

# Neurodevelopmental compromise & recovery following early institutional care in Romania

Findings from the Bucharest Early Intervention Project (BEIP), 2000-Present

**Forum on Investing in Young Children Globally (iYCG)**

**Workshop: Reaching & Investing in Children at the Margins**

November 3, 2015

Prague, Czech Republic



Anne E. Berens, MA, MSc  
Harvard Medical School

## Three aims of the Bucharest Early Intervention Project (BEIP), launched in 2000

Social policy in Ceaușescu's communist Romania (1965-1989) – including banning of contraception and taxation of families without children – drove rising fertility and high rates of **child abandonment** into **state institutions**. Within this historical context, the BEIP developed three aims:

### Aim 1

Examine the effects of institutionalization on the brain and behavioral development of young children

### Aim 2

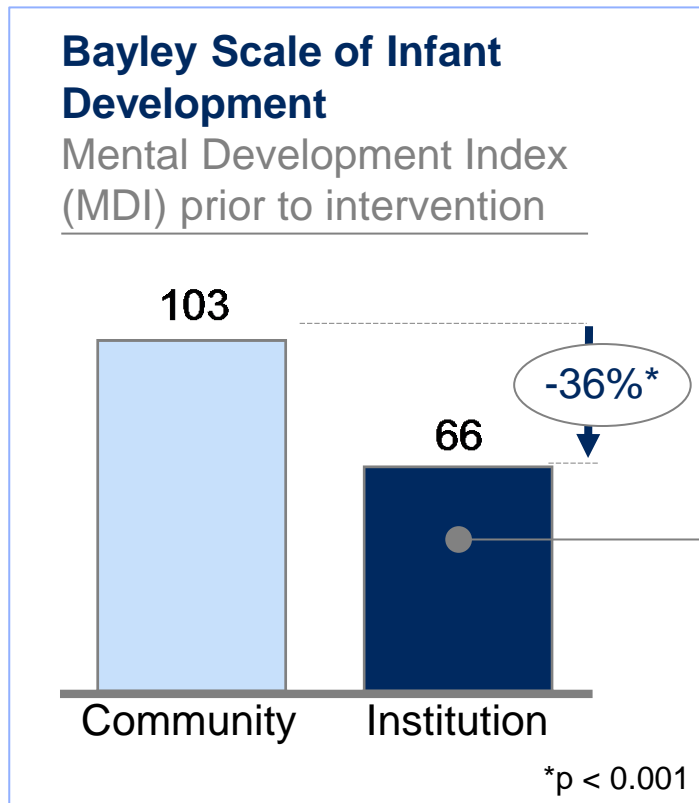
Determine if these effects can be remediated through early intervention, in this case: high-quality foster care

### Aim 3

Improve the welfare of children in Romania by establishing foster care as an alternative to institutionalization

## Background of the BEIP: Policy

**In 2000, the Romanian State had no national foster care system, and skepticism remained about the harms of institutional care**



*Bucharest institution included in BEIP study*

**Skeptics asked:** Were deficits among institutionalized children pre-existing (selection effect) or did they result from the care environment (treatment effect)?

# A unique ethical context led to the first-ever randomized trial of a care intervention for institutionalized children

**Approach:** Recruit as many foster families as possible with support from MacArthur Foundation

**Challenge:** Only able to recruit 58 families—not nearly enough for all children

### Response:

- Randomly allocate children to families
- Advocate for programmatic and policy change necessary for placement of additional children
- Perform intent-to-treat analysis

