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Postinstitutionalized Children's Development: Growth, Cognitive, and Language Outcomes

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Abstract

Objective—Children adopted internationally from institutions are a growing population presenting to professional care providers. Although postinstitutionalized (PI) children are adopted from multiple world regions, current knowledge is predominantly based on those adopted from Romania and Eastern European countries. This study examines and compares developmental outcomes of PI children adopted from multiple world regions.

Method—Five to 11 years after adoption, 8- through 11-year-old PI children (N = 91), children internationally adopted early from foster care (N = 109), and nonadopted children (N = 69) completed screening measures assessing vision, hearing, growth, and cognitive and language abilities. Parents completed questionnaires on service utilization, school performance, preadoptive history, and postadoption environment.

Results—Forty-four percent of PI children's growth was stunted (height <10th percentile) at adoption. At assessment, although physically smaller, nearly all PI children had average growth parameters. Relative to nonadopted children and children adopted early from foster care, PI children performed more poorly on cognitive and language screens with increased time in institution related to lower performance. Notably, group means on these measures were within the average range. PI children were more likely to be falling behind academically and to use intervention services. Family environment did not differ between PI and nonadopted children. There were few differences for PI children by world region of adoption once accounting for duration of institutionalization.

Conclusions—Despite currently living in similar environments, PI children have specific needs that differ from early-adopted and nonadopted children. Consideration of multiple factors, including length of institutionalization, is essential when providing care for these children.

Keywords

institutional care; early deprivation; international adoption; physical growth; school performance

Throughout recent decades, the number of children adopted into the United States from institutional (e.g., orphanage) conditions overseas has grown. Between 1998 and 2008, >215,000 children entered the United States through adoption,¹ with estimates that 85% of internationally adopted children spend some or all of their lives in institutions before adoption. 2 Conditions within these institutions are often marked by high levels of deprivation. For example, children in these settings are often undernourished, receive poor medical care, spend

much of their time unoccupied, and quality of their interactions with caregivers is frequently poor.³ Institutionalized children may be left in cribs or placed on the floor to play alone, thus resulting in inadequate motor and cognitive stimulation.² Postinstitutionalized (PI) children come from all regions of the developing world. They represent a significant and growing population with specific needs to be addressed by medical and school professionals. However, our knowledge of these children's developmental outcomes relies primarily on studies of PI children adopted from Romania and other Eastern European countries⁴; there have been relatively few reports on the development of children adopted from institutions in Asia or South America.^{5,6} Therefore, one goal of this analysis was to provide a more general description of physical growth, cognitive, and language outcomes for PI children from countries in South America and Asia, as well as in Eastern Europe. Because outcomes for PI children may reflect risk factors associated with abandonment such as poverty, prenatal adversity, parental loss, or growing up as adopted children in a culture different from their natal culture, we also studied 2 comparison groups to help isolate the effects of institutional care. One comparison group included children who were internationally adopted but experienced primarily foster care before adoption. The other comparison group included children who were born and raised in US families currently living in the same communities as the internationally adopted children. Because we were also interested in whether children adopted from institutional care in Eastern Europe, South America, and Asia differed, a second goal of the analysis was to examine whether outcomes within the PI group varied by region of origin after controlling for duration of institutional care before adoption.

Adopting a child from overseas can be a rewarding, yet exhausting process. Adoptive families often spend months wading through the necessary steps to adopt and bring their child home.⁷ These challenges continue as the children transition to their new home. During this initial period of adjustment, internationally adopted children may demonstrate feeding and eating difficulties and sleep disturbances.⁸ Physical health concerns and developmental delays are quite prevalent. Studies examining the health of children at their initial pediatric visits postadoption consistently note delays in height, weight, and head circumference.^{9–11} These growth deficits are linked to the amount of time the internationally adopted child spent in an institution: children lose approximately 1 month of linear growth for every 3 months in institutionalized care.² Infectious diseases are another concern for newly adopted children. High incidences of hepatitis B and intestinal parasites are often described at arrival.² Finally, developmental delays in cognition, motor development, and language at the time of arrival are also common for PI children¹² and have been documented for children adopted from various countries of origin including China,⁵ Guatemala,⁶ Romania,^{4,10} Russia, and Eastern Europe.⁹

