

The Effects of Early Adverse Experiences on Development: Lessons from the Bucharest Early Intervention Study

Nathan A. Fox

Department of Human Development

University of Maryland

Stress, Neurodevelopment, and Programs that Promote the Well-Being of Children and Families

Administration of Children and Families

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Primary questions for this talk

- What are the effects of early experiences, particularly severe psychosocial deprivation, on different domains of behavior?
- Are there sensitive or critical periods during which the effects of experience have their greatest impact?

Context of the research

- Children in institutions represent a “natural” experiment---one in which the effects of early experience can be examined
- Children in institutions represent a world wide problem
- This is a global problem, not specific to any one country or area of the world

Project Background

CEAUSESCU LEFT BEHIND A SOCIETY UNABLE AND UNWILLING TO TAKE CARE OF ITS CHILDREN

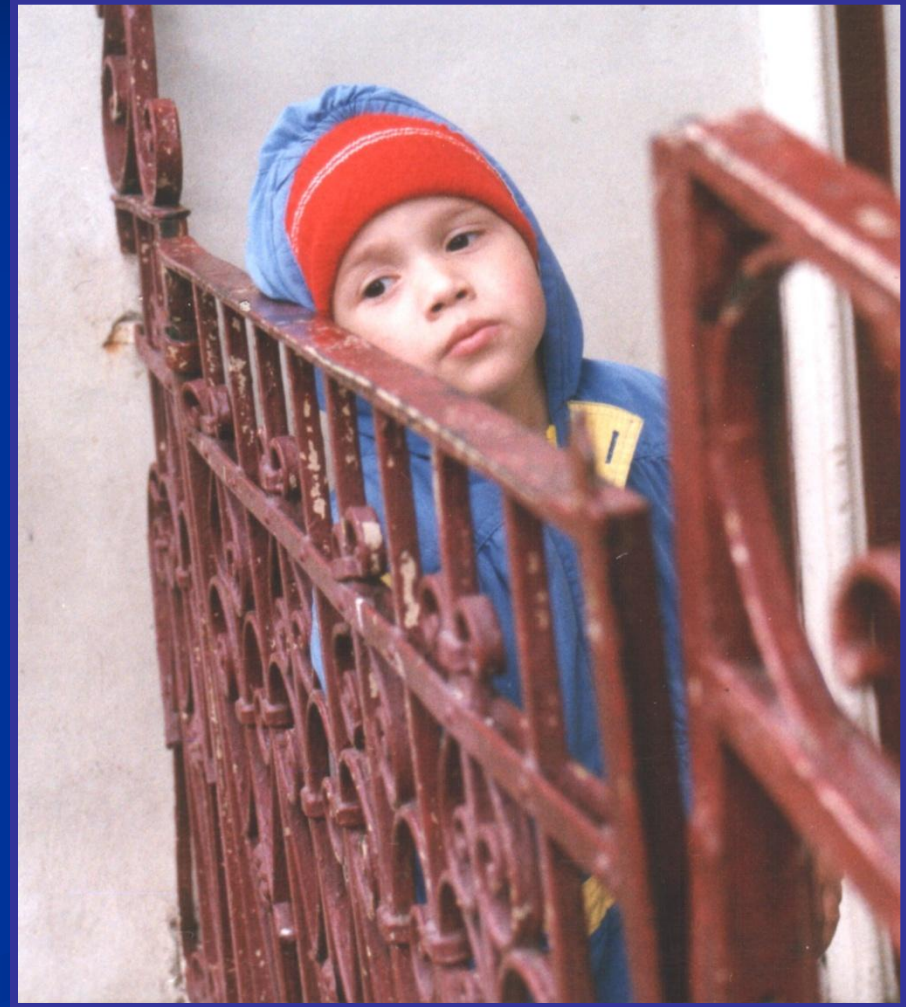
Communist Policy: *1966 decree*

- Raise production by increasing population
- belief that greater population = greater power
- Establishment of the **MENSTRUAL POLICE** - state gynecologists who conducted monthly checks of women of childbearing age who had not borne at least 5 children
- Establishment of **CELIBACY TAX** - families received a stipend for having more than 2 children; were levied tax for having fewer than 5 children
- **OUTLAWED** all contraception and abortion



THE RESULTS OF CEAUSESCU'S 1966 POLICY

- **Child abandonment** became a national disaster, as families could not afford to keep their children, and were encouraged to turn them over to the state. This destroyed the family unit and led to thousands of children being raised in institutions.



1989: The fall of the Ceausescu regime

The aftermath....

100,000 children “warehoused” in state institutions

- Poverty #1 reason for child abandonment
- International media brought the plight of these children to the attention of the world
- Large numbers of children adopted internationally, often by Western families unprepared for challenges that lay ahead
- And then, Romania banned international adoption



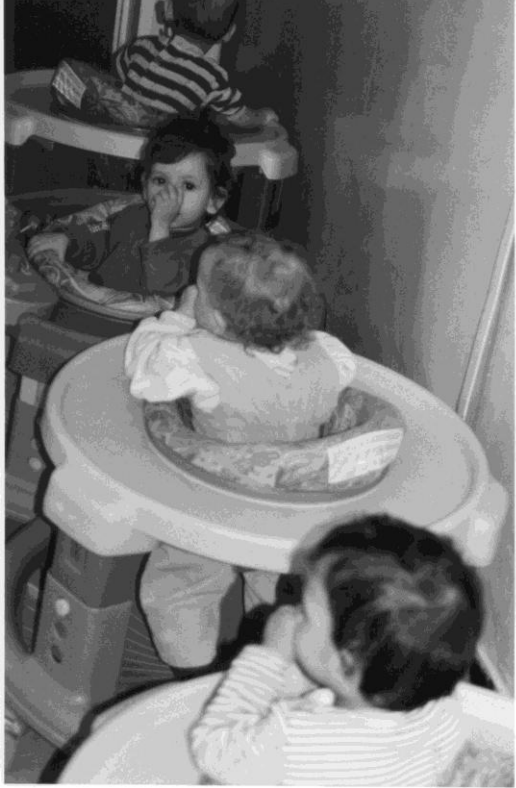
Sfanta Ecaterina Placement Center

- In a given week, children come into contact with a large number of professionals and paraprofessionals

17 caregivers, working rotating
8 hr. shifts
3 housekeepers
4 nurses
2 educators
1 psychologist
1 physical therapist
1 physician



Although children may become familiar with caregivers, the opportunity to form attachments with them is limited



