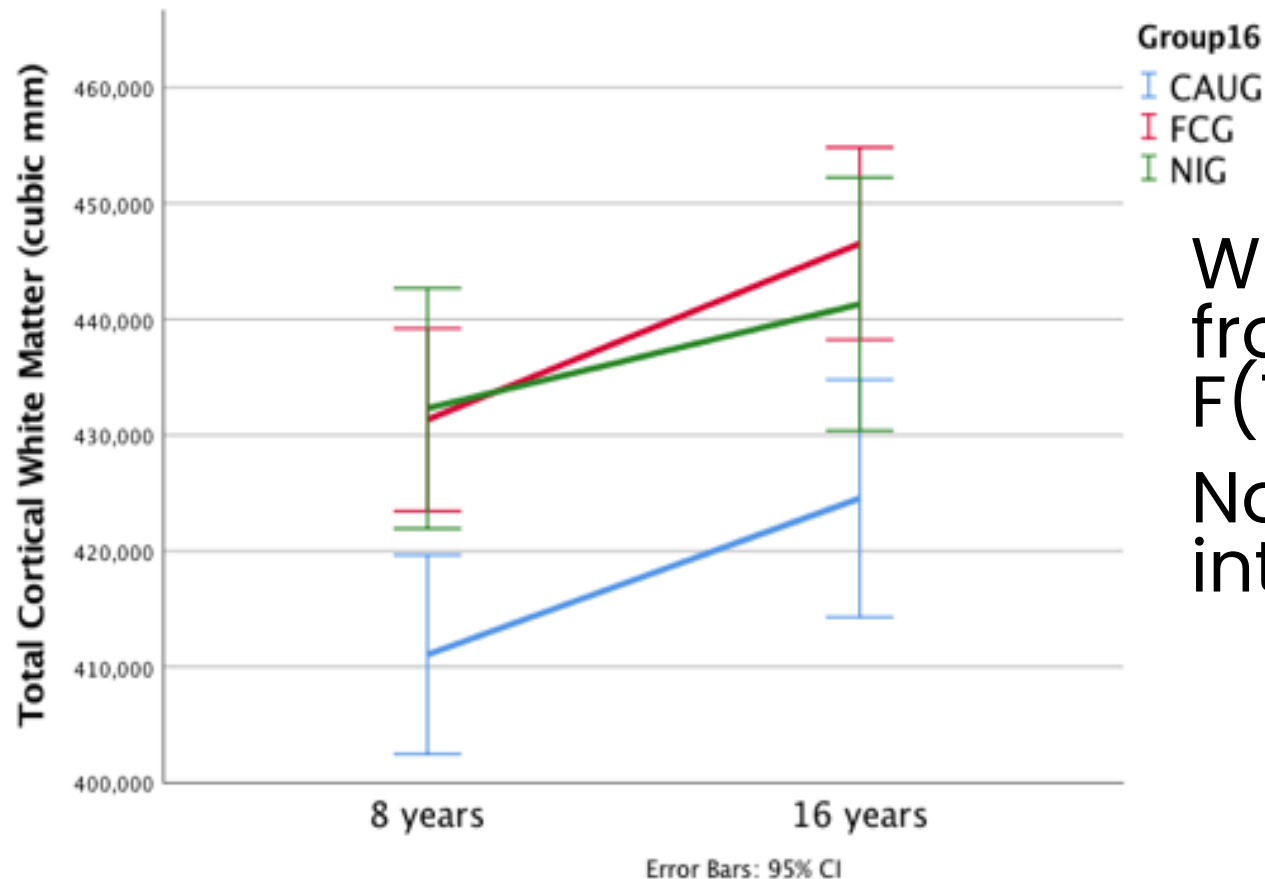


Intracranial volume increased from 8 to 16 years, $F(1,61)=41.4$, $p<0.001$

no significant interaction with group



Are we seeing expected change across time (white matter)?



