Charles A. Nelson, Nathan A. Fox, and Charles H. Zeanah: Romania's Abandoned Children: Deprivation, Brain Development, and the Struggle for Recovery

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When a child is abandoned by their parents, there are only a few placement options for the child. Typically, a child who is abandoned is either raised by family members, placed in an institution, or placed in foster care. The book “Romania’s Abandoned Children” by Charles Nelson, Nathan Fox, and Charles Zeanah describes a groundbreaking study conducted on institutionalized children within Romania in order to determine the systematic developmental effects of institutionalization. Throughout the book, the authors describe the reasons that they chose Romanian children as their subjects, the instruments and evaluation tools that they used to determine effects, and the overall implications of the findings of their study. The authors were able to take a very complex study and explain it in a way that was easily understandable for the majority of English readers that are familiar with basic experimental designs. Overall, the authors were able to convey their ideas and findings in a precise and understandable way and the knowledge contained within the book would be beneficial for all readers throughout the world who are concerned with the future of abandoned children.

The first chapter outlines the commonly accepted ideas within developmental neuroscience, as well as some of the political and historical information that surrounded developmental neuroscience at the time the study was conducted. The study of neuroscience can be broadly viewed as the study of understanding the physical reasons behind why individuals behave the ways that they do. To understand the causes of human actions at an adult level, however, the development of the brain must first be

understood in detail. The study conducted by Nelson, Fox and Zeanah is a study of how experiences effect a child’s brain development and the behavioral effects of different experiences. At the time the study was conducted, some information about brain development was already available, but the field is continuing to grow and develop exponentially. One of the commonly accepted ideas about brain development at the time of the experiment was that brains develop over time, starting just a few weeks after conception and continuing through adolescence. It was also accepted that the basic structure of the brain is predetermined by genetics but that experiences play a critical role in individualizing each individual’s brain. Finally, when this research was conducted, the field widely accepted that the timing of experiences greatly influenced the neural development of humans. The specific times in which experiences most greatly affect specific areas of development have been coined “sensitive periods”. During the time leading up to this study, there were a plethora of misguided facts circulating about developmental neuroscience that lead to public misunderstandings and misguided political legislation efforts. It was due to these misunderstandings that groups formed to help fund further research to provide more authoritative understandings of developing brains. It was the funding of one of these groups, the John D. and Catherine T. MacArthur Foundation, that allowed for this study to take place.

The John D. and Catherine T. MacArthur Foundation was founded around two principals: Individual experiences occur through the interaction of the environment and the brain and that individuality was formed through unique experiences as well as genetics. It is important to view experience as not something that just occurs upon someone, but as the interaction between the environment and the brain. The interactions that occur leave the opportunity for

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any experience to have a great effect on an individual's development, no matter how small the experience may seem. Also, the timing in which the experience occurs throughout development can have an impact on the effect that the experiences will cause. Due to the differences in development across different areas of the brain, the effects of experiences can differ across an individual's life depending on the maturity of different areas of the brain. While the pathways from different areas of the brain are somewhat predetermined through genetics, the customization of pathways for each individual occurs due to experiences.

Due to the importance of different experiences at different sensitive periods for development and the publication of several studies indicating large effects of the lack of constant caregiving on psychological development, the impact of institutionalization became an important area of study for the MacArthur Foundation. Previous research on the lack of care for young individuals had been conducted using animal subjects; due to ethical considerations, there had not been opportunities to study the effects on human children. The situation in Romania, following the overthrow of dictator Nicolae Ceaușescu, allowed for a unique opportunity for the study of institutionalized children due to the large numbers of children that had been turned over to the government for care in state-run institutions. Some studies were conducted on the children who had been adopted from these orphanages in Romania, but this study was the first that seemed to account for large variations in confounds that could have been present within those studies due to their failure to use randomized sampling.

The second chapter gave a detailed account of the study's design and the difficulties and requirements of beginning the actual study. There were numerous difficulties that arose due to the study taking place in a foreign country, one of which was the requirement of special equipment needed to evaluate the participants that were not readily available in Romania. Also, for the researchers to best execute their study, they required staff and liaisons present within Romania that could help them not only complete their experiments, but also communicate with government officials and citizens of Romania. Without these staff and liaisons, the study would not have been possible let alone efficient due to the barrier of language. There was a large amount of preparation that was required before the study could begin. Methods and procedures needed to be determined, staff needed to be trained, and participants needed to be found. In the end, participants were recruited from five different sectors within Bucharest, Romania. Each sector contained its own institution and this led to some discrepancies in the care that the children received due to differences in institutions themselves. One