Although much information is available about the medical and developmental profile of children adopted internationally when they first arrive in their adoptive homes, less is known about functioning in the years postadoption. There is significant evidence of recovery during the first few years after arrival. Internationally adopted children demonstrate considerable catch-up growth, particularly in height and weight.^{2,11} Catch-up is also noted for developmental outcomes. After only a few years in adoptive families, children adopted from dire conditions in Romania demonstrated significant gains in their developmental abilities for age.^{4,10} For example, Ames¹⁰ noted gain of 2 developmental quotient points per month in the adoptive home. However, the degree of recovery is often related to the amount of time spent in an institution before adoption and the age at which the child was adopted. Children adopted at older ages have been found to display relatively poorer cognitive outcomes compared with those adopted younger.^{10,13,14} As indicated earlier, much of the current information regarding medical and developmental outcomes years after adoption is based on the PI children adopted from Romania and other areas of Eastern Europe. However, a very small number of immigrant visas have been issued by the United States to children adopted from Romania since 2004.¹ This leaves questions regarding whether children adopted from Asian and South American

countries or other countries in Eastern Europe display similar outcomes to the Romanian adoptees years after adoption. The current study sets out to provide information regarding the long-term growth and functioning of PI children adopted from a range of countries.

METHOD

Participants

The participants were 269 8- to 11-year-old children from 3 early life experience groups. The first group was postinstitutionalized (PI) internationally adopted children ($n = 91$, 54 girls) who were adopted at 12 months of age or older and spent 75% or more of their preadoptive lives in institutional care. Nearly 70% of this group experienced only institutional care before adoption. The second group was children internationally adopted early, predominantly from foster care (early adopted/foster care [EA/FC], $n = 109$, 53 females) who were adopted at 8 months of age or younger having spent no >2 months in institutional care. Almost 65% of the EA/FC children experienced only foster care before adoption. Those who experienced institutional care were adopted before 3 months of age. The remaining children from both adoptive groups experienced a combination of early caregiving settings (e.g., institutional care, foster care, and relative care). Descriptive adoption data are shown in Table 1. The third group was nonadopted (NA) children raised continuously in their biological families in the United States. The groups did not differ in age at assessment (PI: $M = 10.1$, $SD = 1.3$; EA/FC: $M = 10.2$, $SD = 1.2$; NA: $M = 10.4$, $SD = 1.1$). As expected, children in the EA/FC group had spent longer time in their adoptive families than PI children (Table 1).

Recruitment

The children were recruited to participate in a series of neurocognitive studies. The health, cognitive, and language measures included in the current study were collected to screen participants for subsequent studies and provide descriptive background information. Internationally adopted children were recruited from the Minnesota International Adoption Registry of families interested in participating in research, which reflects approximately 60% of children adopted internationally through Minnesota adoption agencies over the years included in this report.¹⁵ Ninety-two percent of internationally adopted children contacted agreed to participate in the current study. Children in the NA group were recruited from a university registry of families from the local community who were interested in having their biological children participate in research. Typically, about 70% of children contacted from this university registry agree to participate.

To reduce the likelihood of group effects because of prenatal and congenital conditions versus postnatal adversity, children were screened for known genetic conditions (e.g., Down syndrome), congenital anomalies, neurological conditions, and medically diagnosed fetal alcohol spectrum disorder (FASD) as reported by the parent at the time of recruitment. Photographic screening was completed during the laboratory assessment to detect facial features associated with the FASD. Digital pictures of the participants were taken and analyzed using the Fetal Alcohol Syndrome Facial Photographic Analysis Software,¹⁶ which has been used across racial/ethnic groups.¹⁷ The 2004 Centers for Disease Control and Prevention guidelines regarding FASD-associated facial dysmorphism (i.e., smooth philtrum, thin vermilion border, and small palpebral fissures) were used to screen for these facial features. Consequently, 12 children were screened but excluded from our final sample of 269 because of the parent report of FASD diagnosis (PI: $n = 5$), FASD facial photographic screening for children whose parents did not report an FASD diagnosis (PI: $n = 2$, EA/FC: $n = 1$); cerebral palsy (PI: $n = 1$); seizures (EA/FC: $n = 1$); Marfan syndrome (NA: $n = 1$); and Autism (NA: $n = 1$). No sibling pairs, adopted or nonadopted, were included in these analyses.

Assessment Procedures

All procedures were approved by the institutional review board. Consent and assent were obtained before data collection. Assessments were completed in a laboratory setting and were videotaped to ensure reliability of administration. Videotapes were scored by independent raters trained to 90% reliability. After training, sessions in which coders were <90% reliable were conference coded to resolve discrepancies. Parents observed the assessment through a closed-circuit television. Child participants received a small gift certificate for participation.

Measures

Questionnaires

Parents answered questions from the Minnesota International Adoption Project Survey,¹⁵ regarding their child's prematurity, educational performance (6-point scale ranging from [1] excels in most subjects to [6] falling behind in most subjects), and use of educational or medical services including whether the child has an individualized education program or receives any therapies (e.g., speech/language, physical/occupational, sensory, adapted physical education, and mental health services). In addition, adoptive parents answered questions regarding the child's experiences of care before adoption.