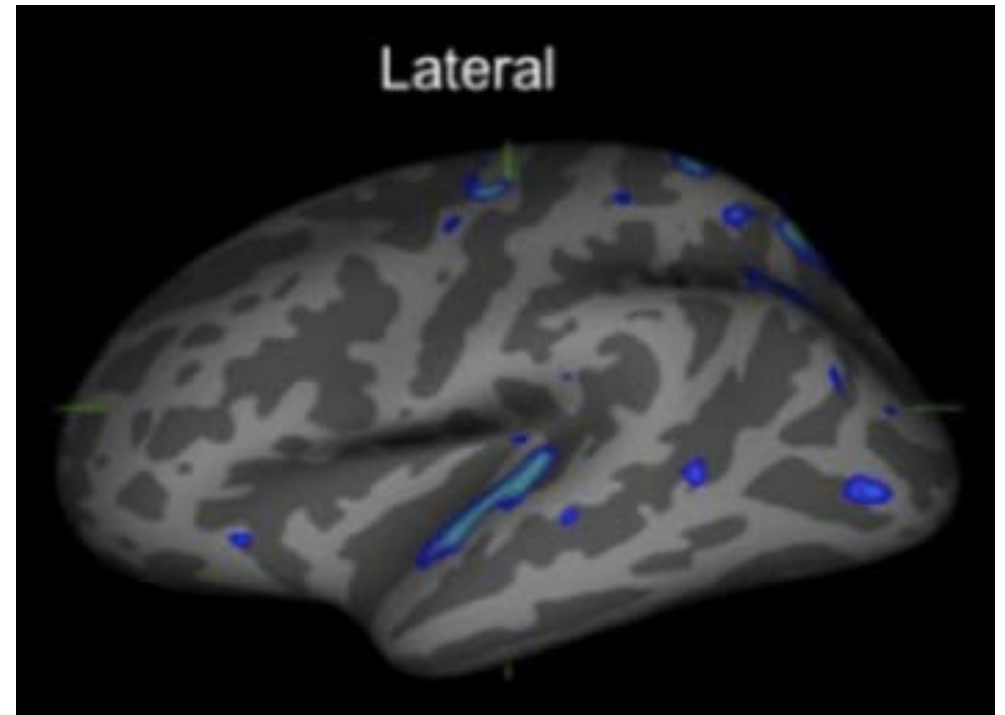
White matter increased from 8 to 16 years,
 $F(1,61) = 3565.5, p < .001$