important piece of information that was excluded by the authors was the reasoning for only using five of the six sectors within Bucharest instead of all six. The lack of inclusion of the data that could have been obtained from the children in the sixth sector could have altered the findings of the study and therefore this makes an opportunity for individuals to question the reliability of the study. The authors went on to explain that participants were randomly assigned to either the foster care or the institutional care groups by drawing out of a hat the identification numbers associated with individual children. The randomization of these individuals eliminated the potential of sample bias; however, as the authors indicated, there may have been an underlying yet unidentified sample bias due to the inability to understand why children had initially been institutionalized in the first place. The inclusion and exclusion criteria that the study used allowed for more validity of the study and less chance of statistical confounds. One of the most influential sets of data within this study was the inclusion of a comparison group of typically developing children within Romania. Due to the differences in environments between the United States and Romania, a unique control group was required because, without it, the researchers would not have been able to adequately associate any irregularities to the institutionalization itself because of the possible differences in development between the two nations. One possible confound that was created to avoid ethical problems was the agreement of the researchers to not interfere with changes that might occur for individual participants in either group. This agreement meant that some children in the institution group were adopted or returned to their families and while they were still studied, the data that was obtained was compiled with the data of the group they were initially apart of. The failure to differentiate these children could have had a large effect on the final outcome and analysis of the data. Another confound that was present that the authors mentioned was the inability to determine whether the differences observed between participants occurred due to the amount of time that they had been exposed to their condition or if they were due to the age at which they were assigned to their condition. This confound was present because of the variance in the age of the participants when the study began. While all children who were studied in the experimental conditions had experienced durations of time within institutional care, there were differences among the institutions themselves. There were some commonalities among all of the environments, however. One of these similarities was the highly regimented schedules of the institutions. Strict schedules were required to meet the needs of the large amount of children within the institutions and these regimented schedules reduce the ability of caregivers to interact with the children in a social way.

While each child encountered a large number of adults a day, the lack of personal interaction with these adults could be one of the reasons for some of the children had deficiencies in personal interaction in the futures.

The third chapter, “The History of Children Institutionalization in Romania”, described the societal reasoning behind the large number of institutionalized children within Romania. News about the deplorable conditions in which children frequently lived in Romania’s institutions did not reach the United States until October 5, 1990. It is important to note, however, that orphanages have been imperative to raising abandoned and parentless children for centuries. In fact, there were a large number of orphanages within the United States through the 19th century during which time they were flooded with children due to the loss of parents to disease and war. The majority of these institutions remained open until the 1970’s when foster care was established as a preferred alternative to institutionalization. The author even brings to light that while the majority of institutions for children are closed within the United States, there are still a small number existing that are used for short-term placement of children until they can be placed into a foster home or adopted. Childhood institutions became prevalent in Romania during Ceaușescu’s rule due to the emphasis on increasing Romania’s economy. Due to the widespread poverty that was present when Ceaușescu first took power, there was a high rate of abortion due to the inability for families to financially care for their children. Ceaușescu saw the high rates of abortion as a problem, however, because it reduced the number of future workers, and therefore he put a ban on abortion and created financial incentives for families to produce more children. Due to the loss of a strong family unit that occurred during the time of Ceaușescu’s rule, there was less support for child rearing and parents were left to abandon their children in state institutions where they were promised that they would receive better care than they would have been provided at home. The authors explained that there were many different types of institutions for different types of children throughout Romania. Children who were abandoned at birth or up until the age of three were all placed in an institution that was referred to as the Leagane. Upon turning 3 years of age, however, children were evaluated and separated based on their ability to become contributing members of society. Children who were deemed “normal” were sent to child homes that would eventually allow them public education. Children who were deemed “handicapped” or “incapable of ever entering the workforce” were sent to a different facility where they frequently were malnourished and received very little attention from workers. The process of placing children into different institutions based on their ability to perform later in life as successful contributors to the

workforce and society was described as being called “defectology”. This division of children was not done to benefit the children but instead to benefit the economy of Romania. The emphasis on improving society as a whole at the expense of individual children lead to an influx of problems once Ceaușescu’s rule ended. The country was faced with the problem of caring for tens of thousands of institutionalized children while there was still a large portion of parents abandoning their children and no foreseeable solution to the problem. Also, there was a problem of educating the people of Romania about the seriousness of the issue. While the majority of Romanian citizens were aware of the existence of institutions, they were not aware of the deplorable conditions in which the children lived and the detrimental effects the institutions had on neurological development. When the information became more widespread, the lack of an established foster care system created difficulty in finding alternative placement opportunities for abandoned children and the stigma of raising a child that was not of blood descent created a lack of interest in adopting the children. There was a large interest in adoption from individuals from different nations, however. For some time, there was a great influx in foreign adoption, but, due to fears of child trafficking and other sinister things that could happen to children, legislation was passed to restrict foreign adoption and eventually it was prevented all together. One of the obstacles that the authors had to overcome to conduct their study in Romania was explaining to the Romanian people and the Romanian government that the study did not in fact have ties to international adoption, but instead it looked to use the families in the country for foster care.