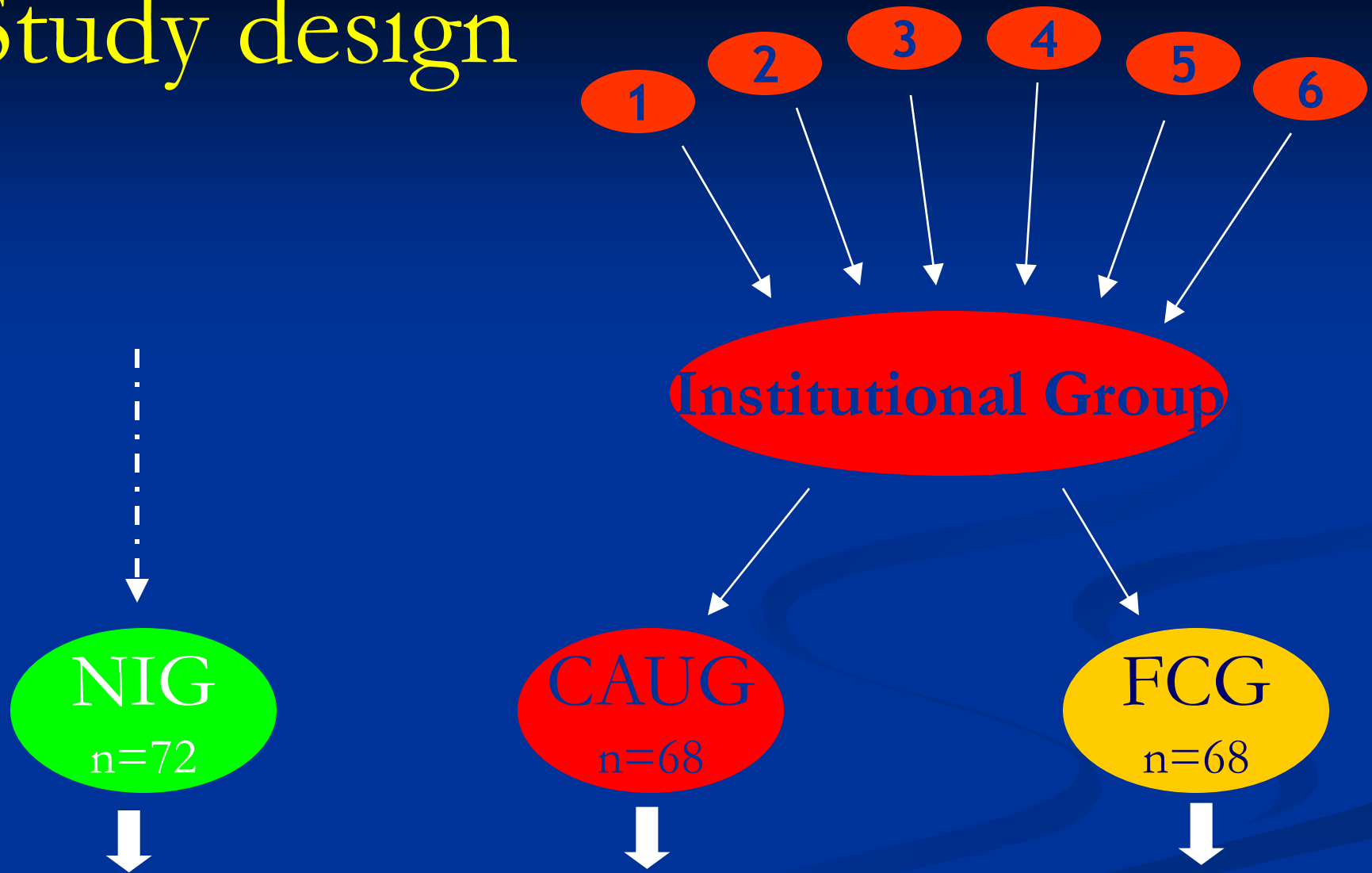
Why institutional rearing might be bad for the brain

- ▶ Insensitive care
 - regimented daily schedule
 - non-individualized care
- ▶ Isolation
 - no response to distress
 - unchecked aggression
- ▶ Lack of psychological investment by caregivers
 - rotating shifts
 - high child/caregiver ratio



The Study

Study design



After baseline assessment (pre-group assignment), comprehensive follow up performed at 30, 42, 54 months and 8 years

Foster care intervention

Recruited and trained to become attachment figures for children

Supported by Tulane clinicians, weekly consultations



Goal was to have foster care that was:

Effective

Affordable

Replicable

Culturally sensitive

Informed by latest findings

The Bucharest Early Intervention Project seeks to:

- Examine the effects of institutionalization on brain and behavioral development of young children
- Determine if these effects can be remediated through intervention, in this case: **foster care**
- Improve the welfare of children in Romania by establishing foster care as an alternative to institutionalization

Domains of Assessment

- Physical Development
- Language
- **Cognition**
- **Brain Function**
- **Emotional reactivity**
- Caregiving Environment
- **Attachment**
- **Social competence**
- **Mental Health Problems**
- Genetics

General Hypotheses

- Institutional rearing will have profound effects upon children's cognitive and socio-emotional development
- Removing children from the institution and placing them in family environments will remediate some of these deficits.
- The age or timing of placement into foster care will be a significant factor explaining intervention effects (thought this may vary by domain)

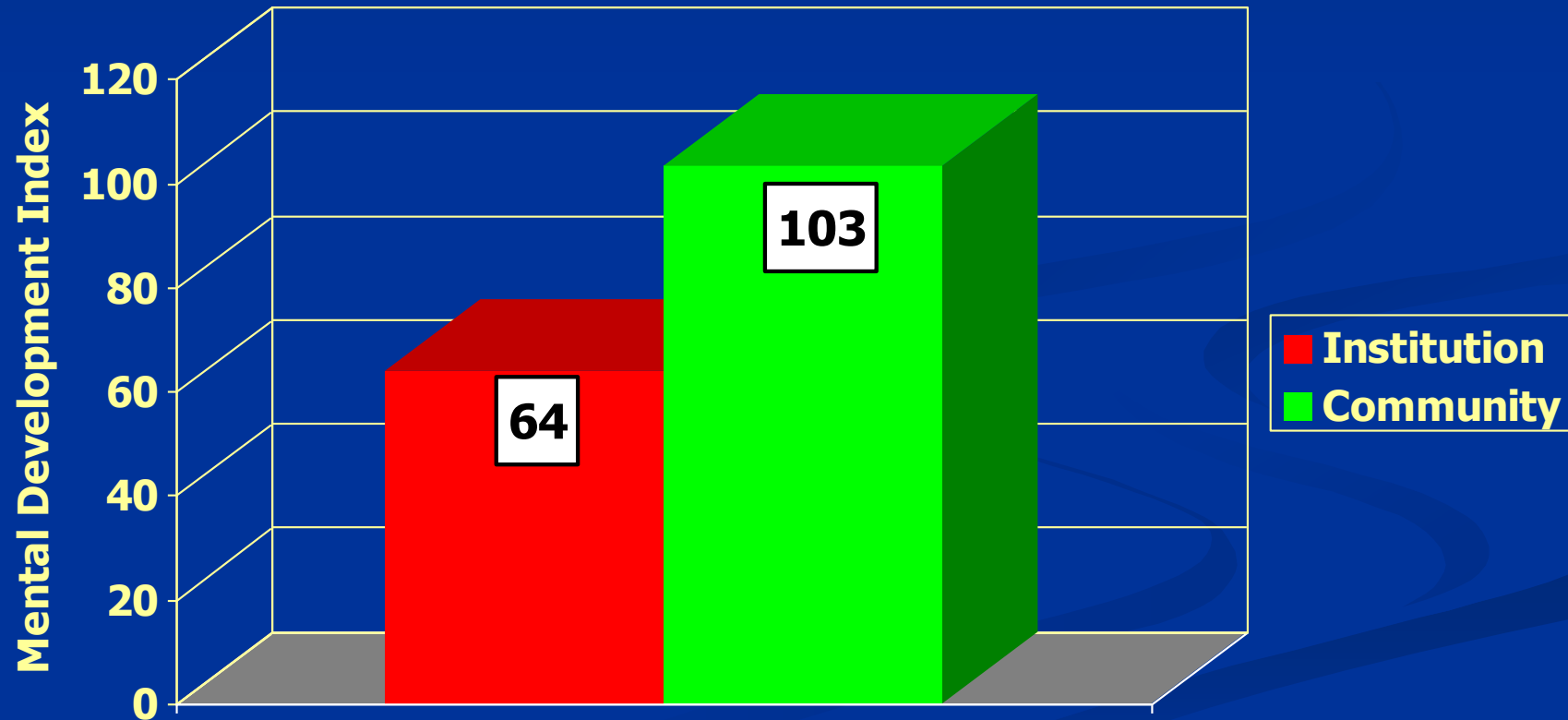
Findings to be Discussed

- Cognitive Development (DQ/IQ)
- Brain Development (EEG, MRI)