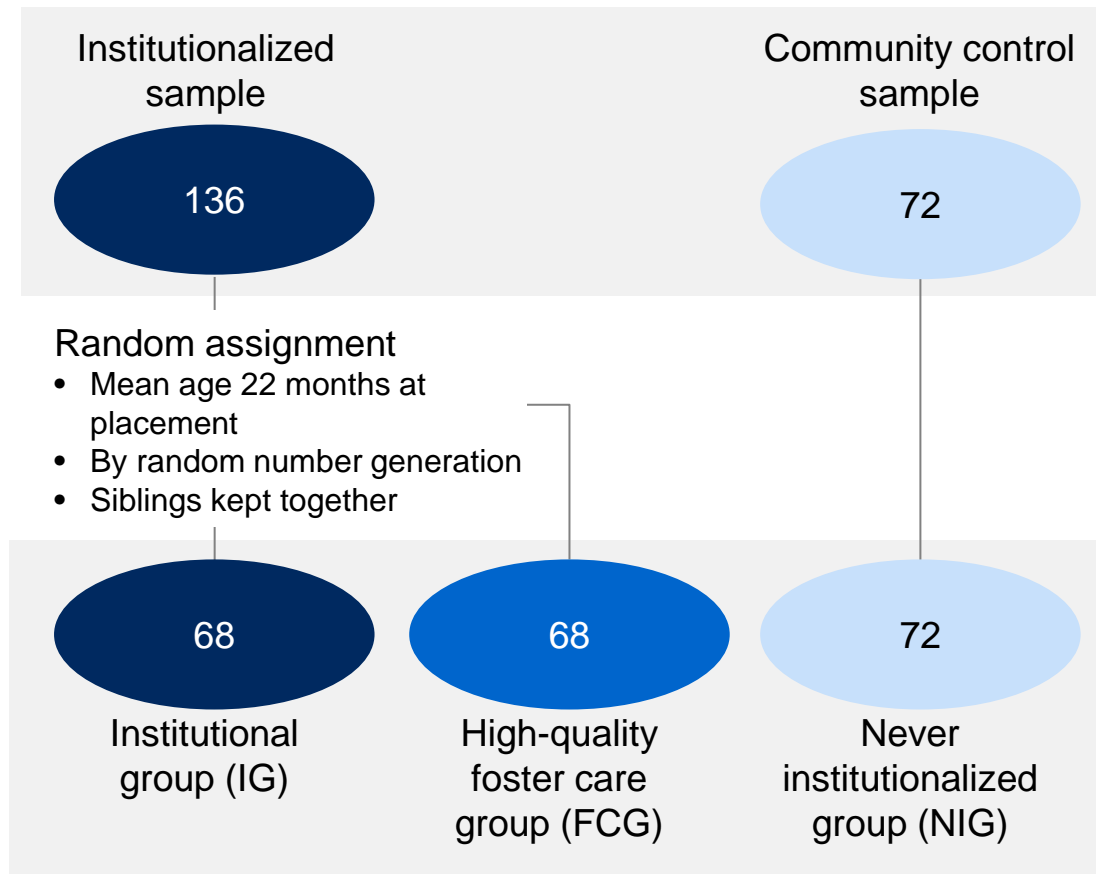
### Ethical oversight:

- Exploitation-related concerns:
  - Protection of vulnerable human subjects
  - Risk/benefit balance
  - Responsibility to children after the study ends
- Non-interference
- “Stop rule”

## Background of the BEIP: Study design

# The BEIP randomized institutionalized children into foster care and collected longitudinal data

### Experimental design



### Assessment

- Baseline assessment of institutionalized sample prior to intervention, mean age 21.6 months
- Follow-up assessments at ages 9, 18, 30, & 42 months, 8 & 12 years
- Age 16 assessment now in progress

## Background of the BEIP: Assessment

### The BEIP assessed a wide range of developmental outcomes

#### Domains of assessment

■ Focus of presentation

- **Cognition**
- **Neurodevelopment (EEG, MRI, ERP)**
- **Psychopathology**
- Physical Development
- Social Skills
- Attachment
- Language
- Temperament
- Autonomic/HPA Function (cardiovascular, cortisol)
- Genetics/Epigenetics