The entire fourth chapter focuses on the large amount of ethical consideration that arose due to the study’s use of an exceptionally vulnerable set of subjects. The authors managed to establish a legitimate need for the study due to the fact that the world as a whole has a legitimate interest in the ways that institutionalization has effects on children. The authors argued that they were not merely performing the study to understand the effects of institutions on children, but they were also looking for an effective solution to the problem. As far as the requirement to do no harm within their research, they reasoned that children were no worse off by participating in the study, in fact the group of children that were placed in foster situations were likely more well off than the children who remained in the institutions. One of the largest ethical impasses that the researchers encountered was the standard that studies without value make it unethical for people to participate, even if risks to them would be minimal and the fact that studies cannot become ethical prospectively, after they have been completed. The authors overcame these considerations because they determined that there was no

agreement among professionals about whether one intervention, institutionalization or foster care, was superior to the other. Therefore, by conducting the study, the authors could shed some light onto the optimal intervention for abandoned children that could lead to future improvements for children throughout the world. Also, the authors found it of utmost importance that they did not interfere with the future of the children due to their participation in the study. In other words, if the child were to be accepted into a foster home from an institution or adopted during the study, the child was not prevented from going to their new home, even if it was at the peril of the study's data, because it was in the child's best interest. Having addressed key ethical issues, the authors were still left with other ones because they were dealing with children. Every ethically sound study requires informed consent from the participants. There was a great difficulty in determining who was able to give consent for the children in the institutions due to the complexity of custody within Romania. In Romania, if a family abandoned their child to the state, doing so did not necessarily mean that they no longer had any power over the choices that were made for the children. For this reason, it was not just the state that had to be consulted about consent for the children to participate but also the parents of the children. Finally, due to the obligation of the researchers to provide sufficient care for the children following the study, one ethical obligation that the authors encountered was the necessity of providing funding for the children to be able to remain in foster care after the completion of the study.

The process of implementing foster care through the Bucharest Early Intervention Project (BEIP) was discussed in detail in chapter five. While the Ceaușescu era allowed for foster care of abandoned children, it was rarely practiced until the 1990's in Romania. The authors provided several possible explanations for the low rate of foster care, some of which include lack of financial and housing stability, the prejudices associated with institutionalized children, the lack of knowledge about the practice, and the lack of tradition associated with caring for abandoned children that are not of blood relation. Since the Romanian foster system was designed to be like the French foster system in which one of the foster parents is employed by the nation and paid a salary with benefits, there was also a lack of funding for widespread foster care within the country. By 1997, foster care as a system of intervention for abandoned children seemed to be making an appearance throughout Romania, however it still had not shown to be a common practice within the capital of Bucharest. In order to make BEIP successful, the authors indicated that they required skilled social workers from Romania and then they utilized the knowledge obtained from the foster care system of the United States to lead the worker in a

positive direction for how to run the program. One variable that the authors viewed as imperative for successful foster care was the sensitivity and individuality of the care that a child received. Due to the low probability of the children ever leaving the care of their foster parents, the foster parents were instructed to treat the child as if it were their own to ensure high quality of care and emotional support for the child. The parents who participated in BEIP were provided with extensive support from social workers, as well as physicians, to minimize the difficulty of assimilating into their newly formed family unit. The amount of support provided was contrasted with the support that foster parents receive within the United States, as it was explained that one of the areas of frustration within the United States foster system is the lack of support. For that reason, this study could have produced the opportunity for further study to investigate the effects of different levels of support for foster parents in reference to the productivity and development of foster children. Due to the low rate of foster care that was pre-established in Bucharest, the actual implementation of the BEIP required a large amount of planning and preparation. One of the largest obstacles that the BEIP social workers faced was the recruitment of potential foster parents for the program. The recruitment process was an intricate process that began with advertisements such as newspaper advertisements, radio advertisements, flyers, and more, and proceeded with verification and approval processes. For a prospective foster parent to be accepted into the program, they first had to verify their educational levels, employment history, and the absence of a criminal history. If participants passed this portion of the process, they were then interviewed and trained. One difference among the foster parents that could possibly be identified as a confound that the authors failed to evaluate is marital status. While the majority of foster parents were married, there were also mothers who were divorced, widowed, or who had never married. Having a male figure within the household or just two primary caregivers in general, could have led to more optimal results for child care than were present with only the mother. All foster parents were trained across more than 6 weeks on topics such as child's rights, Romanian child protection, the rights and obligations of foster parents, child psychology, and specialty training about children with disabilities. While this training had the potential to be useful, it would be of interest to understand the comprehension levels as well as effectiveness of the information that they were instructed on. Finally, the last step of recruitment for potential BEIP foster parents was the assessment of the attachment between the child and the parent. Due to legal complications there was frequently about a 2-month gap between child assessment and child placement. Once placement occurred, there were frequent

