HHS Public Access

Author manuscript

Curr Dir Psychol Sci. Author manuscript; available in PMC 2024 March 28.

Published in final edited form as:

Curr Dir Psychol Sci. 2023 December ; 32(6): 515–521. doi:10.1177/09637214231201079.

Romania's Abandoned Children: The Effects of Early Profound Psychosocial Deprivation on the Course of Human Development

Charles A. Nelson,
Harvard Medical School, Richard David Scott Chair in Pediatric Developmental Medicine Research, Boston Children's Hospital, Boston, Massachusetts, USA

Harvard Graduate School of Education, Cambridge, MA

Nathan A. Fox,
Department of Human Development and Quantitative Methodology, University of Maryland, College Park, MD

Charles H. Zeanah
Section of Child and Adolescent Psychiatry, Department of Psychiatry and Behavioral Sciences, Tulane University School of Medicine, New Orleans, LA

Abstract

Understanding the impact that early psychosocial neglect has on the course of human development has implications for the millions of children around the world who are living in contexts of adversity. In the US, approximately 76% of cases reported to child protective services involve neglect; world-wide, there are more than 150 million orphaned or abandoned children, including 10.5 million orphaned because of COVID-19. In much of the world, children without primary caregivers are reared in institutional settings. We review two decades of research based on the only randomized controlled trial of foster care as an alternative to institutional care. We report that children randomly assigned to continued care as usual (institutional care) suffer from persistent deficits in social, cognitive, and emotional development, and show evidence of disruptions in brain development. By contrast, children randomly assigned to foster care show improvements in most domains of functioning, although the degree of recovery is in part a function of how old they were when placed into foster care and the stability of that placement. These findings have important implications for understanding critical periods in human development, as well as elucidating the power of the psychosocial environment in shaping multiple domains of human development.

Keywords

neglect; brain development; neural plasticity; institutional rearing

Correspondence concerning this article should be addressed to Charles A. Nelson, Laboratories of Cognitive Neuroscience, 2 Brookline Place, Suite BC 525.10, Brookline, Massachusetts 02445. Charles_nelson@harvard.edu.

[i]This expression has long been attributed to the late William Greenough, but Greenough told the first author of this paper the quote should be attributed to J. McVicker Hunt.

Although genes contribute to the basic blueprint of early brain development (particularly during the prenatal period), the course of human development is greatly influenced by experiences that transpire over the early years of life, when the pace of brain development is greatest. Indeed, by some estimates the brain generates more than one million synapses *per minute* from the late prenatal period through the 2nd–3rd year of life (see Anasuya and Katti, 2010; Bourgeois, 1999; Huttenlocher, 1999). Because the brain is constructed in part in response to an individual's experience, the experiences children have are enormously impactful on the course of development. As J. McVicker Hunt noted, "Experience cuts both ways[i]". Thus, children's exposure to positive experiences biases development in a healthy direction, whereas children's exposure to adverse experiences biases the system in an unhealthy direction. An analogy here might be that experience provides the foundation and speed upon which brains are built. Not surprisingly, then, psychosocial neglect can lead to disastrous consequences, for the simple reason that the brain lacks the "expected" experiences during critical periods of development to build that foundation and to wire adaptively. Given that 76% of the cases reported to child protective services involve neglect (U.S. Dept. of Health & Human Services, 2021), it is imperative that we understand how neglect shapes brain development and changes the course of human development.

For many decades neuroscientists have studied the effects of experience – or the lack of experience – using animal models. Classic work in the visual and auditory systems, for example, demonstrated that the lack of visual or auditory input during critical periods of development led to impairments in vision and audition (e.g., Chen & Yuan, 2015; Hubel and Wisel, 1962). Similarly, work with non-human primates demonstrated that infant monkeys deprived of maternal care suffered long-term impairments in their social-emotional functioning (Harlow & Suomi, 1971). Nevertheless, studying the effects of neglect on *human* development has been more difficult, as neglect is often embedded in a host of other adverse experiences, such as abuse, poverty, or parental substance use, making it difficult to disentangle neglect from other adverse events. Arguably, children raised in deprived institutional settings represents the purest example of psychosocial neglect, since they are fed, clothed, and sheltered in a setting that is physically safe, albeit impersonal and insensitive (Zeanah & King, 2022). The absence of nurturing care is the primary form of deprivation. It is in this context that the Bucharest Early Intervention Project (BEIP) was launched more than 20 years ago.