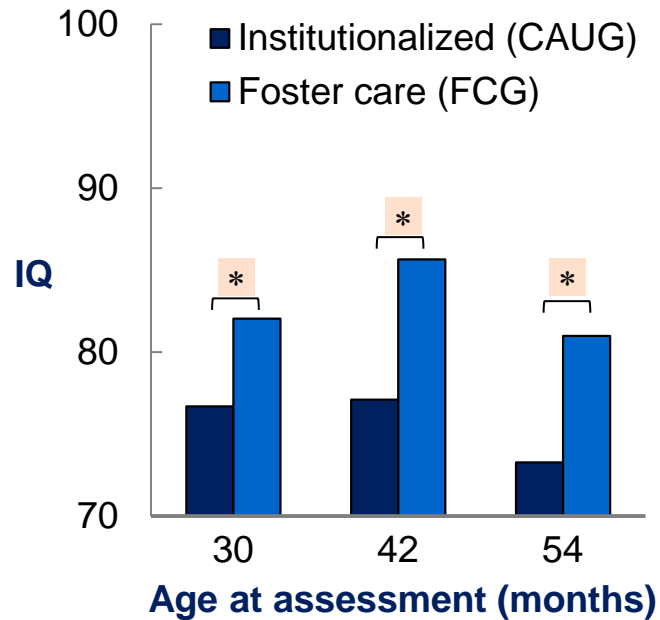
## Core findings: Cognitive development

### Foster care produced gains in DQ/IQ, with greatest benefits for children placed before age 2

\*  $p < 0.001$

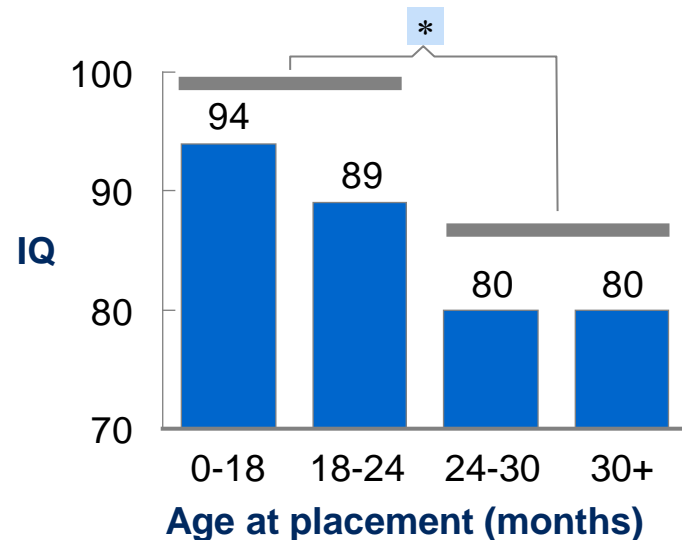
\*  $p \leq 0.05$

#### DQ/IQ by treatment group



#### IQ by age at foster care placement (assessed at age 54 months)

IQ difference is significant comparing children placed before vs. after age 24mo



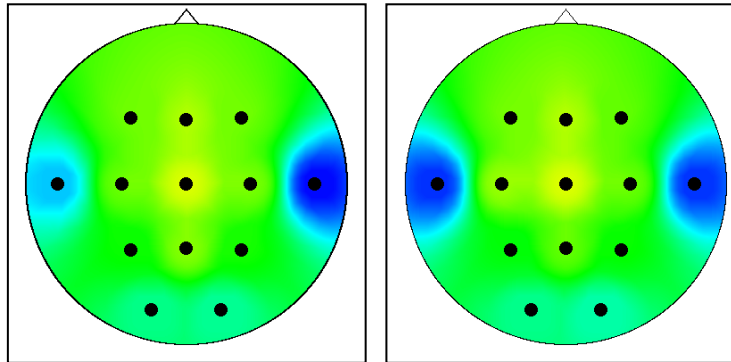
**Note:** In no case did the foster care group catch up completely to community controls