visits from the social workers to the families and, as time progressed, social workers were required to visit less and less often. To help the social workers perform at their best ability and therefore help the children develop in the best ways possible, one supervisor was hired to consult and supervise the social workers. Initially, the supervisor was utilized as a resource for educating the social workers on childhood development, attachment, and the challenges of foster parenting but, as time went on, the supervisor was relied upon more heavily as a resource for questions regarding the real life children and cases. Due to professional supervision being uncommon in Romania, there were some initial difficulties in communication between the supervisor and the social workers. The social workers seemed to be afraid that their conferences with the supervisor would affect their employment so they were hesitant to open up to the supervisor; however, over time, the communication improved and the relationships became much more effective.

The sixth chapter focused on the systematic effects of institutionalization on development. The authors referenced several studies that had previously been conducted on institutionalized children and that had found correlations between institutionalization and abnormal personality development, abnormal cognitive and motor development, and abnormal brain function and development. One area of measurements that were taken was head circumference, height, and weight. As shown in previous studies, it was observed that children who had been institutionalized for more than 6 months showed dramatically lower measurements on all three of these factors. When cognitive development was evaluated, it was observed that children who were raised in institutions, particularly when they entered the institution prior to 12 months of age, consistently displayed lower IQ scores than what was considered typical for their age. The authors then go on to describe several studies that have been conducted about the effects of institutionalization as well as adoption on IQ scores. The majority of the cases that were mentioned by the authors involved the recorded IQ scores of the institutionalized or previously institutionalized children being lower on average than the average IQ scores of normally developing children of the same age. One interesting finding that the authors described, however, was that sometimes children who left the institutions were able to recover and eventually reach IQ scores that were comparable with normally developing children. Another area of concern for development of institutionalized children that the authors identified was the deficits in executive functioning. Executive function levels can be evaluated by how well an individual is able to display inhibitory control, attention shifting, and the presence of a working memory. The authors recited data from previous studies that indicated

that the more amount of time a child spent within an institution, the lower their executive function abilities. Another area of development that seems to be impaired by institutionalization is language development. Studies on language development of adopted children indicated that previously institutionalized children suffered from greater language impairments than the average child. Due to the ability of internationally adopted children to learn the language of their new home, however, language is now beginning to be viewed as plastic and, therefore, there might be opportunities for children to improve their language skills upon removal from institutions. Due to the lack of a consistent caregiver within institutions, the authors raised a concern about the attachment and social and emotional development of institutionalized children. Through the aid of previously conducted research on attachment of previously institutionalized children, the authors concluded that children who were at one time institutionalized seem to display non-normative attachment and behaviors toward caregivers compared to the average child of the same age group. Previous research has also identified an increase in different forms of psychopathology among children who had previously been institutionalized. One major form of psychopathology that is frequently observed in previously institutionalized children is inattention/hyperactivity. There also seems to be an increase of the display of autistic-like behaviors among previously institutionalized children; however, one study that is referenced indicated that there was a dramatic decrease in the presence of autistic-like behaviors upon placement within more structured and individualized homes. Finally, previous studies using neuroimaging among institutionalized children were referenced to identify different possible areas of study for the authors during their study. Through the use of neuroimaging mechanisms, such as PET scans and MRI, several differences in brain structures have been identified between institutionalized children and normally developing children. Overall, there seems to be a reduction in white and gray matter, differences in amygdala volume, differences in hippocampal volume, and more. The introduction of these studies was essential to help understand the thought processes of the authors and how they decided what areas of development were likely to show differences between institutionalized children and the average developing child.

The evaluation of cognitive and language abilities of the BEIP children were described in the seventh chapter. Prior to randomization of group assignment, all of the participants in the study were administered the Bayley Scales of Infant Development to determine their base IQ scores. The authors were able to infer, based on the average baseline scores of the institutionalized children, that institutionalization has a profound effect on the development of normal