Parents provided information on annual household income (11-point scale ranging from [1] < \$15,000 to [11] \$200,001 or higher) and parental education. A modified parent-report version of the Home Observation for Measurement of the Environment¹⁸ was collected to assess the presence of stimulating objects and experiences. Parents completed the Child Life Events Scale¹⁹ to measure the occurrence of stressful life events (e.g., move to new home, parental job loss, and addition of new sibling to family). Nonadoptive parents reported on event occurrence since their child's birth, whereas adoptive parents reported on event occurrence since their child's adoption.

Vision and hearing screening

Far and near vision were assessed using 2 symbol-based vision tests.^{20,21} Vision in each eye was tested separately. Participants requiring corrective lenses wore them during this screen. Participants passed the vision tests if they correctly identified at least half of the symbols at a Snellen fraction of 20/40 or better on both tests with each eye. Hearing was assessed using an audiometer²² at frequencies of 500, 1000, 2000, and 4000 Hz. Based on American Speech-Language-Hearing Association²³ standards for school age children, responses were scored as pass/fail, with passing defined as responding twice to a tone of 25 dB or less at a frequency of 500 Hz and tones of 20 dB or less at frequencies of 1000, 2000, and 4000 Hz.

Physical growth measurements

Current weight, height, and head circumference (occipito-frontal circumference [OFC]) were measured. Parents provided birth physical measurements and, for internationally adopted children, measurements from the first medical examination postadoption. If this information was unknown, permission was obtained to acquire the child's medical records. A majority of the first postadoption medical examinations were reported to occur within the first month of adoption (range <1–11 months). In cases of known prematurity, physical measurements at birth were excluded from analyses. All physical growth measurements were compared with 2000 Center for Disease Control and Prevention growth norms for boys and girls using Epi Info²⁴ to determine standardized scores for height, weight, and OFC. Centers for Disease Control and Prevention growth norms were not available for OFC after the age of 36 months; therefore, standardized OFC at the assessment session was not derived. Growth delay for height, weight, and OFC was defined as standardized scores ≤ -2 .

Intellectual quotient

Intellectual quotient (IQ) was estimated using the block design and vocabulary subtests of the Wechsler Intelligence Scale for Children-Third Edition (WISC-III).²⁵ These 2 subtests correlate highly with Full Scale Intelligence Quotient.²⁶ Both subtests of the WISC-III were converted into scaled scores with a mean scaled score of 10 and SD of 3. The Leiter International Performance Scale-Revised,²⁷ which provides a nonverbal measure of intellectual functioning, was administered to participants (PI: 23.1%, $n = 21$, EA/FC: 7.3%, $n = 8$, NA: 1.4%, $n = 1$, $\chi^2(2) = 21.22$, $p < .001$) who scored $>1SD$ below the mean on either WISC-III subtest. Two PI children did not complete the Leiter because of fatigue.

IQ was estimated based on the child's performance on the 2 WISC-III subtests. The resultant scaled scores from block design and vocabulary were each multiplied by 5 and summed to produce an estimated sum of scaled scores. An estimated full scale IQ, with a standardized mean of 100 and SD of 15, was derived from this sum. For children requiring a Leiter based on the WISC-III subtest performance, the Leiter Brief IQ score was used instead of the WISC-III estimated IQ score.

Language

The Paragraph Comprehension subtest of the Comprehensive Assessment of Spoken Language²⁸ was administered to measure auditory comprehension of syntax in spoken narratives. Paragraph Comprehension involved reading stories aloud to the participants and asking questions pertaining to the stories. Raw scores were converted into standard scores with a mean standard score of 100 and SD of 15. The Concepts and Following Directions subtest of the Clinical Evaluation of Language Fundamentals, Fourth Edition²⁹ was administered to evaluate the ability to interpret and respond to spoken directions of increasing length and complexity, which contain concepts that require logical operations. This task required participants to remember the names and characteristics of objects and the order in which objects were mentioned by identifying the objects from among several pictured choices. Raw scores were converted into scaled scores with a mean scaled score of 10 and SD of 3. Of the 269 participants, 225 children (PI = 77, EA/FC = 103, NA = 45) completed the Comprehensive Assessment of Spoken Language and Clinical Evaluation of Language Fundamentals, Fourth Edition. These measures were dropped from study protocol once we were no longer running studies that required controlling for language outcomes and to reduce the length of the session.