Core findings: Brain function

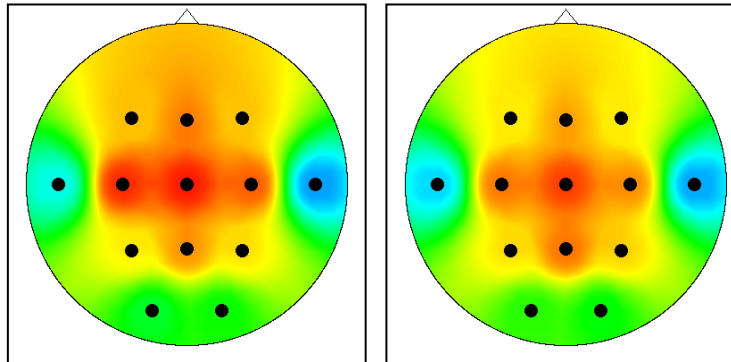
## Foster care placement conferred marked recovery in EEG alpha power, but only among children placed before age 2

### EEG alpha band findings at 8 years

Institutional care group



Foster care group placed before age 24 mo.



Foster care group placed after age 24 mo.

3.80  $\mu\text{V}^2$



Community controls

2.44  $\mu\text{V}^2$



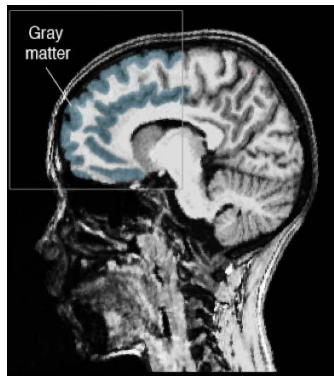
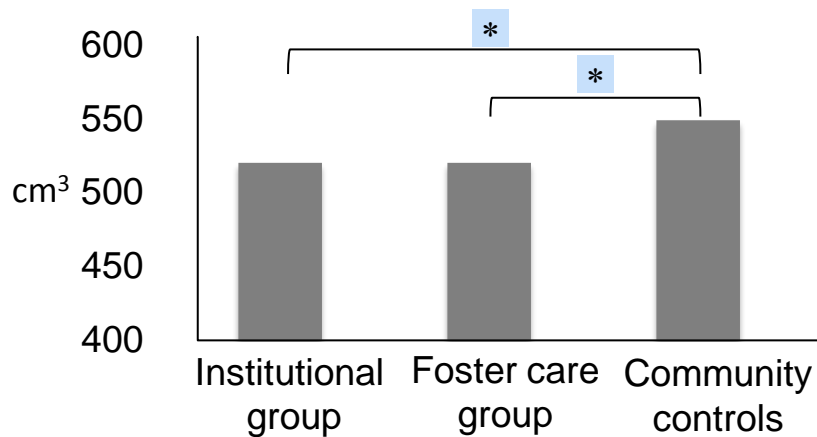
## Core findings: Brain structure

# MRI findings show recovery of cortical volume only for white matter

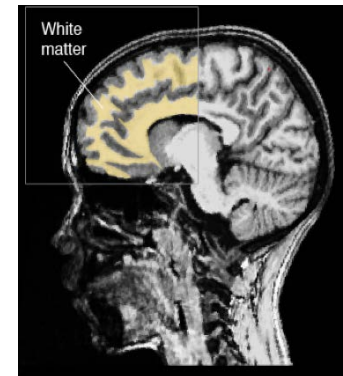
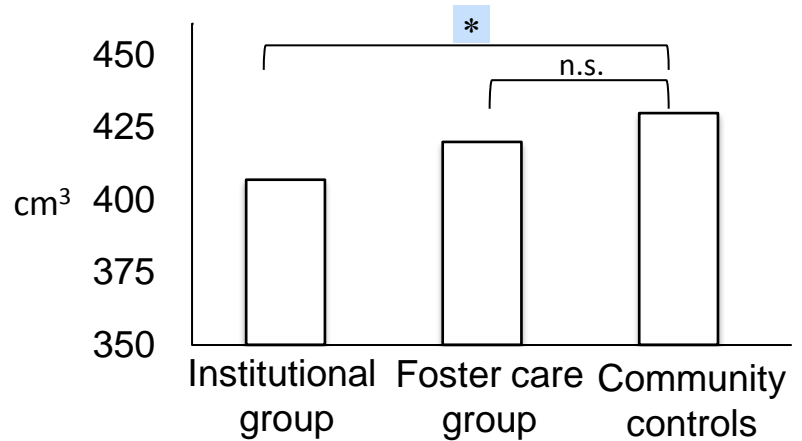
\*  $p \leq 0.05$