No significant interaction with group

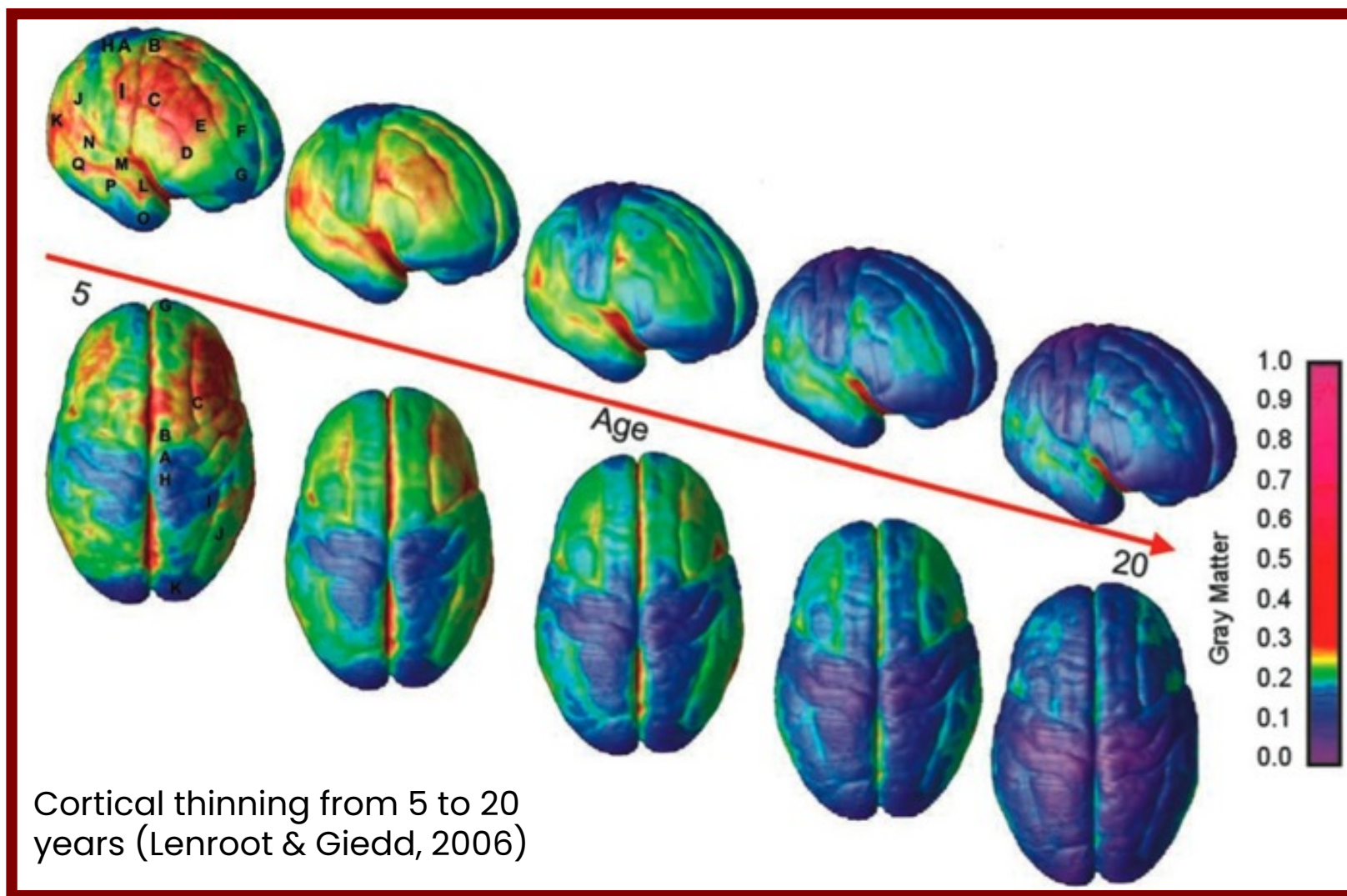


Previous findings in this sample

- Age 8
 - There were differences between children who had been in institutions and community controls
 - Pervasive thinning across cortex for children who had been in institutions relative to community controls
 - No differences by foster care placement.
- Age 16 we sought to identify differences by randomization (Foster Care vs. Care As Usual Group)

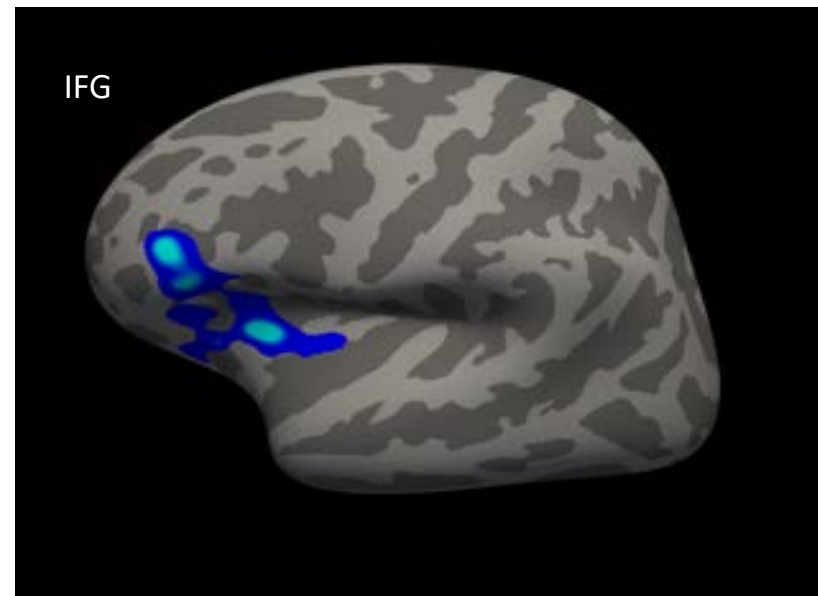
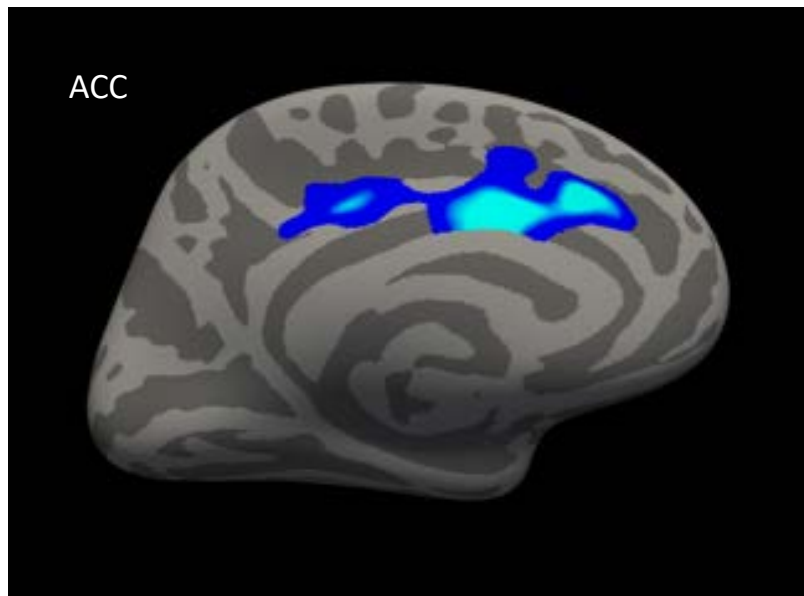