The BEIP is a randomized controlled trial of foster care as an alternative to institutional care. Its RCT design (see Figure 1) facilitates the ability to draw causal inferences about the effects of institutional rearing on child and brain development. Prior to this study, the bulk of the literature on the effects of institutionalization focused on children abandoned or orphaned at birth, placed in institutional settings, and then adopted (generally by middle class families). These studies were correlational in nature and are subject to sample biases that do not exist in an RCT design.

We have no conflicts of interests to disclose.

In this paper we first focus our attention on the cultural forces that led to more than 170,000 children being raised in state-run institutions in Romania. We then describe the experimental design adopted in the BEIP and conclude with a summary of findings to date.

History of Child Abandonment in Romania and the Rise of Institutional Care

Nicolae Ceausescu, the communist leader of Romania from 1965 to 1989, believed that he could increase Romania's stature by increasing the population to support massive industrial expansion. To accomplish rapid population growth, he implemented a series of decrees that included banning contraception and abortion and imposing a tax on families who had fewer than five children. This resulted in an increase in the number of children whose parents were unable to care for them, which in turn led to an enormous number of abandoned children. Ceausescu then constructed dozens of state-run institutions to warehouse these children; by January, 1990, shortly after Ceausescu was deposed and executed, there were more than 170,000 children living in institutions, many in unspeakably squalid conditions (Kast & Rosapepe, 2014). These institutions were generally characterized as having a small number of caregivers take responsibility for many children, coupled with profound neglect, as illustrated in Figure 2.

The Bucharest Early Intervention Project (BEIP)

The BEIP was an outgrowth of a MacArthur Foundation research network on *Early Experience and Brain Development* (https://www.macfound.org/networks/research-network-on-early-experience-brain-develop), and took place in Romania at the invitation of a member of the Romanian government. After establishing a laboratory that was physically located at St. Catherine's, the largest of the six institutions for young children in Bucharest (in 1989, St. Catherine's housed ~850 children less than 3 years old), a pediatric team conducted exams on more than 180 children under the age of 3. Of these, 136 met inclusion criteria (e.g., no frank neurological or genetic problems, no fetal alcohol syndrome, etc.). An additional 72 never institutionalized children were recruited from public pediatric clinics as a comparison sample. After an extensive baseline assessment while children were living in the institutions, these 136 children were randomly assigned to either a high-quality foster care program that our team created, financed, and supported, or to continued care as usual (continued institutional care). A few components of our foster care program included a) all foster parents were licensed by the government, and they received a monthly salary comparable to the per capita income in Romania at the time (by Romanian law foster parents are salaried employees), b) BEIP social workers visited the families every 10 days initially and met weekly with the BEIP team in the US (via Skype, phone or in person); c) we provided all material support (e.g., toys, diapers), and d) a 24 hour on-call pediatrician. Children were initially followed up at 30, 42 and 54 months, when the trial ended. Children were seen again at 8, 12, and 16 years; a 22 year follow up is in progress. Table 1 illustrates the domains we assessed.

Conceptual Framework for the project

Based on our knowledge of Greenough's concept of experience-expectant and experience-dependent brain development (the former referring to elements of the environment likely to be experienced by all members of the species, whereas the latter refers to elements of the environment unique to individual members of the species; see Greenough & Black, 1987), we assumed that for typical neural circuitry to form, the brain requires patterned, contingent input, and the lack of such input could lead to under-specification and miswiring of circuits. For children growing up in neglectful environments, contingent input is generally lacking; thus, we might expect errors in brain development among such children, which would be manifest in brain structure and functioning and therefore in behavior. Moreover, the *timing* of when the neglect occurs should prove important; if certain experiences fail to occur during critical periods, the consequences could be worse than if the neglect occurs at a later age.