intelligence. The Bayley was again administered at 30 and 42 months of age so that comparisons could be made between the care as usual group (CAUG) and the foster care group (FCG) to determine if there was an effect of the foster care intervention and if the age of placement into foster care had an effect on intelligence levels. Through interpretation of the data collected, the authors could determine that the FCG children did have an improvement in intelligence scores compared to the CAUG children; however, they still were not able to reach the same intelligence scores as their normally developing, never institutionalized, peers. The authors also examined if the age of placement into foster care or the duration within foster care had an effect on IQ scores. It was found that, while duration of foster care had no effect on the FCG, the age at which the children entered foster care had a great effect on the IQ outcomes of the FCG. Children who were placed in foster care before the age of 24 months showed a difference in IQ scores when compared to children placed in foster care after 24 months. In fact, children placed in foster care after 24 months were similar in scores of the CAUG. This division of age indicates a critical period for intelligence around the age of 24 months; however, the inability of the FCG to reach IQ levels that were congruent with typically developing children indicates that there is another factor that influences these children. Next, a full scale IQ test called the WISC-IV was administered to all of the subjects. When data was analyzed by “intent to treat”, which means that the data was analyzed as if the subjects remained in their original treatment groups, even if they moved groups throughout the process through adoption or placement into a foster family, there was no significant difference between the FCG and the CAUG on the full scale IQ. When the data was reanalyzed, however, by the participants’ current placement status, a significant difference was found between the full scale IQ scores of participants in foster care and participants in institutions. Through analysis, it was also determined that children who remained in institutions throughout their entire lives showed a decrease in IQ scores throughout time. Along with IQ deficiencies, memory and executive functioning abnormalities have been studied for institutionalized children. Based on previous studies, the authors predicted that children with a history of institutionalization would have deficits in memory as well as executive functioning when compared with normally developing children. While deficits were expected, however, there was expected to be improvements in these areas for FCG when compared to CAUG. To evaluate inhibitory control, children were administered the “Bear-Dragon” test at 54 months of age. The “Bear-Dragon” test is a modification of the childhood game “Simon Says”. Then, at 8 years of age the children were evaluated again but with two separate event-related

potential tasks known as the “Go-No-Go” task and the Flanker task. In response to the “Bear-Dragon” test, children from the CAUG preformed very poorly with seemingly no inhibitory actions, the FCG were able to perform better than the CAUG; however, the same-age typically developing children performed better. The differences in test results between the three groups allowed the authors to infer that there was an effect of treatment on the previously institutionalized children; however, it was not sufficient enough to raise them to the level of the normally developing children within the community. For the “Go-No-Go” test that was administered at 8 years of age, just like in the “Bear-Dragon” task, there was an evident association of accuracy with group assignment. Once again, while deficits were identified between the previously institutionalized and the normally developing group, there was more of a deficit observed for the CAUG than the FCG. An unexpected and unique finding, however, was found when 8 year olds were administered the Flanker test, which is a study that evaluates a child’s ability to correctly respond to a stimulus while the stimulus is accompanied by distractor stimuli. The authors were unable to find a significant difference between the average error-related negativity (ERN) between all three groups. However, the researchers were able to identify a higher magnitude of ERN moderated responses with the foster care intervention group of the previously institutionalized children. This finding indicated that institutionalization leads to deficiencies in inhibitory control and error monitoring; however, the foster care intervention seems to help improve previously institutionalized children’s inhibitory control. Finally, cognition was evaluated using the Cambridge Automated Neuropsychological Test and Battery (CANTAB), a test that evaluates a wide variety of executive functions. It was found through administering the CANTAB that there were no significant differences between the CAUG, the FCG, or the never institutionalized group of normally developing children for the motor screening part of the test. There were, however, holistic discrepancies for the remaining areas of executive control that the CANTAB evaluates for both the CAUG and the FCG. Finally, language ability was monitored for all groups of children. By the time the groups reached 8 years of age, it was apparent that institutionalization had a substantial effect on language development. However, through foster care intervention, language ability was significantly improved for previously institutionalized children. Once again, there seemed to be a benefit to earlier placement within the intervention for the improvement of language; however, there seemed to be overall improvements throughout the FCG.

One unique quality of this study that was extremely useful was the use of brain-imaging methods to better

understand the effects of early institutionalization on brain development. The imaging techniques and findings of these evolutions were discussed in chapter eight. There were several methods utilized to better study the physical neural effects of institutionalization but the method that the authors seemed to rely on most heavily was electroencephalogram (EEG). An EEG is an instrument that records the electrical signals that travel through neurons as a means of communication; the instrument measures by having small electrodes placed on the scalp of the head and amplifying the voltage of the information that they receive. One of the primary difficulties that the researchers encountered regarding EEG was building the EEG laboratory and training staff on how to properly use it. Luckily, the researchers were able to ship equipment to Romania and set up a laboratory in one of the institutions. For EEG recordings, a Lycra stretchable cap was used with tin electrodes already sewn into the cap to ensure proper placement. Two areas of interest for data collection that could be identified about this electrode set up was the choice for using tin electrodes as well as the reasoning for using sixteen electrodes. Typically, in EEG recording, electrodes used are made out of silver–silver-chloride. Silver–silver-chloride electrodes are the preferred electrodes for EEG because they have less interface charge distribution and they are the least noisy and least susceptible electrodes to random drift over time. The number of electrodes used also raises questions about the research methods that were used traditionally when EEG's are administered a standardized 10–20 system is utilized the system involves 21 electrodes. Due to these slight changes, it would be difficult to compare the data that was collected during the BEIP to previous and future studies. This research setup, however, does allow for within study comparison between different subject groups and when comparisons were done; there were found to be significant differences in the EEG data between normally developing children and the previously institutionalized children. Before randomization, a baseline EEG was recorded for all of the children in the study. Then at 30 and 42 months, follow up EEG's were again recorded. At baseline, it was observed that institutionalized children had far lower power of electrical waves at specific frequency bands. The institutionalized children displayed more brain activity associated with lower levels of neural development than normally developing children, and normally developing children displayed more brain activity at higher frequency bands associated with higher neural development. At the first follow-up recording, there was only a very subtle change observed in the intervention group compared to the CAUG, however both groups still showed dramatically less high frequency waves than the typically developing children. At the second follow up EEG, however, there was