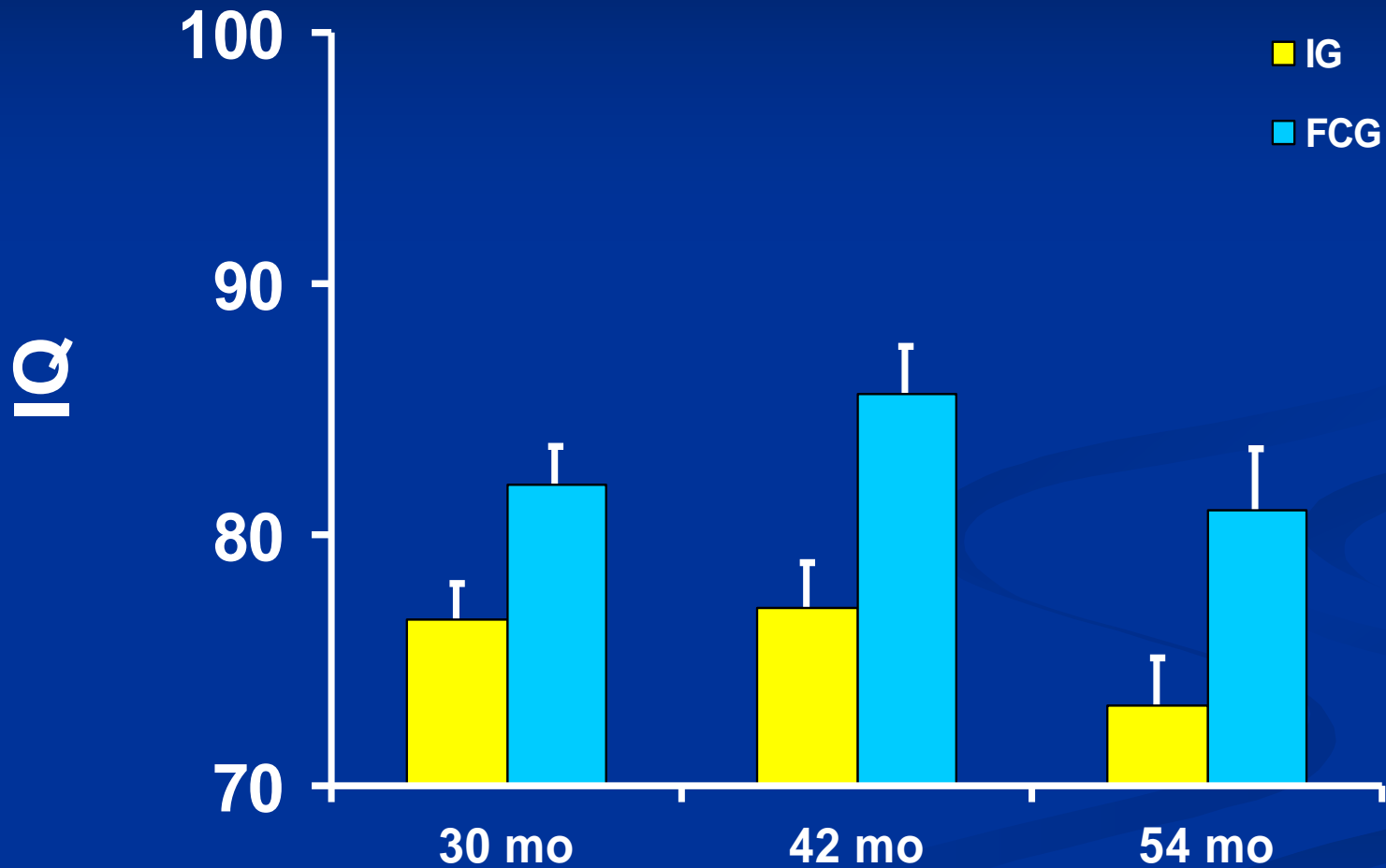
Cognitive Development

- What are the effects of institutionalization on IQ/DQ?
- At baseline, Mean DQ=
 - ~64 (Institutionalized Group)
 - ~103 (Never Institutionalized Group)

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



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

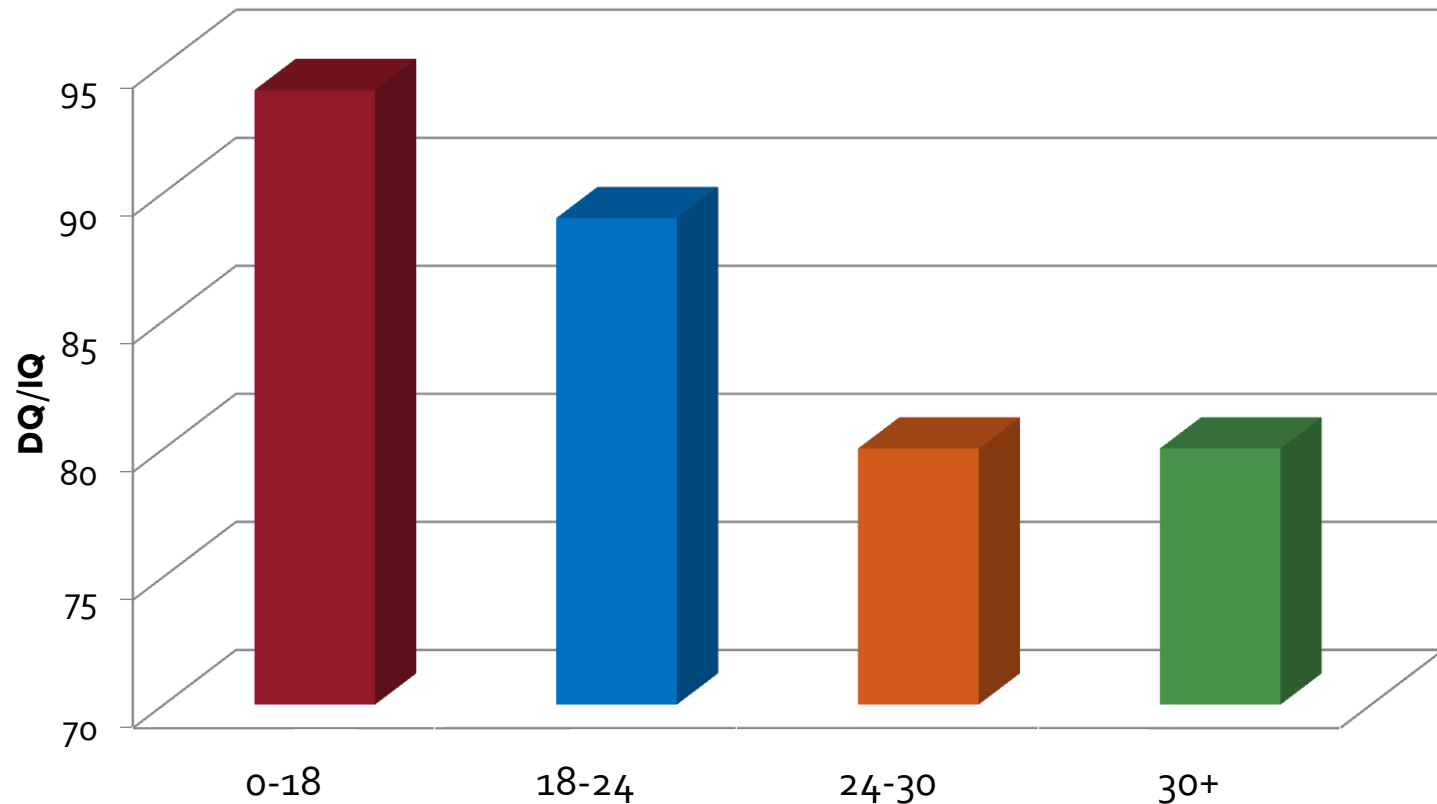


How does DQ/IQ differ for children in foster care as a function of age of entry?