### Structural MRI findings at ages 8-10 years, age- and sex-adjusted

#### Mean cortical gray matter volume by group

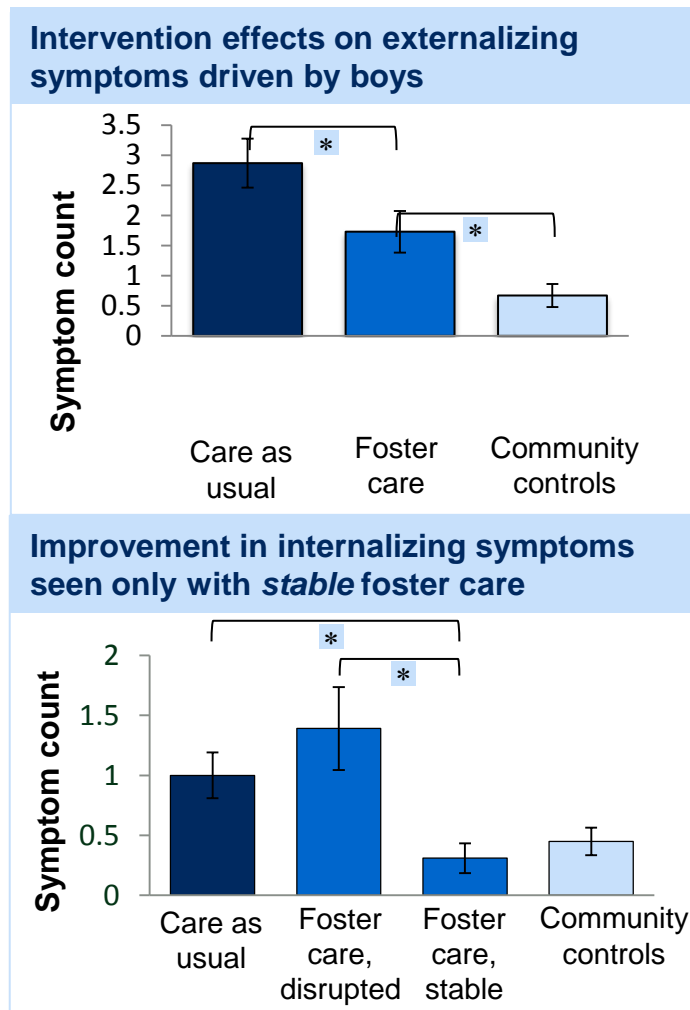
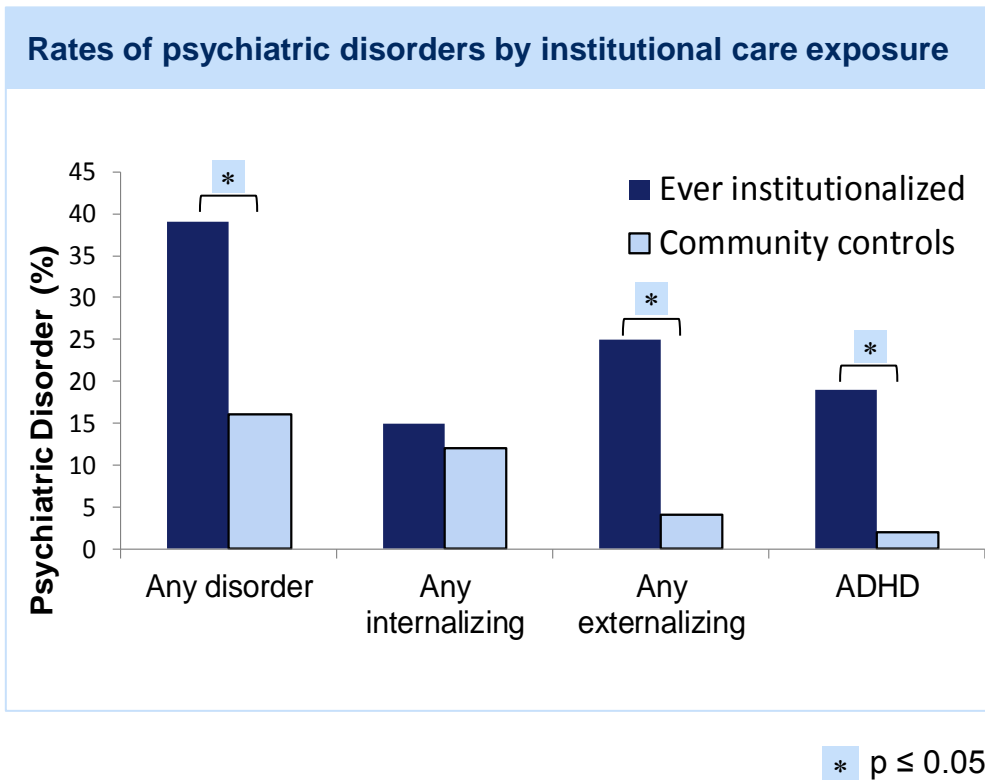