finally a noticeable difference between the recordings of the CAUG and the FCG when children who were placed in foster care were removed from institutionalization before the age of 24 months. The children from the FCG who had received the intervention before 24 months had EEG's that were seemingly indistinguishable from the EEG's of typically developing children. The identification of 24 months as a cut off time for optimal intervention effects indicates an age dependency for intervention. The fact that the differences in EEG frequencies did not appear between the FCG and the CAUG until the second follow up indicate a duration dependency for intervention. Event related potential (ERP) is a subset of EEG that is used to understand the amount of time that the brain requires to identify and process different stimuli. One of the most known studies that utilizes ERP is the study of adult face recognition. Due to the lack of exposure for faces, the authors predicted that institutionalized children would differ in the time required to process both familiar and unfamiliar faces. A baseline recording was taken for the three groups in the study. At baseline, three observations were made by researchers. First, the FCG and the CAUG groups both showed smaller amplitude responses to stimuli than the never institutionalized group. Second, both never institutionalized children and institutionalized children showed similar responses to stimuli when comparing the responses to unfamiliar faces compared to the response to their primary caregiver's face. Third, there was a difference in waves associated with memory when children from the institutionalized group were shown their caregivers' faces, while the group of children who had never been institutionalized showed no difference in response to both familiar and unfamiliar faces. These findings indicate that institutionalized children respond differently to both familiar and unfamiliar faces compared to children who had never been institutionalized. When follow up ERP's were taken for the children at the age of 42 months, the data observed was relatively identical to the baseline data. The lack of change from base line to 42 months indicates very little effect of intervention on children who were at one point institutionalized. Researchers also found it important to study the possibility of differences amongst facial emotional processing between the different groups due to the high importance in emotional processing in becoming a functioning part of society. At baseline evaluation of ERP's, it was found that children in the institutionalized group had greater responses to fearful facial expressions while children who had never been institutionalized showed greater response to sad faces. Similar to other areas of ERP's, the institutionalized children showed overall lower responses to all faces when compared to the never institutionalized group. At a 42 month follow up, it was observed that, while the

institutionalized group still showed global reductions in responses to facial emotions, there seemed to be improvement within the FCG which allowed them to fall between the CAUG and the normally developing children. When the data was statistically analyzed, however, there was not a significant difference among the responses of all groups and, therefore, the authors indicated that there likely was not a significant effect of institutionalization on the ability to discriminate between facial emotions. Overall, through these brain-imaging techniques, it can be concluded that the foster care intervention allows for adequate improvement of neural activity and development that is not observed for children who remain institutionalized.

The institutional effects on growth, motor and cellular development are discussed in detail in the ninth chapter. In reference to physical growth, institutionalized children are known to be significantly smaller than normally developing children. The authors discussed two possible reasons for stunted growth, one being that children are undernourished and the second being that the brain fails to produce the hormones necessary for growth. Through the observation that with removal from institutions the FCG was able to significantly increase in height and weight, the authors reasoned that they had significant evidence to support the theory that the lack of calorie intake by institutionalized children was the reason for stunted growth. One area of growth that the FCG was unable to achieve normal measurements for, even after intervention, was head size. It was observed that effectiveness of intervention seemed to be duration dependent, however not time dependent. This means that no matter the age at which a child was placed into foster care, they seemed to make significant improvements in the area of growth after a specified amount of time, which was observed to be 12 months during this study. An interesting observation that was noted by the authors was that there was a relationship between growth and IQ. It was observed that as the FCG caught up to normal growth levels, their IQ's also increased. A striking observation by researchers was the presence of stereotypies among the CAUG and FCG. Stereotypies are repetitive movements that are thought to be the result of the lack of proper stimulation during development. Through caregiver reports and coded videos, it was determined that there was a higher rate of stereotypies among the CAUG than the FCG and there was no occurrence of stereotypies among the normally developing children. This difference in the occurrence of stereotypies indicates that the foster care intervention lead to improvements and reduction of stereotypies. Previous research studies had indicated that institutionalization led to delays and impairments in motor developments. With the use of the Bruininks-Osteretsky Test of Motor Proficiency, researchers were able to evaluate the presence of motor impairments and delays.