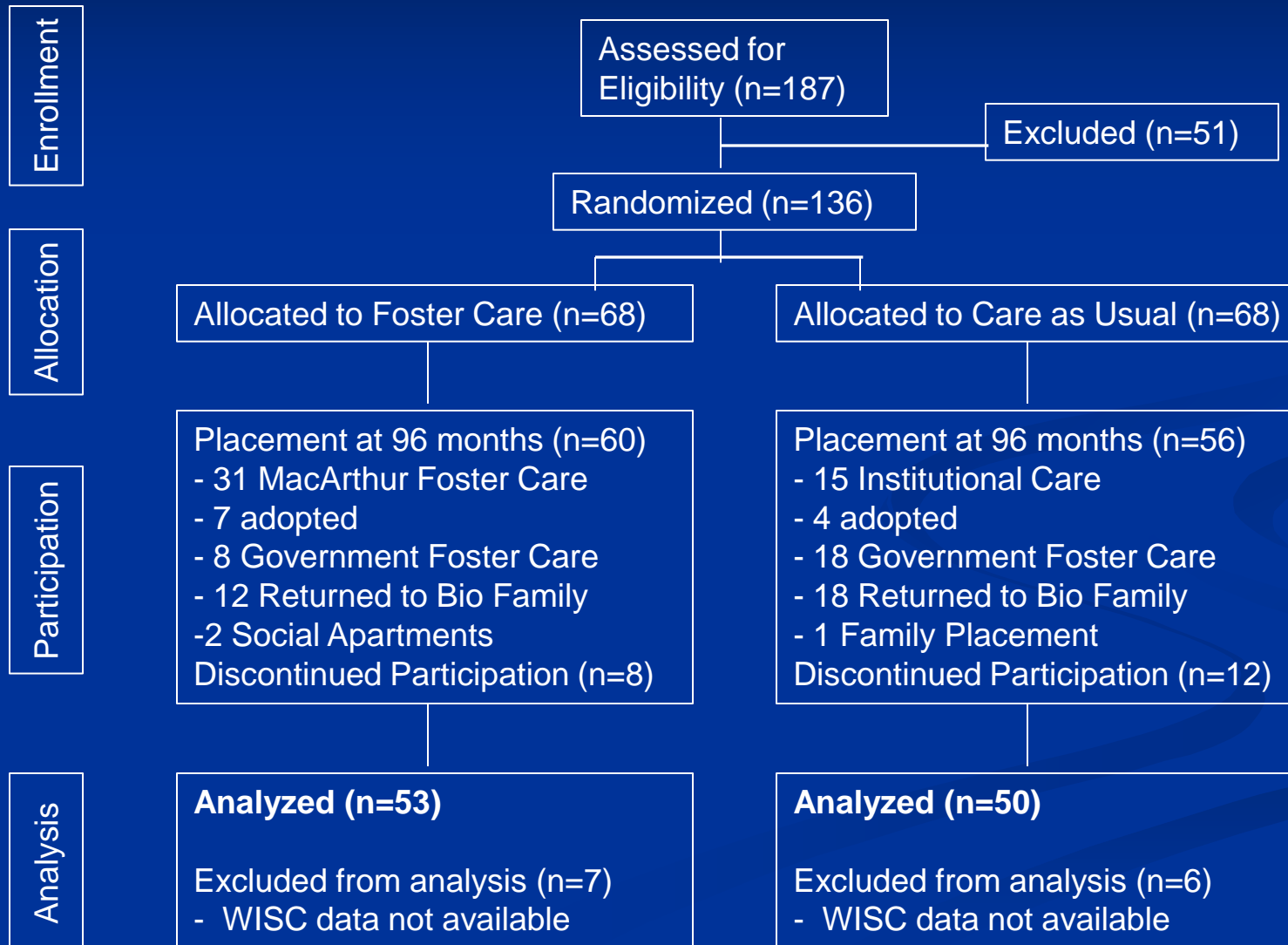
Age at placement	42 Months (Bayley)				54 Months (WPPSI)			
	N	Mean	Std Dev	Std Err	N	Mean	Std Dev	Std Err
0-18 months	14	94.4	11.9	3.2	14	84.8	16.0	4.3
18-24 months	16	89.0	11.3	2.8	15	86.7	14.8	3.8
24-30 months	22	80.1	13.3	2.8	22	78.1	19.5	4.2
30+ months	9	79.7	17.1	5.7	8	71.5	23.8	8.4

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

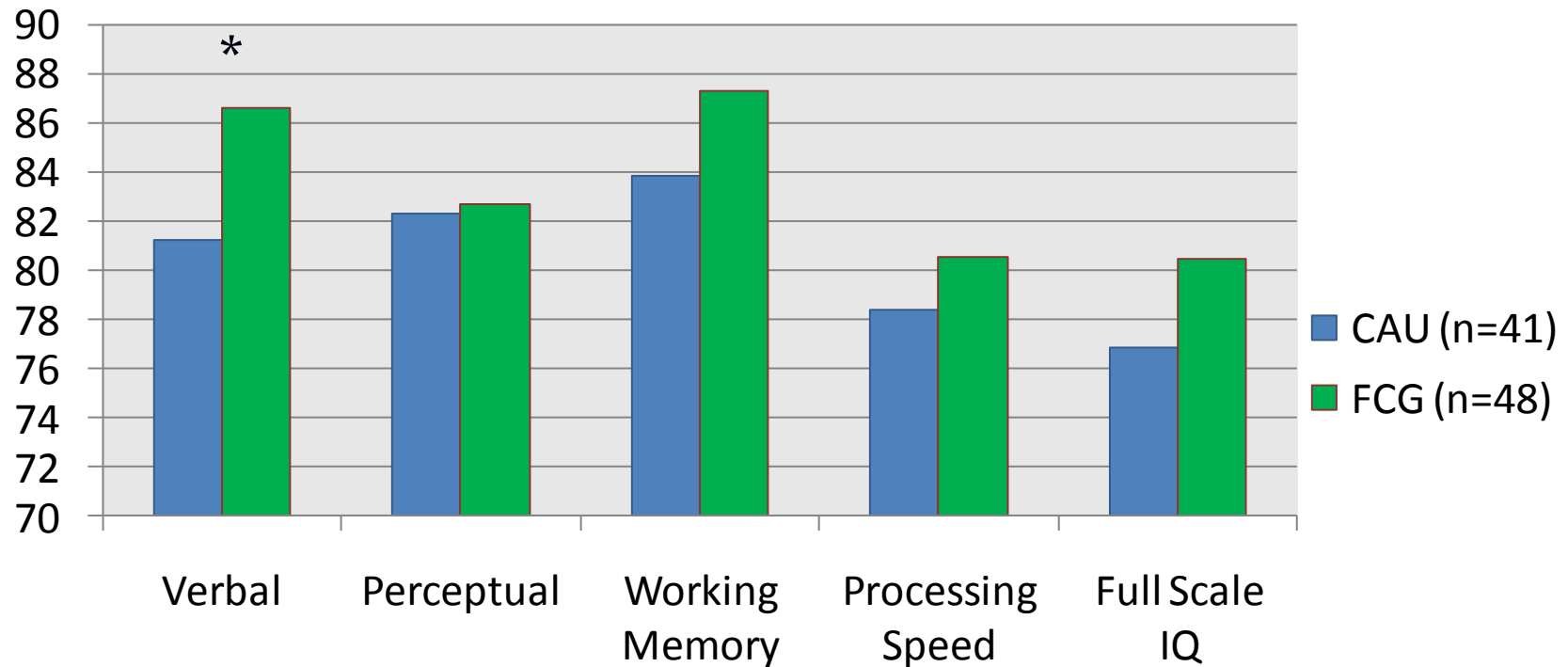
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Change in Group Assignment Over Time/Subject Attrition (as of 96 months)