#### Mean cortical white matter volume by group



## Core findings: Psychopathology

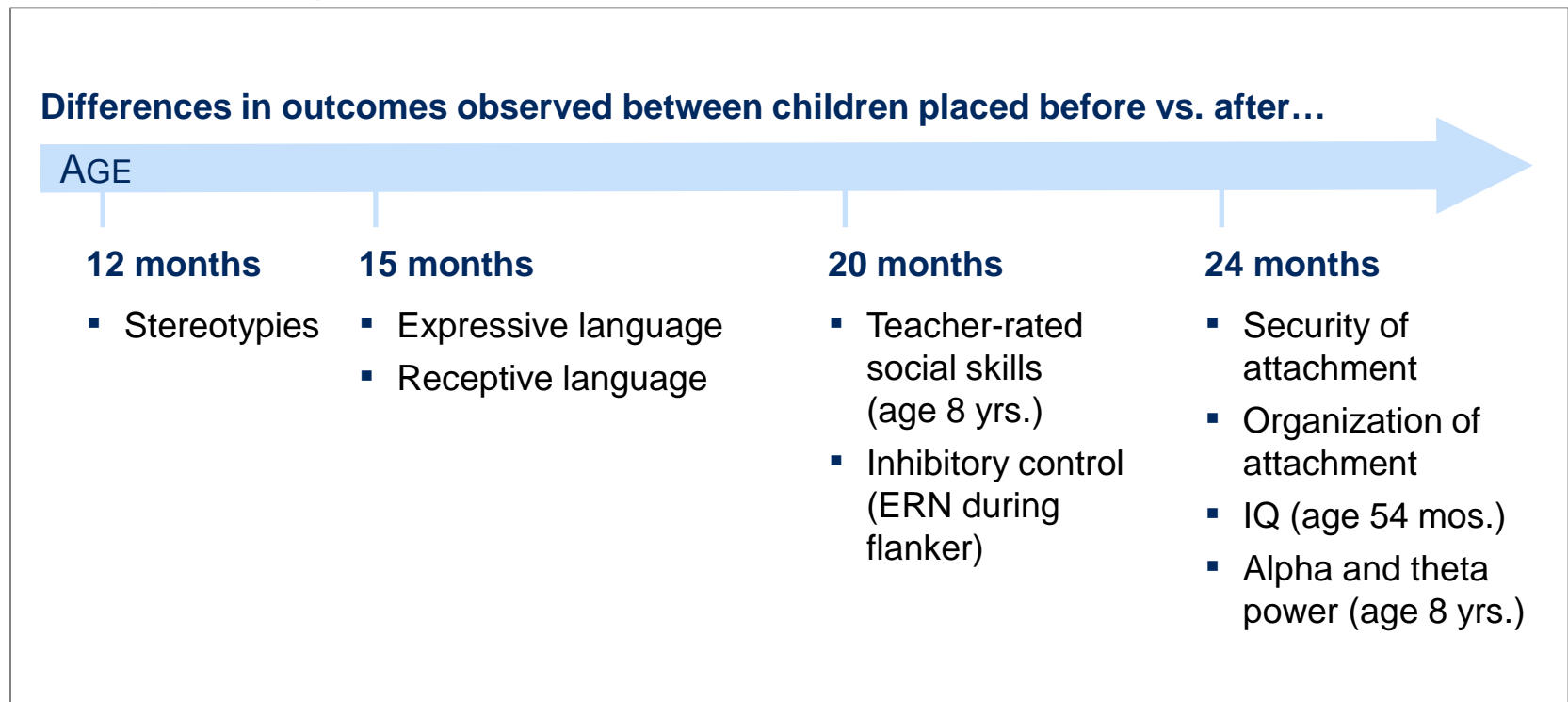
# History of any institutional care predicted psychiatric illness at age 12 years, only partially ameliorated by foster care



