

CHILD DEVELOPMENT

Anguish of the Abandoned Child

The plight of orphaned Romanian children reveals the psychic and physical scars from first years spent without a loving, responsive caregiver

*By Charles A. Nelson III, Nathan A. Fox
and Charles H. Zeanah, Jr.*

IN BRIEF

Communist dictator Nicolae Ceaușescu banned birth control and abortion in 1966 to increase Romania's population. Overwhelmed, parents left children by the thousands in state institutions.

Romanian officials, in trying later to make up for these abuses, agreed to a study by U.S. investigators to determine the inimical effects of early life in an orphanage on the still large numbers of institutionalized children.

A first-ever randomized trial comparing the emotional and physical well-being of institutionalized children with those placed in a foster home began in Bucharest in 2000.

Life in an orphanage took its toll. The study found that children who passed the first two years in an institution had a lower IQ and attenuated brain activity compared with foster children or those never institutionalized.





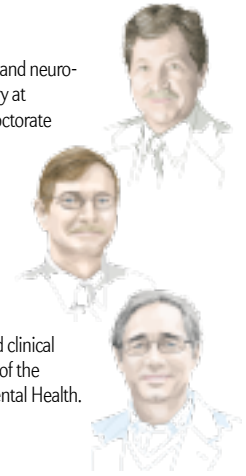
ORPHANS:

Two Romanian boys occupied a urine-soaked iron crib in a state-run institution in 1990.

Charles A. Nelson III is professor of pediatrics and neuroscience and professor of psychology in psychiatry at Harvard Medical School. He has an honorary doctorate from the University of Bucharest in Romania.

Nathan A. Fox is Distinguished University Professor in the department of human development and quantitative methodology at the University of Maryland, College Park.

Charles H. Zeanah, Jr., is professor of psychiatry and clinical pediatrics at Tulane University and executive director of the university's Institute of Infant and Early Childhood Mental Health.



IN A MISGUIDED EFFORT TO ENHANCE ECONOMIC PRODUCTIVITY, NICOLAE CEAUȘESCU DECREED in 1966 that Romania would develop its “human capital” via a government-enforced mandate to increase the country’s population. Ceaușescu, Romania’s leader from 1965 to 1989, banned contraception and abortions and imposed a “celibacy tax” on families that had fewer than five children. State doctors—the menstrual police—conducted gynecologic examinations in the workplace of women of child-bearing age to see whether they were producing sufficient offspring. The birth rate initially skyrocketed. Yet because families were too poor to keep their children, they abandoned many of them to large state-run institutions. By 1989 this social experiment led to more than 170,000 children living in these facilities.

The Romanian revolution of 1989 deposed Ceaușescu, and over the next 10 years his successors made a series of halting attempts to undo the damage. The “orphan problem” Ceaușescu left behind was enormous and did not disappear for many years. The country remained impoverished, and the rate of child abandonment did not change appreciably at least through 2005. A decade after Ceaușescu had been removed from power, some government officials could still be heard saying that the state did a better job than families in bringing up abandoned children and that those confined in institutions were, by definition, “defective”—a view grounded in the Soviet-inspired system of educating the disabled, dubbed “defectology.”

Even after the 1989 revolution, families still felt free to abandon an unwanted infant to a state-run institution. Social scientists had long suspected that early life in an orphanage could have adverse consequences. A number of mostly small, descriptive studies that lacked control groups were conducted from the 1940s to the 1960s in the West that compared children in orphanages with those in foster care and showed that life in an institution did not come close to matching the care of a parent—even if that parent was not the natural mother or father. One issue with these studies was the possibility of “selection bias”: children removed from institutions and placed into adoptive or foster homes might be less impaired, whereas the ones who remained in the institution were more disabled. The only way to counter any bias would require the unprecedented step of randomly placing a group of abandoned children into either an institution or a foster home.

Understanding the effects of life in an institution on children’s

early development is important because of the immensity of the orphan problem worldwide (an orphan is defined here as an abandoned child or one whose parents have died). War, disease, poverty and sometimes government policies have stranded at least eight million children worldwide in state-run facilities. Often these children live in highly structured but hopelessly bleak environments, where typically one adult oversees 12 to 15 children. Research is still lacking to gain a full understanding of what happens to children who spend their first years in such deprived circumstances.

In 1999, when we approached Cristian Tabacaru, then secretary of state for Romania’s National Authority for Child Protection, he encouraged us to conduct a study on institutionalized children because he wanted data to address the question of whether to develop alternative forms of care for the 100,000 Romanian children then living in state institutions. Yet Tabacaru faced stiff resistance from some government officials, who believed for decades that children received a better upbringing in institutions than in foster care. The problem was exacerbated because some government agencies’ budgets were funded, in part, by their role in making institutional care arrangements. Faced with these challenges, Tabacaru thought that scientific evidence about putative advantages of foster care for young children over state institutions would make a convincing case for reform, and so he invited us to go ahead with a study.