Data Analyses

All analyses were conducted using SPSS 16.0 for Windows. Group differences were analyzed with analysis of variance with group and sex as independent variables. Unless otherwise noted, there were no main effects of sex or interactions between sex and group. Significant main effects were explored using Tukey's Honestly Significant Difference procedure. To examine effects associated with birth region within the PI group, analyses of covariance were performed with duration of institutionalization as a covariate and region-of-origin as independent factors: Asia (duration of institutionalization, $M = 18.5$ months, $SD = 9.0$ months), South America (duration of institutionalization, $M = 21.4$ months, $SD = 16.7$ months), and Russia/Eastern Europe (duration of institutionalization, $M = 27.9$ months, $SD = 15.5$ months). Note that because only one child was adopted from Africa, it was excluded from birth region analyses. Pearson correlations were used to determine relations between the outcomes and time in the institutional care. Categorical measures were analyzed using Pearson χ^2 . Significance for all analyses was set at $p < .05$.

RESULTS

Health-related Outcomes

Vision and hearing—The groups did not differ in the number of children failing the vision (with corrective lenses) (postinstitutionalized [PI] = 9.9%, early adopted/foster care [EA/FC] = 8.3%, nonadopted [NA] = 8.7%; $\chi^2(2) = 0.17$, NS) and hearing (PI = 16.5%, EA/FC = 14.7%, NA = 11.6%; $\chi^2(2) = 0.76$, ns) screens. There was no region-of-origin difference among PI children in the number failing either screen (vision: Russia/Eastern Europe = 7.1%, South America = 28.6%, Asia = 9.8%; $\chi^2(2) = 3.07$, NS; hearing: Russia/Eastern Europe = 19.0%, South America = 0%, Asia = 17.1%, $\chi^2(2) = 1.58$, NS).

Birth data—For children with birth measurement data, PI and EA/FC children had lower birth weights than NA children. EA/FC children also had shorter birth length than both NA and PI children and smaller birth OFC than NA children (Table 2). Notably, mean birth growth measurements all fell within the broad average range. PI children were more likely to have missing birth data (prematurity unknown: PI = 53.8%, EA = 16.8%, NA = 0%; $\chi^2(4) = 71.17$, $p < .001$), and among PI children, missing data were most prevalent for children adopted from South America and Asia (prematurity unknown: Russia/Eastern Europe = 23.8%, South America = 85.7%, Asia = 78.0%, $\chi^2(4) = 27.90$, $p < .001$); however, for children with these data, there was no region-of-origin difference in birth measurements.

Physical growth at adoption—PI children had lower height and weight at adoption than EA/FC children (Table 2). More PI children had growth delays at adoption in height alone ($\chi^2(4) = 14.89$, $p < .001$; PI: 43.5%, EA/FC: 16%), weight alone ($\chi^2(4) = 28.54$, $p < .001$; PI: 48%, EA/FC: 11%), and both height and weight ($\chi^2(4) = 11.93$, $p = .001$; PI: 30%, EA/FC: 9%). There was no difference for OFC. Within PI children, there was no region-of-origin difference in growth at adoption (Table 3), nor was there a relation between duration of institutionalization and growth measurements.

Physical growth at current assessment—PI and EA/FC children had shorter height at the assessment than NA children (Table 2). For weight, PI children had lower assessment weight than EA/FC and NA children. Frequency of growth delays was similar across groups (height: PI: 1%, EA/FC: 0%, NA: 1.5%, $\chi^2(2) = 1.49$, $p = \text{NS}$; weight: PI: 4.5%, EA/FC: 2.8%, NA: 1.5%, $\chi^2(2) = 1.22$, $p = \text{NS}$). Among PI children, duration of institutionalization was not correlated with assessment height or weight. However, South American adoptees had larger heights and weights than those from Russia/Eastern Europe and Asia (Table 3). Russian/Eastern European adoptees also had larger weight than Asian adoptees.

Academic Performance and Service Utilization

PI children were more likely to be reported as falling behind in some or most school subjects and less likely to be reported as excelling in most subjects (Table 4), $\chi^2(10) = 48.49$, $p < .001$. PI children (24.7%) also were more likely than EA (8.7%) and NA children (3%), $\chi^2(2) = 18.65$, $p < .001$, to have an individualized education program. The most common disabilities listed on individualized education programs were speech/language impairment (45%), specific learning disability (32%), and emotional/behavioral disability (16%). PI children were also more likely to use or have used language/speech therapy ($\chi^2(2) = 12.06$, $p < .01$; PI: 25.3%, EA/FC: 11%, NA: 7.4%) and physical/occupational therapy currently ($\chi^2(2) = 8.77$, $p < .05$; PI: 15.4%, EA/FC: 6.4%, NA: 2.9%) with a trend toward significance for sensory therapy use ($\chi^2(2) = 5.16$, $p = .07$; PI: 7.7%, EA/FC: 5.5%, NA: 0%). Among PI children, although there was no difference across region-of-origin in reported school performance, region was associated with having an individualized education program ($\chi^2(2) = 6.353$, $p < .05$, Russia/Eastern Europe: 34.1%, South America: 42.9%, Asia: 12.5%) and using language/speech

therapy ($\chi^2(2) = 8.85, p < .05$, Russia/Eastern Europe: 33.3%, South America: 57.1%, Asia: 12.2%).