## Core findings: Timing matters

# Effect modification by age at foster care placement suggests multiple sensitive periods across developmental domains

### Summary of timing effects



## Broader literature

# BEIP findings are part of a larger scientific literature on institutional care in early childhood; a recent Lancet review provides a summary

### Review



## The science of early adversity: is there a role for large institutions in the care of vulnerable children?

Anne E Berens, Charles A Nelson

*Lancet* 2015; 386: 388–98

Published Online

January 29, 2015

[http://dx.doi.org/10.1016/](http://dx.doi.org/10.1016/S0140-6736(14)61131-4)

[S0140-6736\(14\)61131-4](http://dx.doi.org/10.1016/S0140-6736(14)61131-4)

See Editorial page 312

Harvard Medical School,  
Boston Children's Hospital,  
Boston, MA, USA

(A E Berens MSc,  
C A Nelson PhD); and Harvard  
Center on the Developing Child,  
Harvard Graduate School of  
Education, Cambridge, MA,  
USA (Prof C A Nelson)

It has been more than 80 years since researchers in child psychiatry first documented developmental delays among children separated from family environments and placed in orphanages or other institutions. Informed by such findings, global conventions, including the 1989 UN Convention on the Rights of the Child, assert a child's right to care within a family-like environment that offers individualised support. Nevertheless, an estimated 8 million children are presently growing up in congregate care institutions. Common reasons for institutionalisation include orphaning, abandonment due to poverty, abuse in families of origin, disability, and mental illness. Although the practice remains widespread, a robust body of scientific work suggests that institutionalisation in early childhood can incur developmental damage across diverse domains. Specific deficits have been documented in areas including physical growth, cognitive function, neurodevelopment, and social-psychological health. Effects seem most pronounced when children have least access to individualised caregiving, and when deprivation coincides with early developmental sensitive periods. Offering hope, early interventions that place institutionalised children into families have afforded substantial recovery. The strength of scientific evidence imparts urgency to efforts to achieve deinstitutionalisation in global child protection sectors, and to intervene early for individual children experiencing deprivation.