Through the application of the test, it was found that there was a difference in motor development between the institutionalized children and the children who had never been institutionalized; however, there was no difference between the CAUG and the FCG. These findings indicate that institutionalization has a significant effect on motor development while the foster care intervention was not able to improve development. Finally, the authors wanted to evaluate if institutionalization had a cellular effect. Telomeres, specialized nucleoprotein complexes located at the end of all chromosomes, are thought to be sensitive to stressors and, when individuals are under large amounts of stress, telomeres are thought to shorten in length. Researchers analyzed the telomere length of typically developing children and then compared them to the length of institutionalized children. Analysis identified that there was an association between telomere length and time of institutionalization. There was, however, a difference in the effects of institutionalization on the different sexes. The authors were able to determine that early stressors associated with institutionalization had greater effects on the telomere length of females, while cumulative stresses associated with institutionalization had a greater effect on the telomere length of males. These differences among institutionalized children on growth, motor development and cellular development have a variety of future implications that would require further research to better understand.

Socioemotional development among institutionalized children was discussed in chapter ten, particularly in reference to attachment. The researchers utilized an adaption of the strange situation test as well as a variety of different tests in order to evaluate attachment tendencies for the different groups of children. First, emotional expression was evaluated for the children. The Laboratory Temperament Assessment Battery (LABTAB) was used to examine the individual differences between children in reference to their emotional expressivity. The LABTAB was able to identify increases in negative expressions of emotion among institutionalized children compared to normally developing children. A large effect of intervention was identified, however, with the FCG displaying significantly more positive expressions compared to similarly aged children within the CAUG. The Strange Situation Procedure, a procedure in which a child is observed for their reactions in the presence of their primary caregiver, for their reactions when the caregiver leaves, and their reactions upon reunion with their caregiver, was utilized to analyze the attachment tendencies of the different groups of children. Typical responses to the Strange Situation Procedure normally lead to children being divided into four different groups of attachment types. The first type of attachment, secure attachment, is thought to be the most

normal form of attachment, in which children are distressed by separation from their primary caregiver and seek the comfort of their caregiver upon their return. The second form of attachment, which consists of a very small proportion of children, is ambivalent/resistant attachment which is assigned to children who are distressed by separation from their primary caregiver; however, they are not comforted when the caregiver returns. Avoidant attachment, a third form of attachment, is assigned to children who do not react to separation from their primary caregiver and in some instances they avoid and ignore their caregiver when they return from separation. Finally, a fourth form of attachment involves children who do not have an organized strategy for comfort and instead display fearful behaviors are considered to have disorganized attachments. The authors described the distribution of different attachment types among typically developing children and institutionalized children. For typically developing Romanian children, 74 % were identified as having secure attachments, 4 % had avoidant attachments, and 22 % were found to have disorganized attachments. In contrast, 18 % of institutionalized children were found to have secure attachments, 3 % had avoidant attachments, 65 % were found to have disorganized attachments, and 13 % were unable to be classified in any of the attachment categories due to their lack of identifiable attachment behaviors. Along with abnormal attachment type proportions among institutionalized children there are also a large proportion of attachment disorders. There are two patterns of Reactive Attachment Disorder (RAD) that the authors examined in detail. These two patterns include an emotionally withdrawn/inhibited pattern, which involves the child displaying little to no attachment characteristics when they are distressed and lesser emotional regulatory abilities, and the and an indiscriminately social/disinhibited pattern, which involves a lack of discrimination between familiar and unfamiliar adults when seeking the attention and attachment of others. By using caregiver interviews, the authors were able to identify a high rate of both withdrawn/inhibited and social/disinhibited attachment disorders among the institutionalized children. An interesting finding, however, was that the length of time a child was institutionalized did not correlate to the presence of RAD. Fortunately, when the effectiveness of intervention was evaluated, there seemed to be an improvement for children who had previously been identified as processing withdrawn/inhibited RAD. Unfortunately, however, there was a much smaller effect of foster care on children who had previously been identified as having signs of social/disinhibited RAD. While RAD indicates abnormal attachment with caregivers, the authors also found it imperative to investigate the effects of institutionalization on social relationships with peers. With the use of the Social Skills

Rating System (SSRS) researchers were able to identify an overall discrepancy in the ability of institutionalized children to interact with unfamiliar peers. Within intervention, there seemed to be an overall improvement in social interactions among children who were previously institutionalized, but the timing of placement of the children into foster care greatly affected this observation. Overall, it was found through the techniques described in chapter ten that institutionalization has a profound effect on the social capabilities of developing children, which is logical given that they experience such distorted forms of interactions within their caregivers. The information found in this part of the study could be used in future situations as a tool to better understand how to improve the interactions between institutional caregivers and children to culminate in the best possible social outcome for the children.