Cognitive Outcomes

The means for estimated intellectual quotient (IQ) were in the average range for all groups (Table 5). However, PI children scored lower than EA/FC children, who, in turn, scored lower than NA children on estimated IQ. Analyzing the 2 subtests of the Wechsler Intelligence Scale for Children-Third Edition separately (Table 5), PI children scored below NA children on both the block design and vocabulary subtests; however, EA/FC children only scored lower than NA children on the vocabulary subtest. Using the estimated IQ measure, more PI children (7.7%) than EA/FC (1%) and NA (0%) children fell into the borderline or extremely low IQ range, $\chi^2(2) = 11.01, p < .01$. Removing these children from the analysis did not eliminate the group difference in IQ scores [$F(2,253) = 18.36, p < .001$]. Among PI children, there were no region-of-origin differences in estimated IQ (Table 5). However, living longer in an institution before adoption was associated with poorer cognitive functioning: estimated IQ, $r = -.36, p < .001$; block design, $r = -.25, p < .05$; vocabulary, $r = -.53, p < .001$.

Language Outcomes

PI children scored lower than EA/FC and NA children on both the Comprehensive Assessment of Spoken Language and Clinical Evaluation of Language Fundamentals, Fourth Edition (Table 5). For PI children, there were no differences across region-of-origin (Table 4). However, duration of institutionalization was associated with poorer performance on the Paragraph Comprehension (Comprehensive Assessment of Spoken Language: $r = -.36, p = .001$) and Understanding and Following Directions (Clinical Evaluation of Language Fundamentals, Fourth Edition: $r = -.35, p < .01$) subtests.

Postadoption Environment

Finally, we examined whether differences in outcomes between PI children and children in the 2 comparison groups might be due to qualities in the postadoption environments. First, we examined whether the groups differed in postadoption family income, parent education, or presence of stimulating activities provided to the child (modified parent-report version of the Home Observation for Measurement of the Environment [HOME]). There were no group differences in family income, $\chi^2(18) = 18.73$, NS (median range: \$75,000 – \$100,000). Education level of the parent who accompanied the child to testing did not differ by group, $\chi^2(8) = 9.35$, NS (40% bachelor's degree or higher). Education level of the other parent did differ by group, $\chi^2(10) = 20.27, p < .05$, but the difference was between the EA/FC group and both the PI and NA groups. Specifically, the second parent's education was higher for EA/FC children (60% of Masters degrees and 56% of Professional/Doctorate degrees). PI parents endorsed one fewer on the modified parent-report version of the HOME than did parents of children in the other groups (PI: $M = 20.6, SD = 2.7$, EA/FC: $M = 21.2, SD = 2.9$), $F(2,266) = 4.07, p < .05$. However, regardless of group, parents endorsed an average of approximately 75% of modified parent-report HOME enrichment items. The groups did not differ on the number of life events experienced, even after adjusting for the time the children lived with their family, $F(2,267) = 0.28$, NS. Next, we examined whether these measures might help explain differences in outcomes for PI children by computing partial correlations within the PI group, controlling for duration of institutional care. None of the partial correlations achieved the .05 level of significance. We also examined whether PI children adopted from different regions of the world were exposed to different postadoption family environments. No differences in postadoptive family income, parent education, life events, or home enrichment items were found across region of origin.

DISCUSSION

The goal of this study was to provide information on the impact of early institutional deprivation on the development of internationally adopted children adopted from various world regions. After an average of 8 years in the adoptive families, children adopted from institutions were distinguishable from other children, including children adopted internationally from foster care, on screening measures of physical growth, parent reported medical needs and academic abilities and several general cognitive and language tasks. With the exception of physical growth measures, there was little evidence of regional differences in measures once duration of institutional care was taken into account. That is, the length of time the child spent in institutional care mattered more in predicting outcomes than the region of the world from which the child was adopted.

These results were obtained even though the families into which these postinstitutionalized (PI) children were adopted differed little in parental education and income compared with either the adopted or nonadopted comparison groups. Specifically, there is little evidence that the poorer functioning of PI children was due to these measures of family environment and enrichment opportunities. On the whole, the children were living in homes where parents were highly educated and had good incomes. Despite a statistical group difference, families in all groups reported providing their children with a high number of experiences to enrich cognitive and social growth. Thus, there is little reason to believe that PI children continued to show evidence of early deprivation effects because they lacked cognitive and social stimulation after adoption.