WISC Data at 96 Months of Age



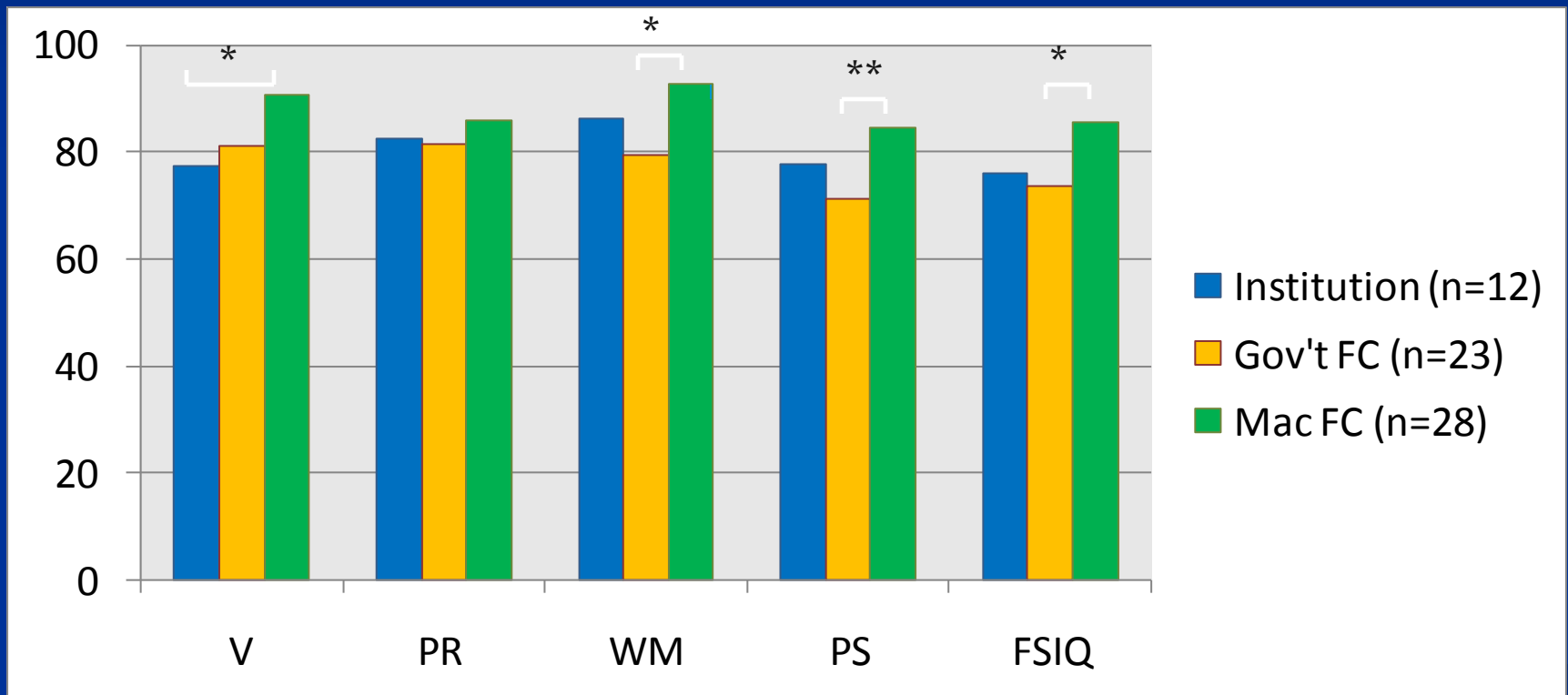
Note: * $p = .05$

Current Placement Analyses

◎ Two sets of comparisons:

- 1) Currently in <> Currently in <> Currently in
Institutions Gov't FC MacArthur FC
(12 CAU) (16 CAU, 7 FCG) (1 CAU, 27 FCG)

Comparing Current Placement in Institutions, Government Foster Care and MacArthur Foster Care



Note: V = Verbal Comprehension, P = Perceptual, WM = Working Memory, PS = Processing Speed, FSIQ = Full Scale IQ; * $p < .05$, ** $p < .01$.

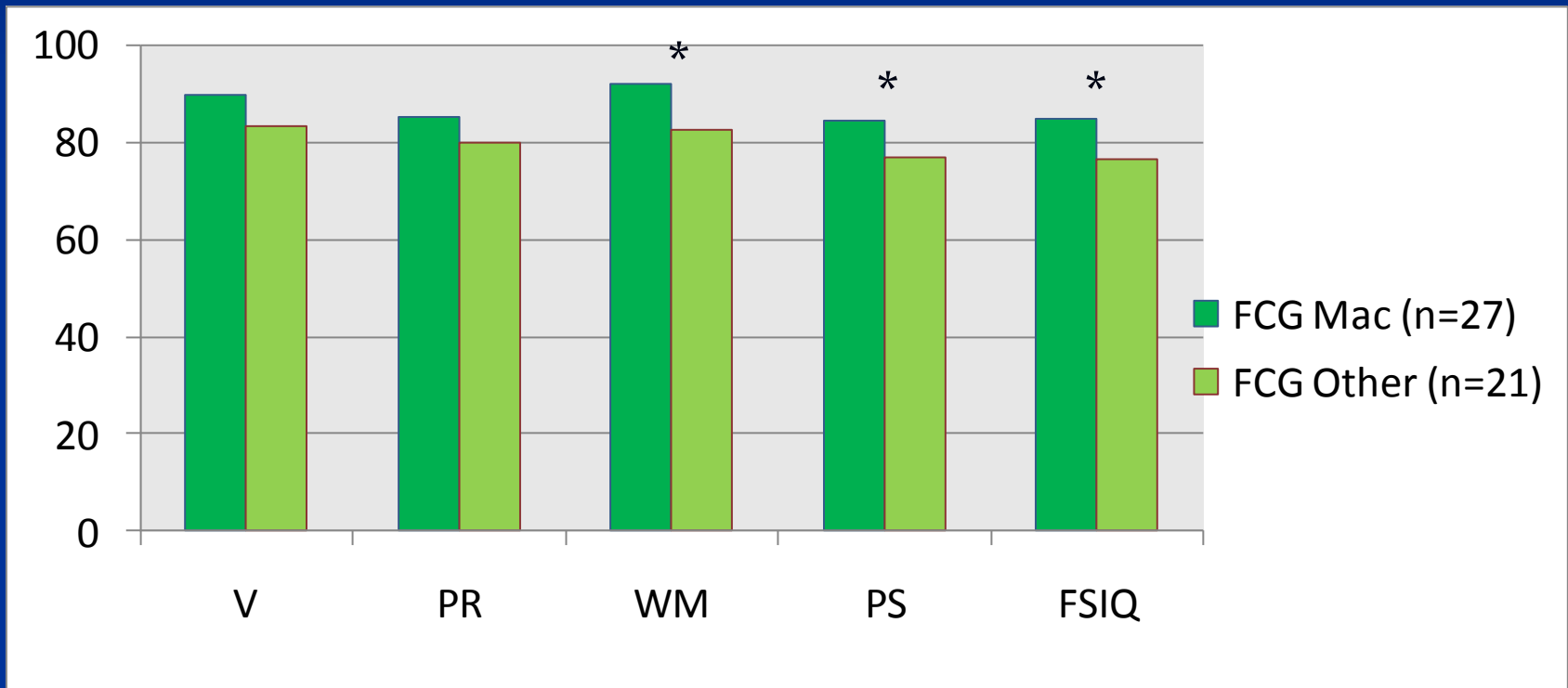
Current Placement Analyses

◎ Two sets of comparisons:

1) Currently in <> Currently in <> Currently in
Institutions Gov't FC MacArthur FC
(12 CAU) (16 CAU, 7 FCG) (1 CAU, 27 FCG)

2) **FCG** currently in <> **FCG** currently in
MacArthur Foster Care Other Placements
(27 FCG) (21 FCG)

Comparing FCG MacArthur Foster Care to FCG Other Placements



Note: V = Verbal Comprehension, P = Perceptual, WM = Working Memory, PS = Processing Speed, FSIQ = Full Scale IQ; * $p < .05$.

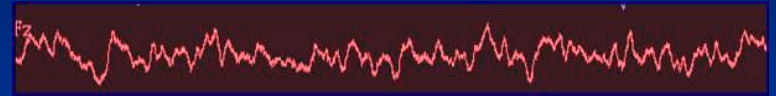
Summary of Cognitive Development

- Institutionalization has a very detrimental effect on cognitive function
- Foster care appears to be effective in improving cognitive function *for those children placed before age 2*
- Duration of time in foster care does not influence timing effects.
- Effects continue through to age 8

Brain Development

- Brain electrical activity-EEG
- Structural changes in the brain-MRI

Brain Development: Electroencephalogram (EEG)