INFANCY IN AN INSTITUTION

WITH THE ASSISTANCE of some officials within the Romanian government and especially with help from others who worked for SERA



PLACE TO CALL HOME for these Romanian foster care children was essential for healthy development.

Romania (a nongovernmental organization), we implemented a study to ascertain the effects on a child's brain and behavior of living in a state institution and whether foster care could ameliorate the effects of being reared in conditions that run counter to what we know about the needs of young children. The Bucharest Early Intervention Project was launched in 2000, in cooperation with the Romanian government, in part to provide answers that might rectify the aftereffects of previous policies. The unfortunate legacy of Ceaușescu's tenure provided a chance to examine, with greater scientific rigor than any previous study, the effects of institutionalized care on the neurological and emotional development of infants and young children. The study was the first-ever randomized controlled study that compared a group of infants placed in foster care with another raised in institutions, providing a level of experimental precision that had been hitherto unavailable.

We recruited, from all six institutions for infants and young children in Bucharest, a group of 136 whom we considered to be free of neurological, genetic and other birth defects based on pediatric exams conducted by a member of the study team. All had been abandoned to institutions in the first weeks or months of life. When the study began, they were, on average, 22 months old—the range of ages was from six to 31 months.

Immediately after a series of baseline physical and psychological assessments, half the children were randomly assigned to a foster care intervention our team developed, maintained and financed. The other half remained in an institution—what we called the “care as usual” group. We also recruited a third group of typically developing children who lived with their families in Bucharest and had never been institutionalized. These three groups of children have been studied for more than 10 years. Because the children were randomly assigned to foster care or to remain in an institution, unlike previous studies, it was possible to show that any differences in development or behavior between

the two groups could be attributed to where they were reared.

Because there was virtually no foster care available for abandoned children in Bucharest when we started, we were in the unique position of having to build our own network. After extensive advertising and background checks, we eventually recruited 53 families to foster 68 children (we kept siblings together).

Of course, many ethical issues were involved in conducting a controlled scientific study of young children, a trial in which only half the participants were initially removed from institutions. The design compared the standard intervention for abandoned children—institutional rearing—with foster care, an intervention that had never been available to these children. Ethical protections put in place included oversight by multiple Romanian and U.S.-based institutions, implementation of “minimal risk” measures (all used routinely with young children), and noninterference with government decisions about changes in placement when children were adopted, returned to biological parents or later placed in government-sponsored foster care that at the outset did not exist.

No child was moved back from foster care to an institution at the end of the study. As soon as the early results became available, we communicated our findings to the Romanian government at a news conference.

To ensure high-quality foster care, we designed the program to incorporate regular involvement of a social work team and provided modest subsidies to families for child-related expenses. All foster parents had to be licensed, and they were paid a salary as well as a subsidy. They received training and were encouraged to make a full psychological commitment to their foster children.

SENSITIVE PERIODS

THE STUDY SET ABOUT TO EXPLORE the premise that early experience often exerts a particularly strong influence in shaping the immature brain. For some behaviors, neural connections form

in early years in response to environmental influences during windows of time, called sensitive periods. A child who listens to spoken language or simply looks around receives aural and visual inputs that shape neural connections during specific periods of development. The results of the study supported this initial premise of a sensitive period: the difference between an early life spent in an institution compared with foster care was dramatic. At 30, 40 and 52 months, the average IQ of the institutionalized group was in the low to middle 70s, whereas it was about 10 points higher for children in foster care. Not surprisingly, IQ was about 100, the standard average, for the group that had never been institutionalized. We also discovered a sensitive

period when a child was able to achieve a maximum gain in IQ: a boy or girl placed in a home before roughly two years of age had a significantly higher IQ than one put there after that age.

The findings clearly demonstrate the devastating impact on mind and brain of spending the first two years of life within the impersonal confines of an institution. The Romanian children living in institutions provide the best evidence to date that the initial two years of life constitute a sensitive period in which a child must receive intimate emotional and physical contact or else find personal development stymied.

Infants learn from experience to seek comfort, support and protection from their significant caregivers, whether those individuals are natural or foster parents—

and so we decided to measure attachment. Only extreme conditions that limit opportunities for a child to form attachments can interfere with a process that is a foundation for normal social development. When we measured this variable in the institutionalized children, we found that the overwhelming majority displayed incompletely formed and aberrant relationships with their caregivers.

