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

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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
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.
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

100,000 children “warehoused” in state institutions

1989: The fall of the Ceausescu regime

The aftermath....
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
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)

- Mental Development Index:
  - Institution: 64
  - Community: 103

Bar chart comparing the MDI scores for Institution and Community.
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?

<table>
<thead>
<tr>
<th>Age at placement</th>
<th>42 Months (Bayley)</th>
<th>54 Months (WPPSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>0-18 months</td>
<td>14</td>
<td>94.4</td>
</tr>
<tr>
<td>18-24 months</td>
<td>16</td>
<td>89.0</td>
</tr>
<tr>
<td>24-30 months</td>
<td>22</td>
<td>80.1</td>
</tr>
<tr>
<td>30+ months</td>
<td>9</td>
<td>79.7</td>
</tr>
</tbody>
</table>

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

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

Enrollment
- Randomized (n=136)
- Assessed for Eligibility (n=187)
- Excluded (n=51)

Allocation
- Allocated to Foster Care (n=68)
- Allocated to Care as Usual (n=68)

Participation
- Placement at 96 months (n=60)
  - 31 MacArthur Foster Care
  - 7 adopted
  - 8 Government Foster Care
  - 12 Returned to Bio Family
  - 2 Social Apartments
  - Discontinued Participation (n=8)
- Placement at 96 months (n=56)
  - 15 Institutional Care
  - 4 adopted
  - 18 Government Foster Care
  - 18 Returned to Bio Family
  - 1 Family Placement
  - Discontinued Participation (n=12)

Analysis
- Analyzed (n=53)
  - Excluded from analysis (n=7)
    - WISC data not available
- Analyzed (n=50)
  - Excluded from analysis (n=6)
    - WISC data not available
WISC Data at 96 Months of Age

Note: *p = .05

Fox et al (2011)
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 Institutions**
   - Current Institutions
     - CAU: 12
     - FCG: 7
   - Mock Institutions
     - CAU: 16
     - FCG: 27

2. **FCG currently in MacArthur Foster Care**
   - MacArthur Foster Care
     - FCG: 27
   - Other Placements
     - FCG: 21
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.
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.

Sheridan et al (under review)
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

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