Ethical Considerations

We and others have written extensively about the ethics involved in conducting this research (Miller, 2009; Nelson et al., 2014; Zeanah et al., 2012). Because the population was exceptionally vulnerable, we ensured oversight from the Institutional Review Boards (IRBs) at the three US Universities of the Principal Investigators and at Bucharest University. Some may object to adoption of an RCT design, but this was critical to our ability to draw causal inference about the efficacy of the foster care intervention compared to the institutional care intervention and to inform a policy debate in Romania about which form of care was preferable. Throughout, all decisions about children's placement were made by Romanian authorities—no children were retained in institutions because of study participation. In fact, at the trial's conclusion, more than half of the children randomly assigned to care as usual (institutional care) were living in families, either by adoption, by reunification with their biological families or by placement into newly available government foster care. Finally, all foster families were licensed by local authorities and monitored carefully by project social workers (for details, see Nelson, Fox & Zeanah, 2014).

Summary of Findings

Since the project was conceived and implemented, the findings through age 16 have been extensively reported in both the scientific and lay literatures. Rather than summarize the findings to date across multiple domains, we instead focus on three broad questions: First, was the intervention efficacious and if so, in what domains? Second, in those domains where the intervention was efficacious, were the effects influenced by critical period timing – that is, the age at which children were removed from institutions and placed into foster care? Finally, did disruptions in care (lack of stability in placement) impact outcomes?

Efficacy of the Intervention

With few exceptions (summarized below), the intervention was largely successful in improving the developmental outcomes of children. For example, at the behavioral level, children randomly assigned to foster care showed improvements in IQ; indeed, through age 18 there was a consistent 7–9 point advantage in full scale IQ in foster care compared to

care as usual (see Humphreys et al., 2022). There were also improvements in language (Windsor et al., 2011; Humphreys et al., 2020); attachment security (Smyke et al., 2010); and in peer relationships (Almas et al., 2015). In terms of physical development, foster care led to improvements in length and height and if placed before one year of age, in head circumference (Johnson et al., 2010). Finally, in terms of brain activity, children randomly assigned to foster care showed increased EEG alpha power at rest (Marshall et al., 2004, 2008; Vanderwert, 2010; Debnath et al 2020), and modest increases in white matter volume (Sheridan et al., 2012). In addition, by age 16, a number of regions of the prefrontal cortex were thinner in children in foster care compared to children remaining in care as usual, a pattern consistent with the normative typical thinning the cortex undergoes during adolescence (Sheridan et al., 2022), likely the effect of synaptic pruning. Finally, in terms of psychopathology, psychiatric disorders were consistently less common in children randomized to foster care (Humphreys et al., 2020; Zeanah et al., 2009).

There were, however, a few exceptions to these positive intervention effects. We observed little improvement in many executive functions through age 16 (Wade et al., 2019). Second, through age 16 we continued to observe a very high rate of attention deficit hyperactivity disorder (ADHD) in both the care as usual and foster care groups (approximately 20%; see Humphreys et al., 2020). Third, children in both the foster care and care as usual groups showed reduced grey matter volume that did not increase with placement into foster care (Sheridan et al., 2012). We have puzzled over the lack of intervention effects in these domains, although this general pattern is consistent with the other major study of Romanian orphans adopted into families – the English Romanian Adoptees Study (ERAs; see Rutter et al., 2007). One possible explanation is that the average age of placement – 22 months – may have exceeded the critical period for recovering from early neglect. Another is that although our RCT design helped us avoid sample bias post randomization, we have incomplete data regarding the prenatal care or prenatal drug or alcohol exposure that may affect the brain areas associated with executive functions. Be that as it may, we remain keenly focused on whether we will observe some recovery in these domains as children make the transition to adulthood (our 22-year follow up).

Critical Period Timing

Because children placed in foster care ranged in age from 7 to 33 months, we were able to assess whether earlier placement was associated with improved outcomes. More favorable development for earlier placed children would be consistent with the concept of critical periods for brain and behavioral development.