Thinning across this age in prior studies

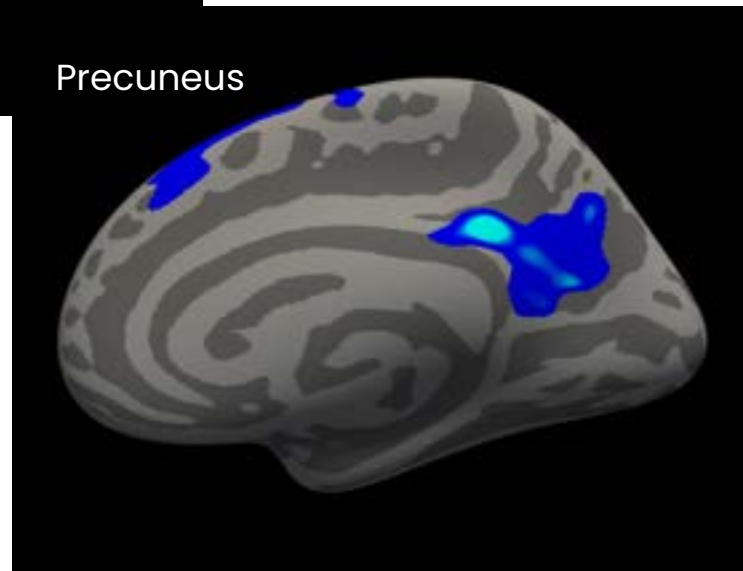
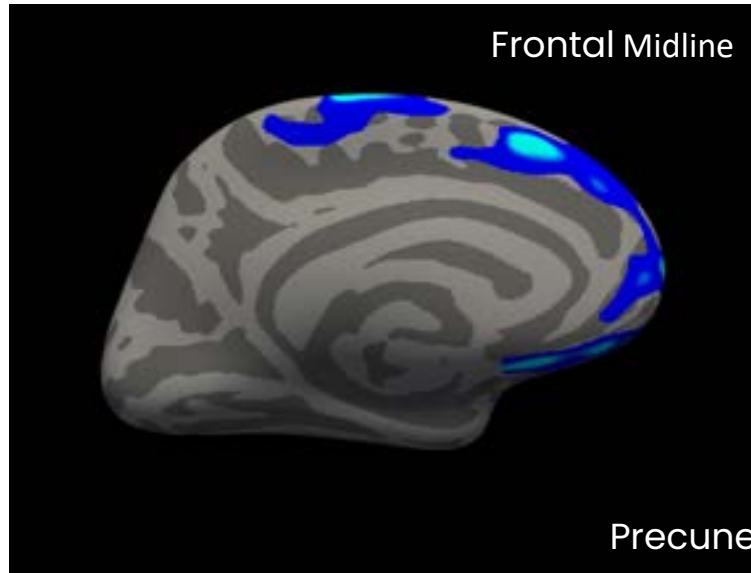


Thicker prefrontal cortex at age 16 years for Care As Usual vs. Foster Care

Children in the Care As Usual Group have significantly thicker dorsal anterior cingulate cortex and left inferior frontal gyrus/insula



Children in the Care As Usual Group show less change in cortical thickness across time



Children in the Care As Usual Group showed significantly less decrease in thickness between 8 and 16 years in midline frontal and precuneus regions compared to foster care group.



Conclusions on Brain Imaging in BEIP

- At 16 years, we observe differences in cortical thickness due to random assignment to foster care before age 3.
 - This 'sleeper effect' mimics other early intervention outcomes
- Children in the Care as Usual Group showed less change in thickness between 8 and 16 years for frontal areas.
 - May result in thicker cortex at age 16 for Care as Usual Group
- Change across this period is normative, thus children in the Care as Usual Group show less normative development of the prefrontal cortex



Conclusions

- ❖ Institutional rearing increases risks for serious impairments/delays in most domains of development
- ❖ High quality foster care reduces but does not eliminate developmental delays
- ❖ Earlier placement leads to more recovery
- ❖ Quality of foster care matters, as does stability of foster care





Thank you



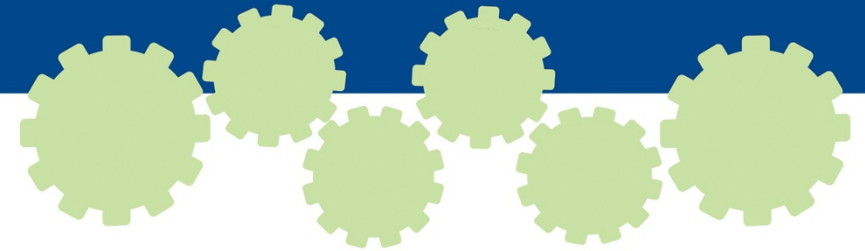
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