When the children were 42 months of age, we made another assessment and found that the children placed in foster care displayed dramatic improvements in making emotional attachments. Almost half had established secure relationships with another person, whereas only 18 percent of the institutionalized children had done so. In the community children, those never institutionalized, 65 percent were securely attached. Children placed into foster care before the end of the 24-month sensitive period were more likely to form secure attachments compared with children placed there after that threshold.

These numbers are more than just statistical disparities that separate the institutionalized and foster groups. They translate into very real experiences of both anguish and hope. Sebastian (none of the children's names in this article are real), now 12, has spent virtually his entire life in an orphanage and has seen his IQ drop 20 points to a subpar 64 since he was tested during his fifth year. A youth who may have never formed an attachment with anyone, Sebastian drinks alcohol and displays other risk-prone behaviors. During an interview with us, he became irritable and erupted with flashes of anger.

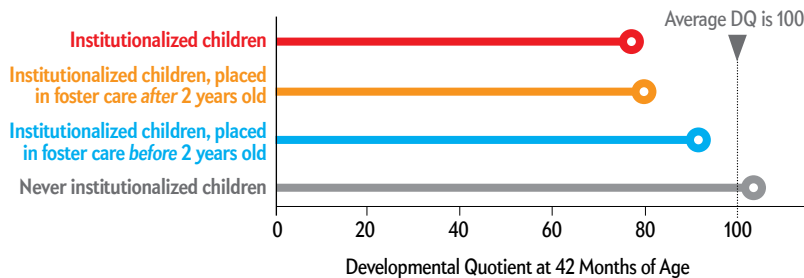
Bogdan, also 12, illustrates the difference that receiving individualized attention from an adult makes. He was abandoned at birth and lived in a maternity ward until two months of age, after which he lived in an institution for nine months.

FINDINGS

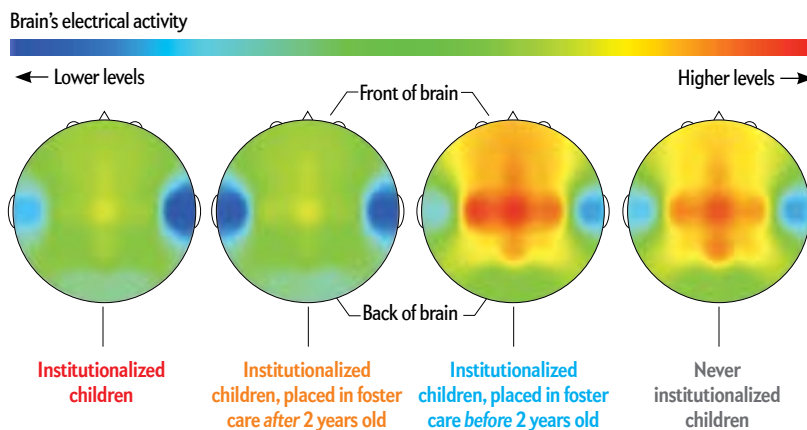
Someone to Watch over You

The tragedy of Communist leader Nicolae Ceaușescu's policy to increase the national birth rate led to as many as 100,000 abandoned children in Romania in 1999—and an unprecedented opportunity to assess the psychological and neurological impact of early life in a state institution. An experiment, undertaken under strict ethical supervision, tracked the fate of children in an institution against those placed in foster care and others who were never institutionalized. Children who went to a foster home during the sensitive period up to 24 months of age fared better than those who remained in an institution when tested later (at 42 months) for developmental quotient (DQ), a measure of intelligence equivalent to IQ, and for brain electrical activity, as assessed by electroencephalograms (EEGs). Entering foster care after two years produced EEGs that resembled those of institutionalized children.

Early Entry into Foster Care Resulted in Higher Average Intelligence ...



... and Brain Functioning at Age 8 Almost Matched That of Never Institutionalized Children



SOURCES: CHARLES A. NELSON (DQ data); "TIMING OF INTERVENTION AFFECTS BRAIN ELECTRICAL ACTIVITY IN CHILDREN EXPOSED TO SEVERE PSYCHOSOCIAL NEGLECT," BY R.E. VANDERWERT, P.J. MARSHALL, C.A. NELSON III, C.H. ZEANA and N.A. FOX, IN PLOS ONE, VOL. 5, NO. 7, JULY 1, 2010 (EEG)

He was then recruited into the project and randomized to the foster care group, where he was placed in the family of a single mother and her adolescent daughter. Bogdan started to catch up quickly and managed to overcome mild developmental delays within months. Although he had some behavioral problems, project staff members worked with the family, and by his fifth birthday the foster mother had decided to adopt him. At age 12, Bogdan's IQ continues to score at an above-average level. He attends one of the best public schools in Bucharest and has the highest grades in his class.