There were many domains that seemed affected by timing of placement. We note only a few examples. For EEG power (a coarse index of brain development), children placed prior to 24 months of age were significantly more likely to have higher alpha power at 8, 12 and 16 years; indeed, alpha power for children randomized to foster care before 24 months was indistinguishable from children who had never been institutionalized (Vanderwert et al., 2010). With regard to IQ, when children were 54 months of age, when the formal trial ended (and BEIP foster care was turned over to the government), those who were placed into foster care before 24 months had significantly higher IQs than those who were placed at 24 months

or later (Nelson et al., 2007). Language also seemed to be influenced by age of placement (Windsor et al., 2011, 2013), as was security of attachment (Smyke et al., 2010).

Collectively, children placed earlier in their development had more favorable outcomes than children placed later in their development, although this varied somewhat by domain, given that different domains are influenced by different critical periods. But the overall main effect of foster care timing suggests that there should be an urgency about removing children from adverse caregiving environments and placing them in more favorable environments. These findings are consistent with other studies supporting urgency about getting children into favorable caregiving environments (Zeanah et al., 2011).

Stability of Placement

It has been well-established that children under the care of child protective services who experience multiple foster care placements have worse developmental outcomes than those who experience stable placements. In a series of recent reports from BEIP, we examined the issue of stability of placement in foster care. We did this by examining children in foster care who had stable placements vs. those who had one or more disruptions in placement. We consistently observed that children in stable foster placements did better than those with disrupted care. For example, foster care children in stable care exhibited fewer symptoms of psychopathology (Humphreys et al., 2015), and had higher IQs (Humphreys et al., 2022). But the question is whether stability reduces psychopathology or psychopathology leads to placement disruptions. To address this as best we could, we examined psychopathology, IQ, and growth parameters at 54 months when the trial was concluded. There were no differences at 54 months in those children who would and would not subsequently remain in their original placements.

Conclusions

Sensitive, consistent caregiving that is responsive to a child's needs is one of the most powerful interventions that is available for children who are orphaned, abandoned and maltreated, for the simple reason that such care is individualized and has the best interests of the child in mind. Over the course of 20 years, we have consistently demonstrated that even when a child's physical needs are met, psychosocial neglect is deleterious to brain and behavioral development. Much like exposure to toxins, the higher the dose of toxin, and the more prolonged the exposure, the more problematic the effects. Similarly, the longer low level of quality care is provided, the more harmful to their development. The sooner children can be placed in adequate or better caregiving environments, the more likely they are to recover and the fuller their recovery is likely to be.

Acknowledgments

The writing of this paper was made possible by the John D. and Catherine T. MacArthur Foundation, the Binder Family Foundation and the National Institute of Mental Health MH091363. The authors wish to thank the dedicated members of our team in Bucharest, Julie Staples-Watson for program development and administrative help, along with the many students and postdocs who have worked on this project for the past two decades. We also thank Sheena Odabashian for editorial assistance. Direct correspondence to the first author at Charles_nelson@harvard.edu.