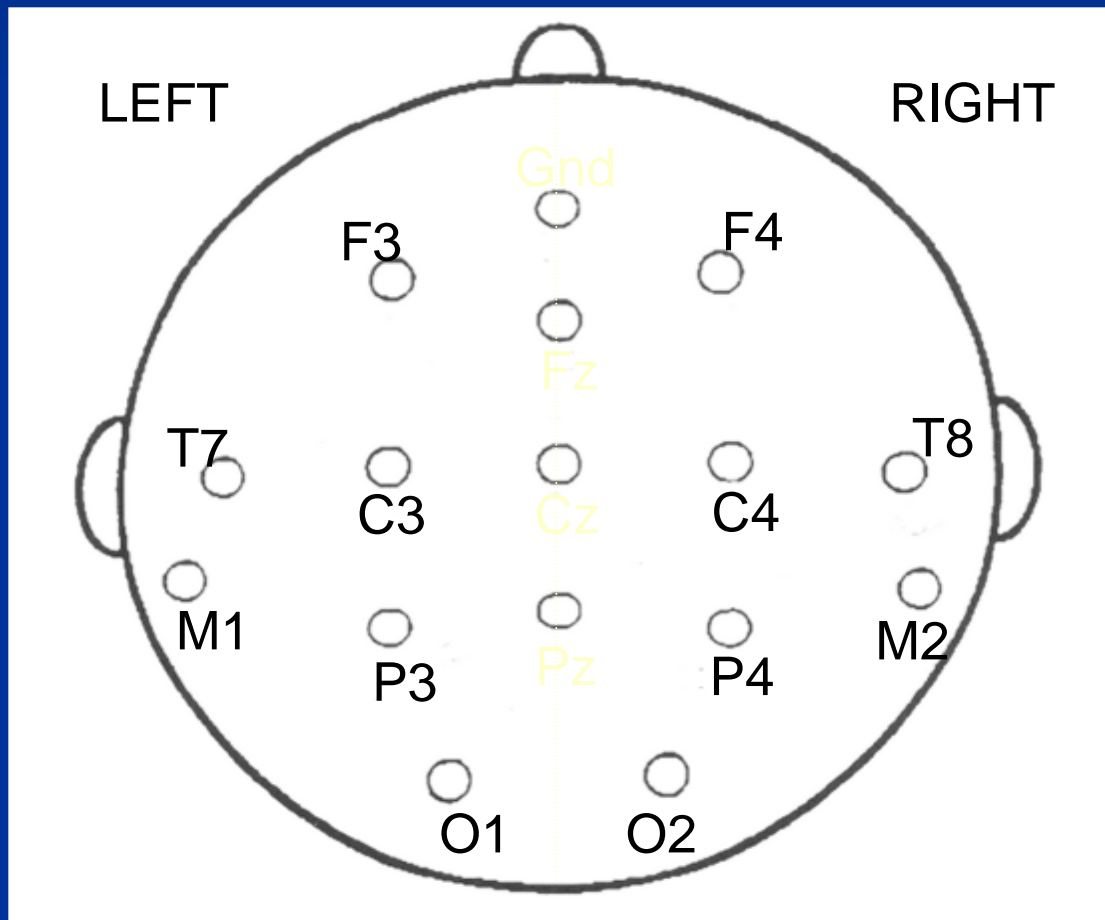


- ❖ The EEG reflects the electrical activity generated by the entire brain, and provides a general measure of brain development
- ❖ The EEG is recorded by placing sensors on the head, which detect the electrical activity generated by the brain.

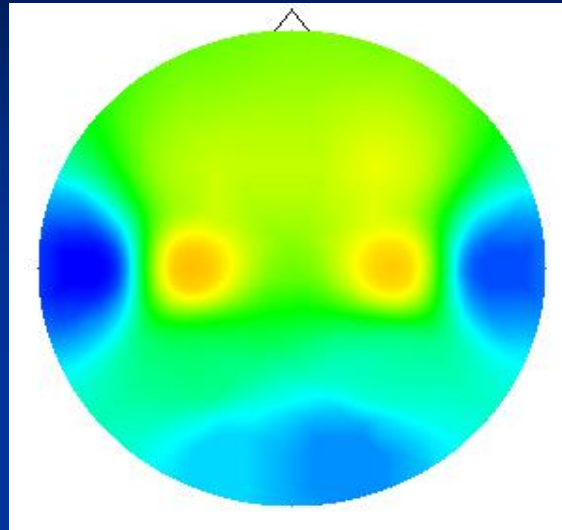


Procedures

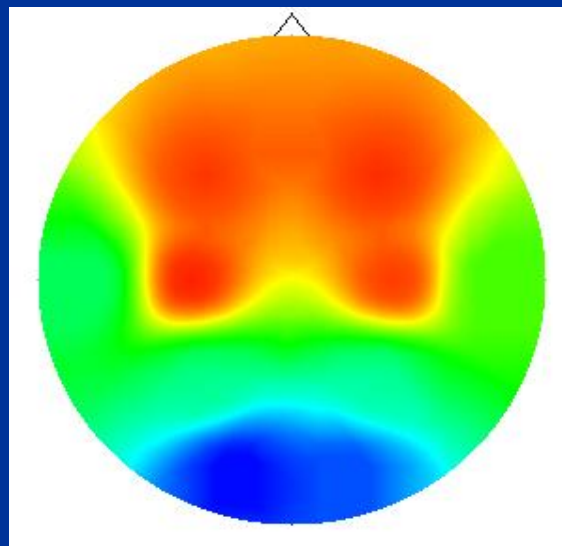
- 3 minutes of EEG data were collected during spinning of a bingo wheel.



EEG Activity at baseline

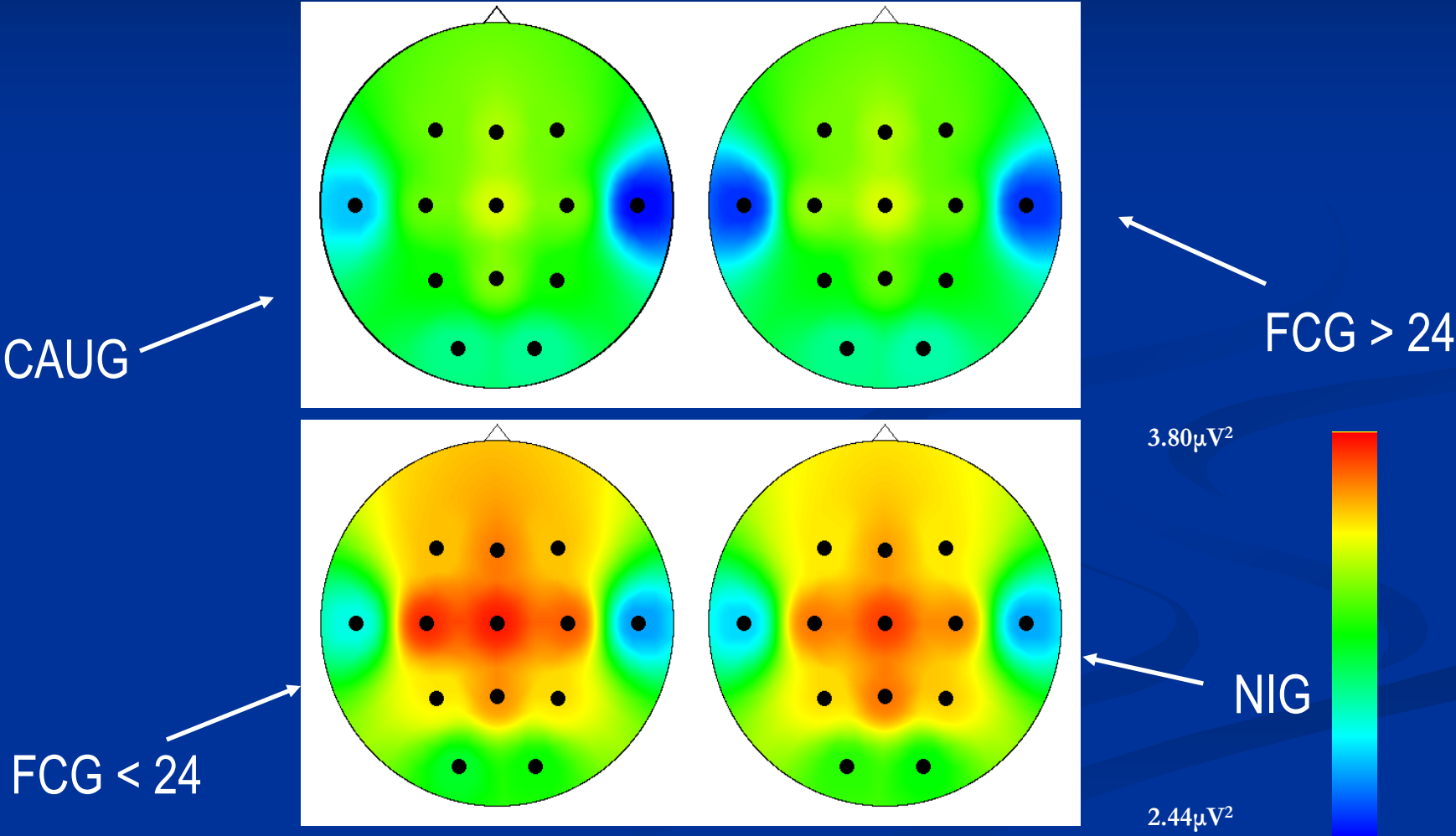


institutionalized children



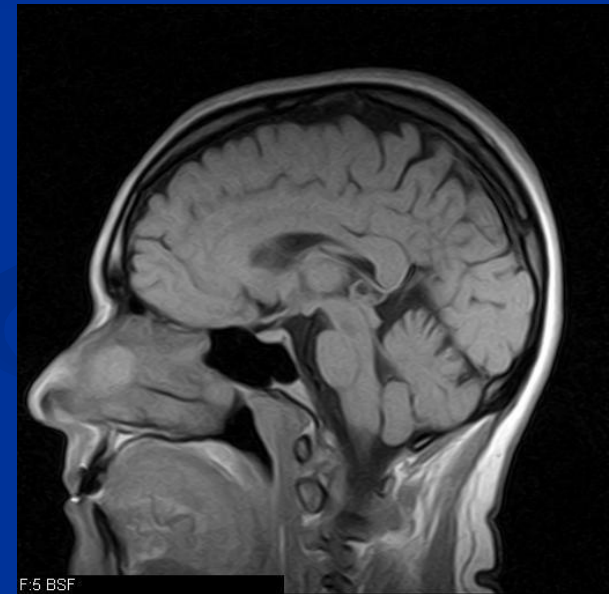
never
institutionalized
children

Does Brain Activity (EEG) Change as a function of intervention and timing? (8 year assessment)



Conclusions for EEG Measure

- Placement into high quality care has significant effects on the development of brain activity-- EEG.
 - Entirely dependent upon timing.
- Alpha power was statistically identical for those children placed into foster care before 24-months and the NIG sample.
 - Alpha power for children placed after 24-months was unaffected by the intervention.