Because children raised in institutions did not appear to receive much personal attention, we were interested in whether a paucity of language exposure would have any effect on them. We observed delays in language development, and if children arrived in foster care before they reached approximately 15 or 16 months, their language was normal, but the later children were felled, the further behind they fell.

We also compared the prevalence of mental health problems among any children who had ever been institutionalized with those who had not. We found that 53 percent of the children who had ever lived in an institution had received a psychiatric diagnosis by the age of four and a half, compared with 20 percent of the group who had never been institutionalized. In fact, 62 percent of the institutionalized children approaching the age of five had diagnoses, ranging from anxiety disorders—44 percent—to attention-deficit hyperactivity disorder (ADHD)—23 percent.

Foster care had a major influence on the level of anxiety and depression—reducing their incidence by half—but did not affect behavioral diagnoses (ADHD and conduct disorder). We could not detect any sensitive period for mental health. Yet relationships were important for assuring good mental health. When we explored the mechanism to explain reduced emotional disorders such as depression, we found that the more secure the attachment between a child and foster parent, the greater probability that the child's symptoms would diminish.

We also wanted to know whether first years in a foster home affected brain development differently than living in an institution. An assessment of brain activity using electroencephalography (EEG)—which records electrical signals—showed that infants living in institutions had significant reductions in one component of EEG activity and a heightened level in another (lower alpha and higher theta waves), a pattern that may reflect delayed brain maturation. When we assessed the children at the eight-year mark, we again recorded EEG scans. We could then see that the pattern of electrical activity in children placed in foster care before two years of age could not be distinguished from that of those who had never passed time in an institution. Children taken out of an orphanage after two years and those who never left showed a less mature pattern of brain activity.

The noticeable decrease in EEG activity among the institutionalized children was perplexing. To interpret this observation, we turned to data from magnetic resonance imaging, which can visualize brain structures. Here we observed that the institutionalized children showed a large reduction in the volume of both gray matter (neurons and other brain cells) and white matter (the insulating substance covering neurons' wirelike extensions).

On the whole, all the children who were institutionalized had smaller brain volumes. Placing children in foster care at any age

had no effect on increasing the amount of gray matter—the foster care group showed levels of gray matter comparable to those of the institutionalized children. Yet the foster care children showed more white matter volume than the institutionalized group, which may account for the changes in EEG activity.

To further examine the biological toll of early institutionalization, we focused attention on a crucial area of the genome. Telomeres, regions at the ends of chromosomes that provide protection from the stresses of cell division, are shorter in adults who undergo extreme psychological stresses than those who escape this duress. Shorter telomeres may even be a mark of accelerated cellular aging. When we examined telomere length in the children in our study, we observed that, on the whole, those who had spent any time in an institution had shorter telomeres than those who had not.

LESSONS FOR ALL

THE BUCHAREST EARLY INTERVENTION PROJECT has demonstrated the profound effects early experience has on brain development. Foster care did not completely remedy the profound developmental abnormalities linked to institutional rearing, but it did mostly shift a child's development toward a healthier trajectory.

The identification of sensitive periods—in which recovery from deprivation occurs the earlier the child begins to experience a more favorable living environment—may be one of the most significant findings from our project. This observation has implications beyond the millions of children living in institutions, extending to additional millions of maltreated children whose care is being overseen by child-protection authorities. We caution readers, however, not to make unwarranted assumptions that two years can be rigidly defined as a sensitive period for development. Yet the evidence suggests that the earlier children are cared for by stable, emotionally invested parents, the better their chances for a more normal development trajectory.

We are continuing to follow these children into adolescence to see if there are “sleeper effects”—that is, significant behavioral or neurological differences that appear only later in youth or even adulthood. Further, we will determine whether the effects of a sensitive period we observed at younger ages will still be observed as children enter adolescence. If they are, they will reinforce a growing body of literature that speaks to the role of early life experiences in shaping development across one's life span. This insight, in turn, may exert pressure on governments throughout the world to pay more attention to the toll that early adversity and institutionalization take on the capacity of a maturing child to traverse the emotional hazards of adolescence and acquire the needed resiliency to cope with the travails of adult life. ■

MORE TO EXPLORE

Cognitive Recovery in Socially Deprived Young Children: The Bucharest Early Intervention Project. Charles A. Nelson III et al. in *Science*, Vol. 318, pages 1937–1940; December 21, 2007.

Effects of Early Intervention and the Moderating Effects of Brain Activity on Institutionalized Children's Social Skills at Age 8. Alisa N. Almas et al. in *Proceedings of the National Academy of Sciences USA*, Vol. 109, Supplement No. 2, pages 17,228–17,231; October, 16, 2012.

SCIENTIFIC AMERICAN ONLINE

For a video that details more about the importance of early-life caregiving, visit ScientificAmerican.com/apr2013/orphans