References

1. Almas AN, Degnan KA, Walker OL, Radulescu A, Nelson CA, Zeanah CH, & Fox NA (2015). The effects of early institutionalization and foster care intervention on children's social behaviors at age 8. Social Development, 24(2), 225–239. [PubMed: 26294847]
2. Anusuya M and Katti S (2010). Superficial Analogies and Differences between the Human Brain and the Computer. International Journal of Computer Science and Network Security, 10 (7).
3. Bourgeois JP (1999). Synaptogenesis, heterochrony and epigenesis in the mammalian neocortex. Acta Paediatrica Suppl, 422: 27–33.
4. Chen Z, Yuan W (2015) Central plasticity and dysfunction elicited by aural deprivation in the critical period. Front Neural Circuits. doi: 10.3389/fncir.2015.00026.
5. Debnath R, Tang A Nelson CA, Zeanah CH, & Fox NA (2020). Long-term effects of institutional rearing, foster care intervention and disruptions in care on brain electrical activity in adolescence. Developmental Science, 23(1), e12872.. doi: 10.1111/desc.12872 [PubMed: 31148302]
6. Greenough WT, Black JE, Wallace CS (1987). Experience and brain development. Child Development, 58(3):539–59. [PubMed: 3038480]
7. Harlow HF, & Suomi SJ (1971) Social Recovery by Isolation-Reared Monkeys. Proceedings of the National Academy of Sciences, 68 (7) 1534–1538; 10.1073/pnas.68.7.1534
8. Hubel DH, & Wiesel TN (1962). Receptive fields, binocular interaction and functional architecture in the cat's visual cortex. J Physiol, 160(1):106–54. doi:10.1113/jphysiol.1962.sp006837. [PubMed: 14449617]
9. Humphreys KL, Gleason MM, Drury SS, Miron D, Nelson CA, Fox NA, & Zeanah CH (2015). Effects of early deprivation on psychopathology at age 12 years: Follow-up of a randomized controlled trial. The Lancet Psychiatry, 2 (7), 625–634. [PubMed: 26303560]
10. Humphreys KL, King LS, Guyon-Harris KL, Sheridan MA, McLaughlin KA, Radulescu A, Nelson CA, Fox NA, & Zeanah CH (2022). Foster care leads to sustained cognitive gains following severe early deprivation. Proceedings of the National Academy of Sciences of the United States of America, 119(38), e2119318119. 10.1073/pnas.2119318119 [PubMed: 36095188]
11. Humphreys KL, Machlin LS, Guyon-Harris KL, Nelson CA, Fox NA, Zeanah CH (2020). Psychosocial deprivation and receptive language ability: a two-sample study. J Neurodev Disord, 16;12(1):36. doi: 10.1186/s11689-020-09341-2. [PubMed: 33327936]
12. Huttenlocher P (1999). The Role of early Experience in Infant Development. eds Fox N, Leavitt L & Warhol J Johnson & Johnson Pediatric Round Table Series.
13. Johnson DE, Guthrie D, Smyke AT, Koga SF, Fox NA, Zeanah CH, & Nelson CA (2010). Growth and relations between auxology, caregiving environment, and cognition in socially deprived Romanian children randomized to foster vs. ongoing institutional care. Archives of Pediatrics & Adolescent Medicine, 164(6): 507–516. [PubMed: 20368481]
14. Kast S, & Rosapepe J (2014) Dracula Is Dead: Travels in Post-Communist Romania Paperback. Random House: New York
15. Marshall PJ, Fox NA, & the Bucharest Early Intervention Project Core Group (2004). A comparison of the electroencephalogram between institutionalized and community children in Romania. Journal of Cognitive Neuroscience, 16, 1327–1338. [PubMed: 15532128]
16. Marshall PJ, Reeb BC, Fox NA, Nelson CA, & Zeanah CH (2008). Effects of early intervention on EEG power and coherence in previously institutionalized children in Romania. Development and Psychopathology, 20 (3), 861–880. [PubMed: 18606035]
17. Miller FG (2009). The randomized controlled trial as a demonstration project: An ethical perspective. American Journal of Psychiatry, 166, 743–745. [PubMed: 19570933]
18. Nelson CA, Fox NA, & Zeanah CH (2014). Romania's abandoned children: Deprivation, brain development and the struggle for recovery. Cambridge, MA: Harvard University Press.
19. Nelson CA, Zeanah CH, Fox NA, Marshall PJ, Smyke AT, & Guthrie D (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. Science, 318, 1937–1940. [PubMed: 18096809]
20. Rutter M, Beckekett C, Castle J, Colvert E, Kreppner J, Mehta M, Stevens S, & Sonuga-Barker E (2007). Effects of profound early institutional deprivation: An overview of findings from a

UK longitudinal study of Romanian adoptees. European Journal of Developmental Psychology, 4, 332–355.