The results of this research suggest that professional care providers must be aware of multiple factors when providing medical and educational services to internationally adopted children. First, consideration of the type of preadoptive experience is essential when examining developmental outcomes within internationally adopted children. Consistent with previous research,¹¹ PI children's physical growth on arrival in their adoptive families was quite delayed, as approximately half the sample fell at least 2 SD below age-typical growth. When measured at the laboratory assessment years after adoption, adoptive children were significantly smaller than nonadopted children, although all groups displayed growth measurements within the average range for age. This change from well below average at adoption to the average range years later is consistent with research indicating significant catch-up in the physical growth of PI children.^{2,11}

With regard to language and cognitive functioning, consistent with work on PI Romanian children, a majority of adopted children in both groups performed within the average range for their age years after adoption. However, when compared with the adopted and nonadopted comparison groups living in similar family environments, PI children demonstrated relatively poorer performance on these language and cognitive measures. Because subtests of the Wechsler Intelligence Scale for Children-Third Edition were used as a screening measures of general cognitive skills, the estimated intellectual quotient values may be inflated because of the Flynn effect (i.e., an inflation of approximately 3 points in intellectual quotient scores due to the need to restandardize over time³⁰). However, even with this correction, the results clearly indicate that most PI children are functioning within the normal range. Indeed, only 7% of the PI group scored in the borderline (below average) range. Nonetheless, there was a clear association between duration of institutional care and estimated intellectual quotient. The PI children, on average, scored nearly 20 estimated intellectual quotient points lower than the children in the nonadopted comparison group. This difference may be quite significant for both parents and children. Given the similar parent education and income across groups, it is likely that the PI child is attending school with children whose abilities exceed their own and that this child is also being compared with high-performing children of family friends. Perhaps, it

is no surprise that parents within this sample reported significantly poorer school performance for PI than other children. Although 60% of parents of nonadopted children and 40% of parents of children adopted early from foster care described their children as excelling in most subjects, this was true for only 20% of the PI children. Furthermore, parents of 28% of PI children described their child as falling behind in some or most subjects. Parents, physicians, and adoption professionals need to be aware that the PI child, despite having cognitive abilities in the average range, may find it extremely challenging to compete in environments where many children have above-average abilities.

The fact that parents of many PI children report that they are struggling academically at school may also reflect problems in attention and behavior regulation. Children adopted from institutional care have repeatedly been found to demonstrate high levels of inattention and hyperactivity in later childhood, despite many years in their adoptive homes.^{12,31} There is also evidence of increased behavior problems and social deficits in PI children.¹² This constellation of struggles may contribute to the increased rates of reported school difficulties for PI children as they may lack the focus necessary to do well in a school environment. In addition, these difficulties may leave adoptive parents feeling stressed and overwhelmed³² and they may turn to professional care providers for answers. For example, parents of children adopted from institutional care may seek out opportunities to support their children's functioning and academic success. Adoptive parents in the current study reported considerable usage of education and therapeutic services including individualized education plans, language/speech therapy, and physical/occupational therapy. Given the similar demographic makeup of our groups, this increased utilization of services for adopted children over their nonadopted peers is not likely due to differential resource availability but rather is consistent with previous reports,³³ suggesting that adoptive parents have a lower threshold for obtaining clinical services. In fact, this sensitivity, paired with well-resourced home environments, may contribute to the positive developmental gains observed in children years after their adoption from institutional care.

In addition to noting the different later outcomes related to institutionalization, the current study further emphasizes the idea of a dose-response effect within the PI group. Older age at adoption and increased duration of institutionalization were related to lower achievement on cognitive and linguistic measures. Interestingly, relations between institutional duration and growth measures were not detected. Relative to other studies that demonstrate this correlation, the current sample had a more truncated period of institutionalization (i.e., 9 – 69 months); this sample did not include the large span of institutionalization reported in other studies (e.g., 2–149 months³⁴). In addition, combining the growth outcomes of children adopted from diverse world regions within the current sample may have introduced additional unknown factors not present in samples examining children only from one country. Experiences of deprivation range in severity across institutions, with varying degrees of deprivation sometimes present even within one institution.³ Notably, growth differences across region-of-origin were found within the PI group when controlling for duration of institutionalization. This suggests that factors related to region-of-origin including cultural practices in prenatal and preadoptive care and genetics are likely involved.