Finally, chapter eleven identifies different psychopathologies frequently associated with institutionalized children. Previous studies have indicated that children who had been institutionalized at one point in their early life seemed to display a higher proportion of psychopathologies in comparison to their normally developing peers who had never been institutionalized. The Infant Toddler Social Emotional Assessment (ITSEA) was used to assess children at baseline for indications of psychopathology. The ITSEA is a normalized caregiver administered questionnaire that evaluates a child based on externalizing problems, internalizing problems, dysregulation, and overall competence. Since the ITSEA is normalized, the authors were able to evaluate the baseline scores of children compared to normally developing children. Previously institutionalized children showed no distinguishable differences from the group of children that had never been institutionalized in their externalizing, internalizing, and dysregulation scales. The authors were surprised by this finding; however, they indicated that it may be because children were too young to be able to truly identify psychopathology precursors. At 54 months, children were reevaluated for precursors of psychopathology and a difference was identified between groups. The authors found that children who had a history of institutionalization were 53 % likely to have a psychopathological disorder while normally developing children from the Romanian communities were only 20 % likely to develop psychopathologic disorders. One positive finding, however, was a significant intervention effect on the occurrence of psychopathology. The researchers were able to find that children who had been placed in the FCG were 46 % less likely than the children placed into the CAUG. This finding has significant implications for the support of foster care as a replacement for institutionalization because children who are institutionalized are far more likely to develop psychopathological disorders than children reared in foster

care. Once there was found to be a significant difference on psychopathology due to intervention, the authors found it important to identify potential moderators of the intervention. It was found that males displayed more precursors to psychopathology compared to females regardless of the environment in which they were raised. Timing of placement into the intervention, however, did not appear to be a moderator of the intervention because there were no significant differences between the displays of psychopathological precursors based on the age at which children were placed in foster care. The possibility of genes as a moderator for intervention was explored by the authors as well; however, genes were proven to be much more complicated for determining the probability of moderation. The authors were able to find a genetic variation that lead to a higher likelihood of depression, attachment, and externalizing behavior that moderated intervention effects based on the ability of individuals to regulate neurotransmitters in the brain. Also, in reference to genetics, the researchers were able to identify a set of polymorphisms associated with the most positive outcomes based on intervention. Another effect of intervention that was analyzed by the authors was the mediators of intervention, which are factors that explain the mechanisms for intervention. The authors were able to identify the fact that the ability to form secure attachments had the greatest effect on maximizing intervention effects and minimizing the chance of psychopathology. Finally, the authors investigated the relationship between institutionalization, brain functioning, and behaviors. With the help of EEG, the researchers were able to determine that the presence of ADHD or at least ADHD like behaviors may be more prevalent in children with a history of institutionalization due to lack of development within the prefrontal cortex which leads to the inability to inhibit hyperactivity and the occurrence of inattention. It was also found that these same children seemed to have underdeveloped temporal lobes, which would explain the high rates of impulsivity that occurs within children with a history of institutionalization.

The final chapter of the book, chapter twelve, summarizes all of the findings of the study and the implications of these findings. Through the Bucharest Early Intervention Project (BEIP), the authors were able to identify invaluable data on the effects of institutionalization and adolescent

neurodevelopment. Due to the randomization of the study, researchers were able to identify that the cause of changes within neurodevelopment did indeed occur due to the foster care intervention. Information critical to policy implications that that authors were able to identify is that there seems to be a timing effect on the effectiveness of intervention. The fact that not all areas of development improved with intervention gave greater support to the fact that institutionalization of children should be avoided at all costs for all ages. The findings of the study also create a dialog for creating new alternatives to institutionalizing abandoned children throughout the world. There has been a new push for both foster care and adoption, domestic and international. Unfortunately, due to the stigmas associated with international adoption, there is still need for better regulatory practices and education to allow for children that require placement in loving families to receive the care that they need. Since the time that the BEIP results were published, there have been movements by the Romanian government, the United States government, and the European Union to reduce the number of children in institutions in order to provide them with the best possible developmental outcomes. While some of the methods utilized for the BEIP could be deemed ethically questionable, the findings that it produced were instrumental for the future development of children in the world today.

Given that the Bucharest Early Intervention Project was such a complex, diverse, and thorough investigation of the systematic effects of institutionalization, the authors were able to convey their ideas and findings in an effective and comprehensible way. While there were incidents when the authors seemed to go into more than enough detail about the studies that they were conducting, it was important to remember that the authors had to explain the previous work that lead them to investigate the institutionalization of children and why they chose the evaluative tools that they did. The findings of this study have already lead to a wide variety of policy changes throughout the world and, over time, the information collected will lead to improvements in the care for abandoned children, which could change their lives forever. Due to the research conducted by Nelson and his team, the world can now definitively identify dramatic systematic effects of institutionalization on adolescent development.