21. Sheridan MS, Fox NA, Zeanah CH, McLaughlin K, & Nelson CA (2012). Variation in neural development as a result of exposure to institutionalization early in childhood. Proceedings of the National Academy of Sciences, 109(32):12927–12932.
22. Sheridan MA, Mukerji CE, Wade M, Humphreys KL, Garrisi K, Goel S, Patel K, Fox NA, Zeanah CH, Nelson CA, McLaughlin KA, (2022). Early Deprivation alters structural brain development from middle childhood to adolescence. 10.17605/OSF.IO/476M8
23. Smyke A, Zeanah, Fox NA, Nelson CA, & Guthrie D (2010). Placement in foster care enhances quality of attachment among young institutionalized children. Child Development, 81(1): 212–223. [PubMed: 20331663]
24. U.S. Department of Health and Human Services (2021). 32nd year of reporting child maltreatment. Child Maltreatment 2021 (hhs.gov)
25. Vanderwert RE, Marshall PJ, Nelson CA, Zeanah CH, & Fox NA (2010). Timing of intervention affects brain electrical activity in children exposed to severe psychosocial neglect. PLoSOne, 5(7): 1–5.
26. Wade M, Fox NA, Zeanah CH, & Nelson CA (2019). Long-term effects of institutional rearing, foster care, and brain activity on memory and executive functioning. Proceedings of the National Academy of Sciences, 116(5): 1808–1813.
27. Windsor J, Benigno JP, Wing CA, Carroll PJ, Koga SF, Nelson CA, Fox NA, & Zeanah CH (2011). Effect of foster care on young children's language learning. Child Development, 82(4), 1040–1046. [PubMed: 21679171]
28. Windsor J, Moraru A, Nelson CA, Fox NA, & Zeanah CH (2013). Effect of foster care on language learning at eight years: Findings from the Bucharest Early Intervention Project. Journal of Child Language, 40(3): 605–627. [PubMed: 22584071]
29. Zeanah CH, Fox NA, & Nelson CA (2012). Case study in research ethics: The Bucharest Early Intervention Project. The Journal of Nervous and Mental Disease, 200(3), 243–247. [PubMed: 22373763]
30. Zeanah CH, Egger HL, Smyke AT, Nelson CA, Fox NA, Marshall PJ, & Guthrie D (2009). Institutional rearing and psychiatric disorders in Romanian preschool children. American Journal of Psychiatry, 166: 777–785. [PubMed: 19487394]
31. Zeanah CH, Nelson CA, Fox NA, Smyke AT, Marshall P, Parker SW, & Koga S (2003). Designing research to study the effects of institutionalization on brain and behavioral development: The Bucharest Early Intervention Project. Development and Psychopathology, 15,885–907 [PubMed: 14984131]
32. Zeanah CH, Shauffer C, Dozier M. (2011). Foster care for young children: why it must be developmentally informed. J Am Acad Child Adolesc Psychiatry, 50(12):1199–201. doi: 10.1016/j.jaac.2011.08.001. [PubMed: 22115138]

Recommended Readings

Humphreys KL, Gleason MM, Drury SS, Miron D, Nelson CA, Fox NA, & Zeanah CH (2015). Effects of early deprivation on psychopathology at age 12 years: Follow-up of a randomized controlled trial. The Lancet Psychiatry, 2 (7), 625–634. [PubMed: 26303560] Ten years after randomization, children placed in foster care had significantly fewer externalizing symptoms and disorders. Those who remained in stable placements had significantly fewer internalizing and externalizing symptoms and disorders than those who experienced one or more placement disruptions.

Humphreys KL, King LS, Guyon-Harris KL, Sheridan MA, McLaughlin KA, Radulescu A, Nelson CA, Fox NA, & Zeanah CH (2022). Foster care leads to sustained cognitive gains following severe early deprivation. Proceedings of the National Academy of Sciences of the United States of America, 119(38), e2119318119. 10.1073/pnas.2119318119. [PubMed: 36095188] Sixteen years after randomization, children placed in high-quality foster care had significantly higher IQ scores than those randomized to care as usual. The causal effect of the intervention on cognitive ability at age 18 is explained, in part, by higher-quality caregiving and attachment security in early childhood.

King LS, Guyon-Harris KL, Valadez EA, Radulescu A, Fox NA, Nelson CA, Zeanah CH, & Humphreys KL (2022). A comprehensive multi-level analysis of the Bucharest Early Intervention Project: Causal effects on recovery from severe deprivation. American Journal of Psychiatry.Through adolescence, children randomized assigned to foster care had better cognitive and physical outcomes and less severe psychopathology than did those who received care as usual. The magnitude of these effect sizes remained stable across follow-ups from middle childhood through adolescence.