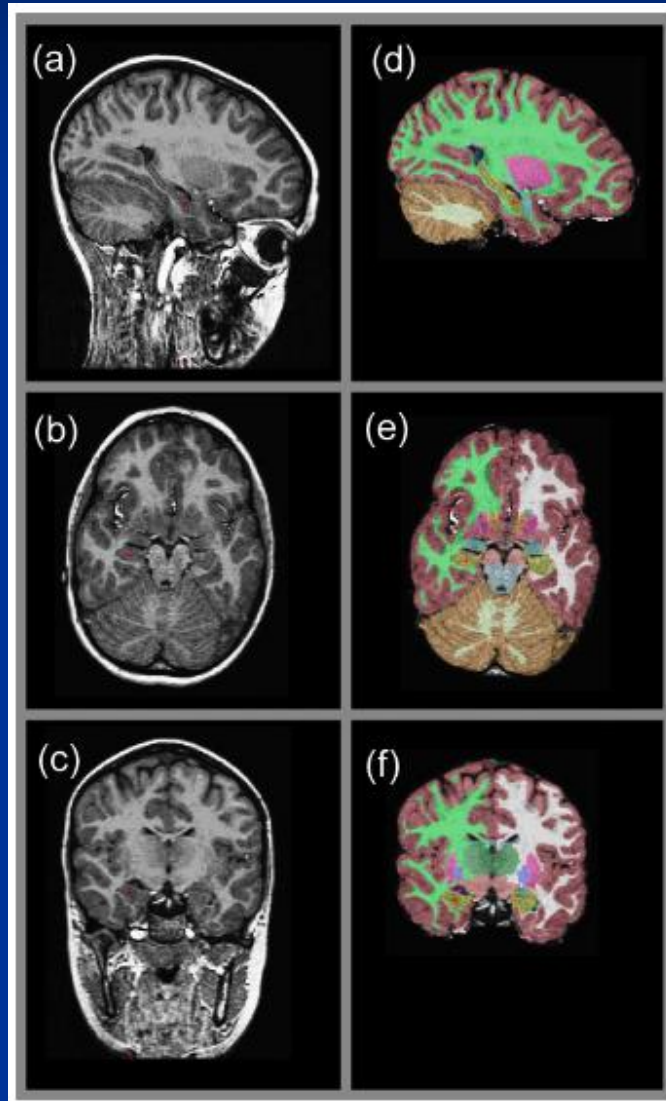


Magnetic Resonance Imaging (MRI)

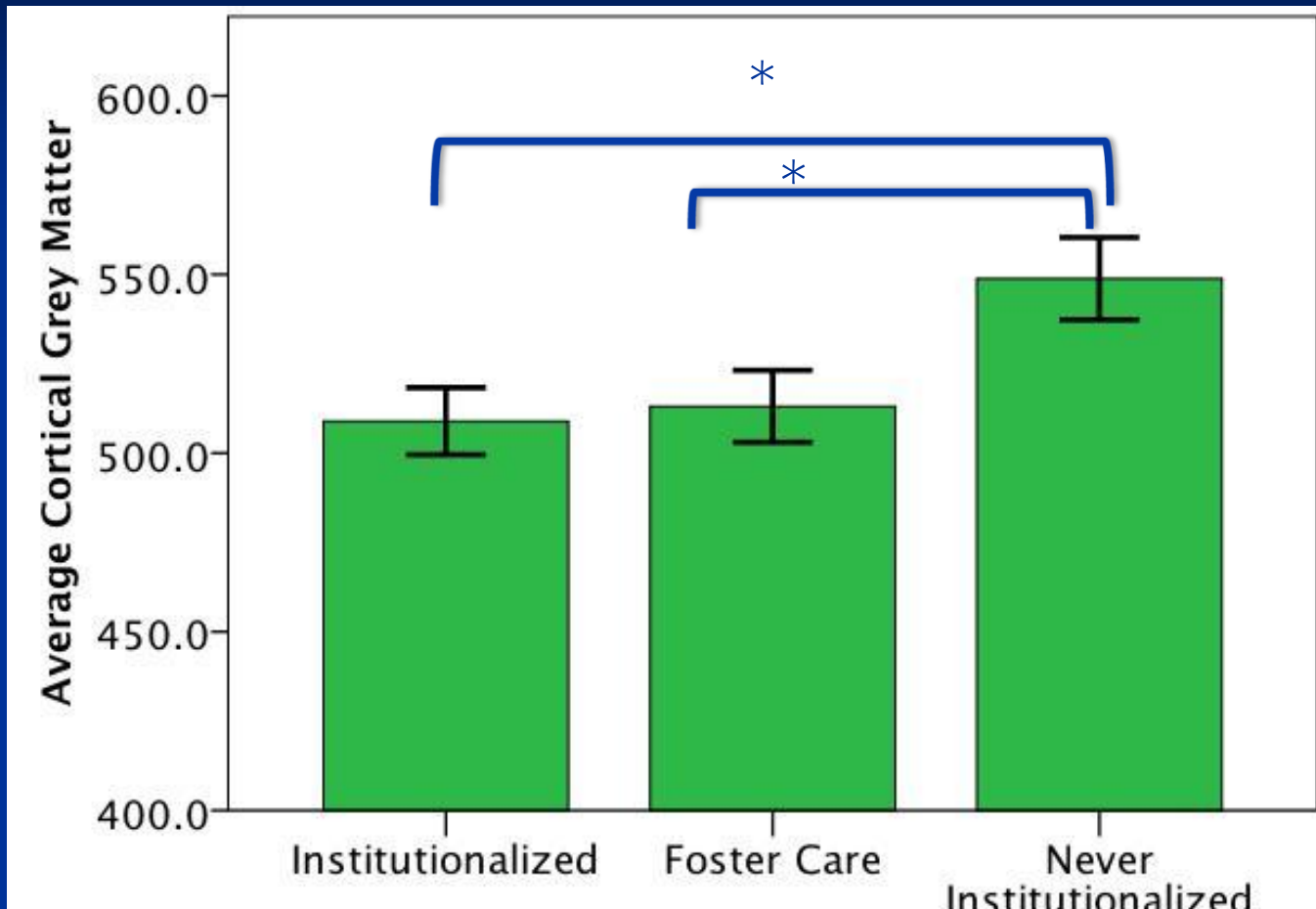
Structural MRI

- Performed in Bucharest on 1.5T Siemens machine (32 channel head coil)
- DTI also obtained on 80% of the children