# Thank you

Anne E. Berens, MA, MSc

Harvard Medical School

Contact: [anne.berens@childrens.harvard.edu](mailto:anne.berens@childrens.harvard.edu)

## References:

- Almas, A. N., Degnan, K. A., Radulescu, A., Nelson, C. A., Zeanah, C. H., Fox, N. A. (2012). Effects of early intervention & the moderating effects of brain activity on institutionalized children's social skills at age 8. *Proceedings of the National Academy of Sciences of the United States of America*, 109(supp 2), 17228-31.
- Berens, A. E., Nelson, C. A. (2015). The science of early adversity: is there a role for large institutions in the care of vulnerable children? *Lancet*, 386(9991), 388-398.
- Bos, K. J., Zeanah, C. H., Smyke, A. T., Fox, N. A., & Nelson, C. A. (2010). Stereotypies in children with a history of early institutional care. *Archives of Pediatrics & Adolescent Medicine*, 164(5), 406–411.
- Bos, K. J., Zeanah, C. H., Fox, N. A., Drury, S. S., McLaughlin, K. A., & Nelson, C. A. (2011). Psychiatric Outcomes in Young Children with a History of Institutionalization. *Harvard Review of Psychiatry*, 19(1), 15–24.
- Fox, N. A., Almas, A. N., Degnan, K. A., Nelson, C. A., & Zeanah, C. H. (2011). The Effects of Severe Psychosocial Deprivation and Foster Care Intervention on Cognitive Development at 8 Years of Age: Findings from the Bucharest Early Intervention Project. *Journal of Child Psychology and Psychiatry*, 52(9), 919-28.
- Humphreys, K. L., Gleason, M. M., Drury, S. S., Miron, D., Nelson, C. A., Fox, N. A., Zeanah, C. H. (2015). Effects of institutional rearing and foster care on psychopathology at age 12 years in Romania: follow-up of an open, randomised controlled trial. *Lancet Psychiatry*, 2(7):625-34.
- McDermott, J. M., Troller-Renfree, S., Vanderwert, R., Nelson, C. A., Zeanah, C. H., & Fox, N. A. (2013). Psychosocial deprivation, executive functions, and the emergence of socio-emotional behavior problems. *Frontiers in Human Neuroscience*, 7, 167.
- Millum, J, Emmanuel, E. J. (2007) The ethics of international research on abandoned children. *Science*, 318(5858):1874–1875.
- Nelson, C. A., Fox, N. A., Zeanah, C. H. (2014). *Romania's Abandoned Children: Deprivation, Brain Development, and the Struggle for Recovery*. Cambridge, MA: Harvard University Press
- Nelson, C. A., Zeanah, C. H., Fox, N. A., Marshall, P. J., Smyke, A. T., Guthrie, D. (2012). Cognitive recovery in socially deprived young children: the Bucharest Early Intervention Project. *Science*, 318(5858), 1937-1940.
- Sheridan, M. A., Fox, N. A., Zeanah, C. H., McLaughlin, K. A., & Nelson, C. A. (2012). Variation in neural development as a result of exposure to institutionalization early in childhood. *Proceedings of the National Academy of Sciences of the United States of America*, 109(32), 12927-12932.
- Smyke, A. T., Koga, S. F., Johnson, D. E., Fox, N. A., Marshall, P. J., Nelson, C. A., Zeanah, C. H. (2007). The caregiving context in institution-reared and family-reared infants and toddlers in Romania. *Journal of Child Psychology and Psychiatry*, 48(2), 210-218.
- Vanderwert, R. E., Marshall, P. J., Nelson, C. A., Zeanah, C. H., Fox, N. A. (2010) Timing of Intervention Affects Brain Electrical Activity in Children Exposed to Severe Psychosocial Neglect. *PLoS ONE* 5(7): e11415.
- Windsor, J., Benigno, J. P., Wing, C. A., Carroll, P. J., Koga, S. F., Nelson, C. A., ... Zeanah, C. H. (2011). Effect of Foster Care on Young Children's Language Learning. *Child Development*, 82(4), 1040–1046.
- Zeanah, C. H., Fox, N. A., & Nelson, C. A. (2012). Case Study in Ethics of Research: The Bucharest Early Intervention Project. *The Journal of Nervous and Mental Disease*, 200(3), 243–247.