This study demonstrated how children adopted from institutions, from a variety of countries, fare differently from other internationally adopted and nonadopted children. By being cognizant of the outcomes associated with early institutional rearing, professional care providers will be better prepared to assist parents in meeting the needs of their children. It is also important for care providers to recognize that it is often difficult for adoptive parents to obtain complete information regarding risk and protective factors related to the child's early life or biological family history. Within the current study for example, a high percentage of adoptive parents lacked basic medical information including birth measurements and whether

their child was born prematurely, a known risk factor for later cognitive and language deficits.³⁵ Although lack of information regarding specific early life experiences including the quality of the preadoptive caregiving environment or reasons for relinquishment of the child is a limitation in drawing conclusions within the current study, this paucity of knowledge is reality for adoptive families and professionals working with internationally adopted children.

This study contributes to the growing knowledge regarding the long-term outcomes of children who have experienced early deprived conditions. However, it is important to acknowledge that this study used measures collected for descriptive and screening purposes within a larger study of internationally adopted children. Therefore, this research is able to offer only a general picture of PI children's functioning. Longitudinal studies using comprehensive measures of developmental outcomes and examining a broad range of postinstitutionalized children from the time of adoption into adulthood will better explain the developmental course associated with early adversity.

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Table 1**Adoption Characteristics**

PI (n = 91)	EA/FC (n = 109)
Age at adoption	
M = 24.0 mo	M = 4.7 mo
SD = 14.2 mo	SD = 1.7 mo
Range = 12–69 mo	Range = 1–8 mo
Region-of-origin ^a	
Eastern Europe = 42	Eastern Europe = 0
Asia = 41	Asia = 73
South America = 7	South America = 36
Africa = 1	Africa = 0
Time spent in preadoption institutional care	
M = 22.9 mo	M = 0.4 mo
SD = 13.7 mo	SD = 0.8 mo
Range = 9–69 mo	Range = 0–2 mo
Duration of preadoption foster care	
M = 0.3 mo	M = 3.8 mo
SD = 1.6 mo	SD = 2.2 mo
Range = 0–12 mo	Range = 0–8 mo
Time spent in adoptive families at assessment	
M = 8.1 yrs	M = 9.8 yrs
SD = 1.6 yrs	SD = 1.3 yrs

PI, postinstitutionalized; EA/FC, early-adopted/foster care.

^aRegion-of-origin: within PI group: Eastern Europe includes Russia (n = 21), Romania (n = 10), Bulgaria (n = 5), Slovakia (n = 2), Ukraine (n = 2), Moldova (n = 1), and Poland (n = 1). Asia includes China (n = 22), India (n = 15), Philippines (n = 3), Vietnam (n = 1). South America includes Brazil (n = 2), Ecuador (n = 2), Colombia (n = 1), El Salvador (n = 1), Paraguay (n = 1). Africa includes Ethiopia (n = 1). Within EA/FC group: Asia includes Korea (n = 69), Vietnam (n = 2), China (n = 1), Cambodia (n = 1). South America includes Colombia (n = 17), Guatemala (n = 17), Bolivia (n = 1), Paraguay (n = 1).

Table 2

Group Physical Growth Measurements (Standardized for Age) at Birth, First Medical Examination Postadoption, and Laboratory Assessment

	PI M (SD)	EA/FC M (SD)	NA M (SD)	Significance Tests
Birth examination measurements				
Length	0.39 (2.03), n = 21	-0.41 (1.03), n = 55	0.93 (0.96), n = 51	F(2,124) = 15.96, NS
Weight	-1.04 (0.96), n = 26	-0.66 (0.99), n = 70	0.23 (0.89), n = 58	F(2,151) = 21.03, NS
Head circumference	-0.23 (1.99), n = 12	-0.73 (0.72), n = 45	0.26 (1.37), n = 21	F(2,75) = 5.20, NS
Postadoption examination measurements				
Height	-1.99 (2.09), n = 69	-0.51 (1.70), n = 89	–	$t(156) = -4.92, p < .001^a$
Weight	-2.18 (1.89), n = 75	-0.48 (1.57), n = 92	–	$t(165) = -6.35, p < .001^a$
Head circumference	-1.33 (1.23), n = 38	-1.01 (1.80), n = 72	–	$t(108) = -1.00, NS$
Assessment measurements				
Height	-0.08 (0.92), n = 90	0.10 (0.98), n = 109	0.60 (1.01), n = 66	F(2,262) = 9.981, $p < .001^b$
Weight	-0.29 (1.02), n = 88	0.37 (1.15), n = 108	0.48 (0.96), n = 66	F(2,259) = 12.99, $p < .001^c$

PI, postinstitutionalized; EA/FC, early-adopted/foster care; NA, nonadopted. Significance ($p < .05$) for post hoc comparisons

All growth measurements (height, weight, OFC) are reported as age-based z scores.

^aEA/FC > PI.

^bNA > PI and EA/FC.

^cNA and EA/FC > PI.