Neural Structures



Total Cortical Grey Matter



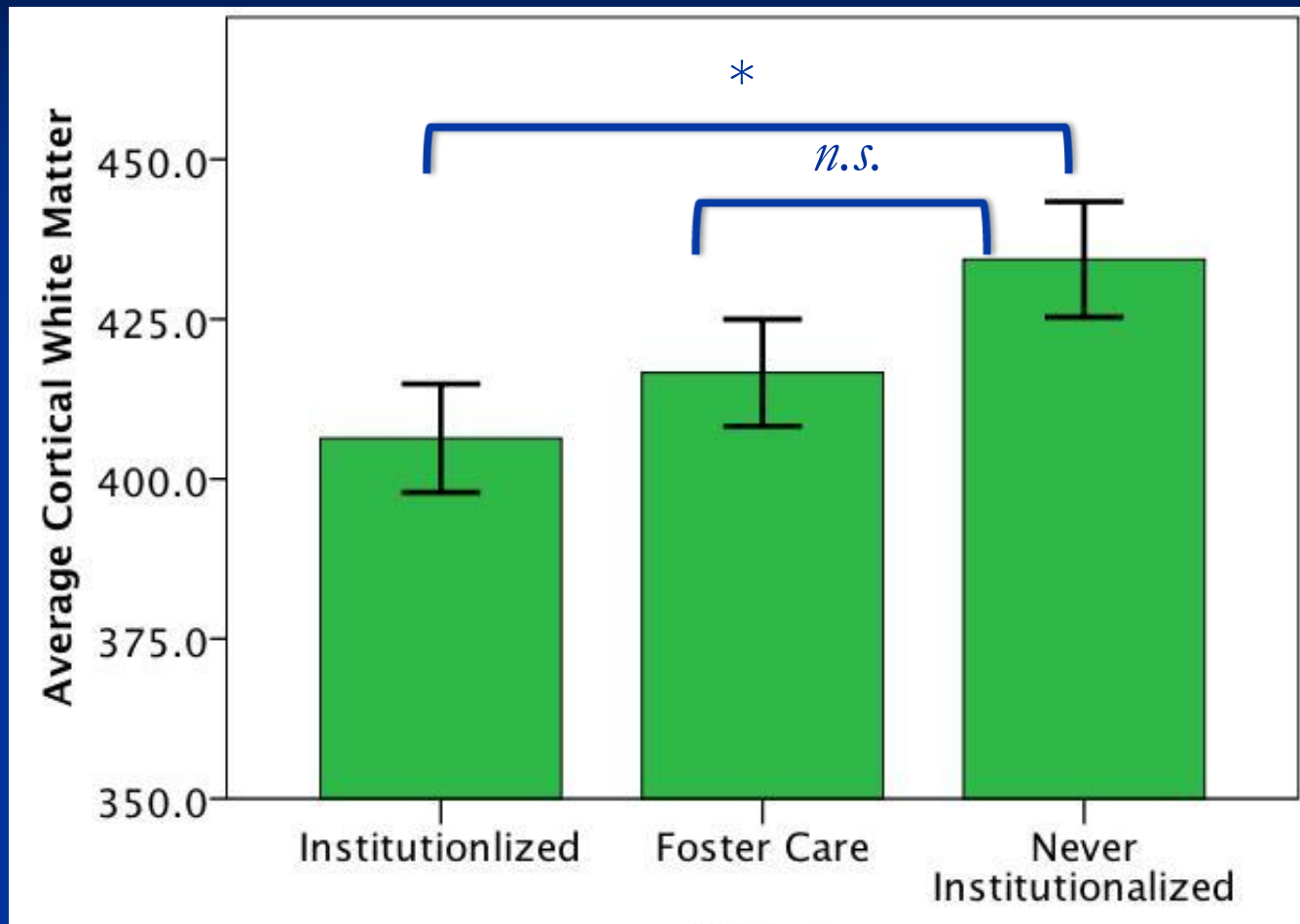
IG $B = -39.9$, $t = -3.01$, $p = .004$

FCG $B = -38.5$, $t = -2.79$, $p = .007$

Regression controlling for age and gender

Sheridan et al (under review)

Total Cortical White Matter

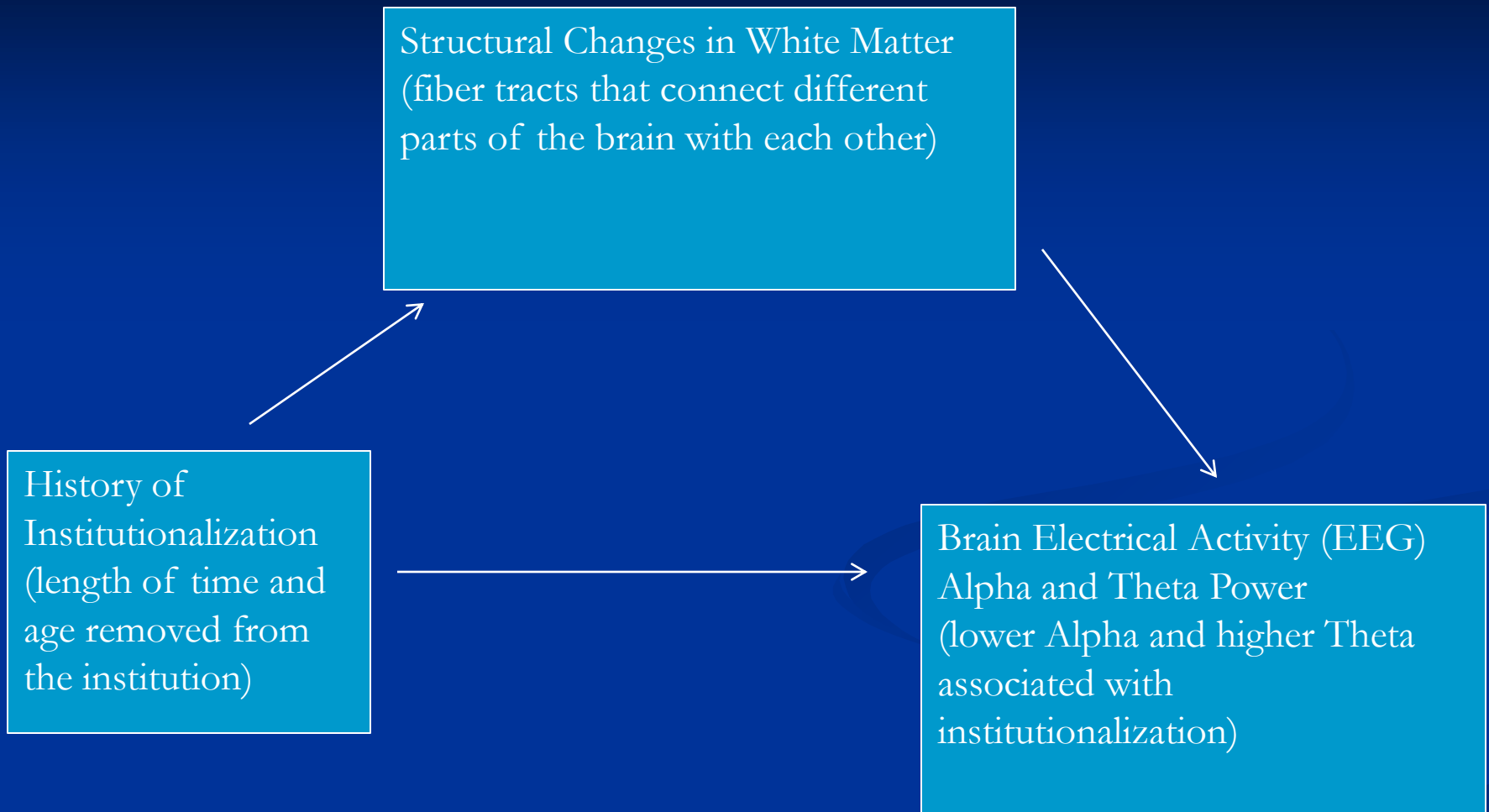


IG $B = -24.1, t = -2.17, p = .03$

FCG $B = -18.1, t = -1.5, p = .12$

Regression controlling for age and gender

Sheridan et al (under review)



Mediation Model---The relations between institutionalization and EEG power are mediated by changes in white matter development

Conclusions

- Being raised in an institution during the first few years of life can lead to a significant derailing of development, across many domains
- Placement in foster care *<24 months* leads to better outcomes in most (but not all) domains
- Policy recommendations: Institutional care should be considered a last resort and if children are young when placed there, efforts should be made to move them to permanent families as early in life as possible

Investigative Team

Principle Investigators

- Charles Zeanah, MD, Tulane University
- Nathan Fox, Ph.D., University of Maryland
- Charles A. Nelson, Ph.D., Harvard Medical School/Children's Hospital Boston

Co-Investigators

- Anna Smyke, Ph.D., Stacy Drury, Tulane University
- Dana Johnson, MD, Ph.D., Jennifer Windsor, Ph.D., University of Minnesota
- Peter Marshall, Ph.D., Temple University
- Helen Link-Egger, MD, Duke University
- Jennifer Martin McDermott, Ph.D., University of Wisconsin-Madison
- Alisa Almas, Ph.D., Kate Degnan, Ph.D., Bethany Sutherland, Ph.D., Ross Vanderwert, M.A., University of Maryland