Nelson CA, Fox NA, & Zeanah CH (2014). Romania's Abandoned Children: Deprivation, Brain Development and the Struggle for Recovery. Harvard University Press: Cambridge, MA.An overview of the Bucharest Early Intervention Project, with a summary of findings through age 8 years.

Nelson CA, Zeanah CH, Fox NA, Marshall PJ, Smyke AT, & Guthrie D (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. Science, 318, 1937–1940. [PubMed: 18096809] In this paper the authors report an early finding from the Bucharest Early Intervention Project to demonstrate a critical period for recovery of IQ following early psychosocial deprivation.

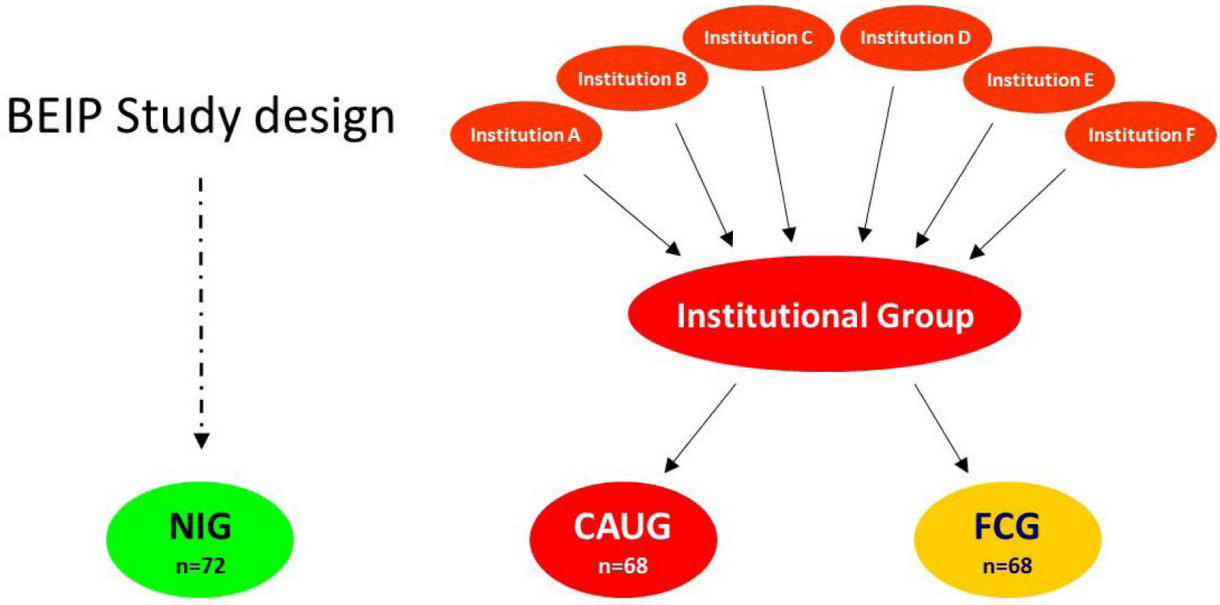

Figure 1:

Drawing from six different institutions in Bucharest, more than 180 children underwent a pediatric and neurological exam. We excluded children with frank genetic or neurological disorders. The remaining 136 children comprised of 68 children from the care as usual group (CAUG) and 68 children from the foster care group (FCG) underwent an extensive baseline assessment, as did 72 never institutionalized children (NIG) we recruited from the community. Following this assessment, half of the institutionalized children were randomly assigned to continued institutional care and half to a high-quality foster care program the study team created and financed. Average age at randomization was ~22 months. Children in all 3 groups were then followed up at 30, 42, and 54 months, and again at 8, 12, and 16 years; a 22 year follow up is in progress.

Figure 2:
an illustration of a typical Romania orphanage in the 1980s (courtesy of Mike Carroll).

Table 1:

Domains of Assessment

Domains of Assessment			
Physical Development	Genetics/Epigenetics	Brain Anatomy (MRI)	Health outcomes
Language	Attachment	Brain Function (EEG, ERP)	Stress responsivity
Cognition	Psychopathology	Social Functioning/Social-Emotional Development	Caregiving environment