Table 3**Results Across Region-of-Origin Within the Postinstitutionalized Group**

	Russia/EE M (SD)	SA M (SD)	Asia M (SD)	Significance Tests
Birth measurements				
Length	0.75 (1.77), n = 13	–	–0.19 (2.40), n = 8	F(1,19) = 1.07, NS
Weight	–0.91 (.66), n = 16	–	–1.24 (1.3), n = 10	F(1,24) = 0.04, NS
OFC	0.04 (2.15), n = 7	–	–0.61 (1.90), n = 5	F(1,17) = 0.06, NS
Postadoption examination measurements				
Height	–2.06 (1.46), n = 32	–2.57 (4.07), n = 7	–1.86 (2.11), n = 29	F(2,68) = 0.30, NS
Weight	–1.90 (1.77), n = 34	–1.31 (1.58), n = 7	–2.71 (1.91), n = 33	F(2,74) = 2.05, NS
OFC	–1.31 (1.22), n = 15	–0.56 (1.10), n = 4	–1.51 (1.27), n = 19	F(2,38) = 0.90, NS
Laboratory session assessments				
Height	–0.01 (0.91), n = 42	0.77 (0.43), n = 7	–0.34 (0.87), n = 40	F(2,89) = 5.55, $p < .01^a$
Weight	–0.14 (0.85), n = 40	0.63 (0.61), n = 7	–0.62 (1.11), n = 40	F(2,87) = 6.74, $p < .01^b$
Estimated IQ	99.6 (15.0), n = 41	95.6 (17.1), n = 7	107.7 (18.3), n = 40	F(2,88) = 1.56, NS
CASL Paragraph Comprehension	101.3 (13.6), n = 39	99.8 (14.2), n = 6	109.9 (11.4), n = 31	F(2,76) = 2.30, NS
CELF Following Directions	8.1 (3.4), n = 9	8.2 (3.2), n = 6	10.2 (2.9), n = 31	F(2,76) = 2.30, NS

EE, Eastern Europe; SA, South America; IQ, intellectual quotient; CASL, Comprehensive Assessment of Spoken Language; CELF, Clinical Evaluation of Language Fundamentals, Fourth Edition. Significance ($p < .05$) for post hoc comparisons

All growth measurements (height, weight, OFC) are reported as age-based z scores. Estimated IQ and CASL are reported as standard scores (population $M = 100$, $SD = 15$). CELF is reported as a scaled score (population $M = 10$, $SD = 3$).

^aSA > EE and SA.

^bSA > EE > Asia.

Table 4

Distribution of Parent-Reported Academic Performance Across Groups

	PI (n = 91) (%)	EA/FC (n = 109) (%)	NA (n = 68) (%)
Excels in most subjects	19.8	39.4	59.4
Excels in some subjects	19.8	24.8	18.8
Excels some subjects, struggles in other	17.6	15.6	8.7
Average in all subjects	15.4	11.9	8.7
Falling behind in some subject	16.5	8.3	2.9
Falling behind in most subjects	11.0	0	0

PI, postinstitutionalized; EA/FC, early-adopted/foster care; NA, nonadopted.

Table 5

Performance on Cognitive and Language Assessments Across Groups

	PI M (SD)	EA/FC M (SD)	NA M (SD)	Significance Tests
Estimated IQ	103.2 (17.1), n = 89	112.7 (16.1), n = 109	121.4 (16.7), n = 69	F (2,261) = 23.18, $p < .001^a$
Block design	10.3 (3.7), n = 91	11.6 (3.3), n = 109	12.9 (3.0), n = 69	F (2,233) = 5.61, $p < .01^b$
Vocabulary	9.7 (3.5), n = 91	11.8 (3.1), n = 109	13.4 (2.9), n = 69	F (2,233) = 14.94, $p < .001^a$
CASL paragraph comprehension	104.7 (13.3), n = 77	110.8 (13.5), n = 103	113.3 (10.0), n = 45	F (2,219) = 7.88, $p < .001^c$
CELF following directions	9.0 (3.3), n = 77	10.8 (2.6), n = 103	11.0 (2.2), n = 45	F (2,219) = 10.98, $p < .001^c$

PI, postinstitutionalized; EA/FC, early-adopted/foster care; NA, nonadopted; IQ, intellectual quotient; CASL, Comprehensive Assessment of Spoken Language; CELF, Clinical Evaluation of Language Fundamentals, Fourth Edition. Significance ($p < .05$) for post hoc comparisons

Scaled scores on Block Design, Vocabulary, and CELF are scored based on a population mean = 10, SD = 3. Estimated IQ and CASL are scored based on a population mean = 100, SD = 15.

^aNA > PI.

^bNA > EA/FC > PI.

^cNA and EA/FC > PI.