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
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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:

<table>
<thead>
<tr>
<th>Aim 1</th>
<th>Examine the effects of institutionalization on the brain and behavioral development of young children</th>
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<tbody>
<tr>
<td>Aim 2</td>
<td>Determine if these effects can be remediated through early intervention, in this case: high-quality foster care</td>
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<td>Aim 3</td>
<td>Improve the welfare of children in Romania by establishing foster care as an alternative to institutionalization</td>
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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

**Bayley Scale of Infant Development**
Mental Development Index (MDI) prior to intervention

- Community: 103
- Institution: 66

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

*Bucharest institution included in BEIP study*

*Source:* Smyke et al. (2002) *J Child Psychol Psychiatry*
Background of the BEIP: Ethics

**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”

**Sources:** Millum & Emmanuel (2007) *Science*; Zeanah et al. (2012) *J Nerv Ment Dis*
The BEIP randomized institutionalized children into foster care and collected longitudinal data

**Experimental design**

- **Institutionalized sample**
  - Institutional group (IG) 136
  - High-quality foster care group (FCG) 68

- **Community control sample**
  - Community control group (CCG) 72
  - Never institutionalized group (NIG) 72

**Random assignment**
- Mean age 22 months at placement
- By random number generation
- Siblings kept together

**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

*SOURCE: Nelson et al. (2013) Science*
Background of the BEIP: Assessment

The BEIP assessed a wide range of developmental outcomes

### Domains of assessment

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

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Core findings: Cognitive development

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

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

<table>
<thead>
<tr>
<th>Institutional care group</th>
<th>Foster care group placed after age 24 mo.</th>
<th>3.80μV^2</th>
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<tbody>
<tr>
<td>Foster care group placed before age 24 mo.</td>
<td>Community controls</td>
<td>2.44μV^2</td>
</tr>
</tbody>
</table>

SOURCE: Vanderwert et al. (2010) *PLoS ONE*
Core findings: Brain structure

MRI findings show recovery of cortical volume only for white matter

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

<table>
<thead>
<tr>
<th>Mean cortical gray matter volume by group</th>
<th>Mean cortical white matter volume by group</th>
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<tbody>
<tr>
<td>Institutional group</td>
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</tr>
<tr>
<td>Foster care group</td>
<td>Foster care group</td>
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<tr>
<td>Community controls</td>
<td>Community controls</td>
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<tr>
<th>cm³</th>
<th>600</th>
<th>550</th>
<th>500</th>
<th>450</th>
<th>400</th>
<th>375</th>
<th>350</th>
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* p ≤ 0.05

SOURCE: Sheridan et al. (2012) PNAS
Core findings: Psychopathology

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

Rates of psychiatric disorders by institutional care exposure

- Any disorder
- Any internalizing
- Any externalizing
- ADHD

Intervention effects on externalizing symptoms driven by boys

- Care as usual
- Foster care, disrupted
- Foster care, stable
- Community controls

Improvement in internalizing symptoms seen only with stable foster care

SOURCE: Humphreys et al. (2015) *Lancet Psychiatry*
Core findings: Timing matters

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

Summary of timing effects

Differences in outcomes observed between children placed before vs. after...

<table>
<thead>
<tr>
<th>Age</th>
<th>Effects</th>
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<tr>
<td>12 months</td>
<td>Stereotypies</td>
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<tr>
<td>15 months</td>
<td>Expressive language, Receptive language</td>
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<tr>
<td>20 months</td>
<td>Teacher-rated social skills (age 8 yrs.), Inhibitory control (ERN during flanker)</td>
</tr>
<tr>
<td>24 months</td>
<td>Security of attachment, Organization of attachment, IQ (age 54 mos.), Alpha and theta power (age 8 yrs.)</td>
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</tbody>
</table>

Broader literature

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

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

Anne E Berens, Charles 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
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References:


