

Predictors of Disruptive Behavior, Developmental Delays, Anxiety, and Affective Symptomatology Among Institutionally Reared Romanian Children

B. HEIDI ELLIS, PH.D., PHILIP A. FISHER, PH.D., AND SONIA ZAHARIE, M.S.

ABSTRACT

Objective: To examine the associations between duration of institutionalization, age at abandonment, and mental and physical health outcomes of young institutionalized children in Romania and to examine patterns of associations between placement history, physical growth variables, and psychiatric symptoms. **Method:** Institutionalized children (ages 2–6 years) in a Romanian orphanage were studied through caregiver reports. Orphanage staff completed questionnaires on the children's psychiatric symptoms and physical growth measurements and placement histories on the children. **Results:** Children showed high rates of developmental delays, anxiety/affective symptoms, and physical growth delays. Patterns of associations between history and growth variables (duration of institutionalization, age at abandonment, and physical stature) and psychiatric symptom clusters were examined using three sequential multiple regressions. Longer duration of institutionalization and shorter physical stature were significantly associated with anxiety/affective symptoms ($F_{3,47} = 6.49, p < .01$). Physical stature was significantly associated with developmental delays ($F_{3,47} = 5.603, p < .01$) and disruptive behaviors ($F_{3,47} = 2.832, p < .05$), with smaller stature being associated with greater developmental delays and fewer disruptive behavior problems. **Conclusions:** Institutionalized children demonstrate high rates of psychiatric symptoms. Duration of institutionalization, physical stature, and age at abandonment differentially relate to psychiatric symptoms. Findings are interpreted in light of implications for intervention and social policy. *J. Am. Acad. Child Adolesc. Psychiatry*, 2004;43(10):1283–1292. **Key Words:** institutionalization, deprivation, physical growth.

The negative effects of institutional rearing on development are well documented. Poor caregiver responsiveness, lack of stimulation, and the absence of a consistent caregiver are all elements of institutional rearing that have been implicated in the negative out-

comes among institutionalized children (Rutter, 1979). These factors converge to create caregiving environments characterized by severe early deprivation, which in turn have been linked to a variety of negative outcomes among children. Among these outcomes are physical growth delays, with approximately 1 month of linear growth lost for every 3 months in an institution (Albers et al., 1997). Developmental delays are also common, with cognitive development typically in the mildly delayed range (Albers et al., 1997; Groze and Ileana, 1996; Nelson et al., 2001; Parker and Bruce, 2001; Rutter et al., 1998).

Although research provides strong documentation of the global negative impact of institutionalization, less is known about the variability in outcomes seen in this population. A number of studies indicate that specific risk factors are associated with greater or lesser disruption to a child's development. Why children who have

Accepted May 20, 2004.

Dr. Ellis is with Boston University School of Medicine and the Center for Medical and Refugee Trauma/National Child Traumatic Stress Network. Dr. Fisher is with the Oregon Social Learning Center. Ms. Zaharie is with World Vision, Cluj-Napoca, Romania.

This project was supported in part by SAMHSA grant U79 SM54305 to Dr. Saxe (principal investigator) and NIMH 1 R21 MH 70261-01 to Dr. Ellis. Additional support was provided by NIMH grant MH 59780 to Dr. Fisher, and MH46690, NIMH and ORMH, U.S. PHS.

Reprint requests to Dr. Ellis, Department of Child and Adolescent Psychiatry, Dowling 1 North, One Boston Medical Center Place, Boston, MA 02118; e-mail: beidi.ellis@bmc.org.

0890-8567/04/4310-1283©2004 by the American Academy of Child and Adolescent Psychiatry.

DOI: 10.1097/01.chi.0000136562.24085.160

experienced early deprivation might develop diverse types of symptoms, however, is less well understood. An examination of associations among different developmental variables in institutionalized children could add to the knowledge base regarding the manner in which deprivation affects children's mental health.

Factors Associated With Developmental Outcomes of Institutionalized Children

Overall, studies of institutionalized children show negative consequences in a variety of developmental domains. The severity and type of problems, however, appear to be associated with a number of factors. One of the strongest associated factors is the duration of deprivation experienced. Several studies have found that children institutionalized for less than 6 months do not differ significantly in physical growth (Chisholm, 1998; Rutter et al., 1998), but beyond that time, increasing duration of institutionalization is linearly related to growth delays (Johnson, 2000).

Duration of institutionalization has also been linked to increases in attachment disorder behaviors (Chisholm, 1998; O'Connor et al., 2000). Chisholm (1998) found that children who had spent at least 8 months in an orphanage before adoption displayed significantly more insecure attachment behaviors than children who had spent little or no time in an institution. O'Connor et al. (1999, 2000) similarly reported a direct association between duration of institutionalization and attachment disorder behaviors in children adopted into the United Kingdom from Romanian institutions but also noted that some children were resilient.

In addition to longer duration of institutionalization, lower quality of care also is related to negative consequences of institutionalization. Smyke et al. (2002) investigated attachment among Romanian toddlers in three different environments: a standard institution, a pilot institutional unit with higher adult-to-child ratios, and a family setting. They found that institutionalized children demonstrated higher levels of attachment disordered behaviors and that the level of attachment disturbance increased in more socially depriving conditions. Carlson and Earls (1997) found improved physical growth and mental development in children exposed to a pilot intervention program.

Chisholm (1998) found that previously institutionalized children adopted into families of low socioeconomic status (SES) were more likely to be insecurely

attached, demonstrate more behavioral problems, and show poorer cognitive catch-up compared with those adopted into families of higher SES. Parents of low SES families also reported experiencing more stress relative to high SES families. Chisholm interpreted these findings as suggesting that differences in resources and parental stress can affect the long-term course of institutionalization on children's functioning.

Few studies have specifically investigated the relationship between physical growth and other outcomes among institutionally reared children. However, Rutter et al. (1998) found that at the time of adoption, head circumference, height, and weight all significantly positively correlated with developmental quotients for previously institutionalized children. Although cognitive development and physical growth may be understood as different outcomes of the same risk factors (e.g., malnutrition due to a neglectful environment leads to disruptions in both physical and cognitive growth), there may also be important concurrent associations among these different outcomes. For instance, noninstitutionalized children who show delayed physical growth in infancy are at risk of concurrent impairments in cognitive development (Boddy et al., 2000). A child's development and nutritional intake are interdependent; a developmentally compromised child who interacts less with a caregiver may subsequently receive less nourishment from the caregiver, resulting in poor physical growth (Puckering et al., 1995). Developmental problems associated with poor nutritional intake, such as depression or cognitive deficits, may predispose the child to engage in less than optimal interactions, thus exacerbating the poor interactional quality between child and caregiver. A child who is lethargic as a result of poor nourishment may be less active in demanding food or engaging the parent and consequently may receive less of both emotional attention and nutrition. This argument suggests that physical growth delay may be associated with an increased risk of ongoing nutritional and/or social deprivation.

Given the nearly ubiquitous finding of delayed physical growth in institutionalized children, studies that examine the association between physical growth and specific psychosocial variables are warranted. An examination of patterns of concurrent developmental factors could provide an important contribution to understanding the ways in which a child's developmental

trajectory is shaped by development itself as well as environmental factors.

In this study, we explored the patterns of associations between specific factors (age at abandonment, duration in orphanage, and physical growth) and psychosocial outcomes (developmental delays, disruptive behavior, and anxiety/affective symptoms). There are two aspects of this investigation that distinguish it from previous work: (1) we assessed specific psychiatric symptoms and (2) the information was collected on currently institutionalized children. These methods facilitate the examination of questions pertaining to how factors in the child's placement and growth history relate to the presence of specific psychiatric symptoms. Specifically, we asked (1) whether duration of institutionalization, age at abandonment, and physical growth delay are associated with an increased number of psychiatric symptoms and (2) whether duration of institutionalization, age at abandonment, and physical growth delay are associated differentially with disruptive behavior, anxiety/affective symptomatology, and developmental delays. We sought to describe the patterns of association between history and growth variables and different symptom clusters. This provides a first step in gaining greater specificity in understanding the breadth of mental health outcomes seen in institutionalized children.

METHOD

Participants

The sample consisted of 51 children currently residing in a state-run placement center in a medium-sized city in Romania. Data were collected on all children in the early childhood residential program of this placement center. Demographic information is presented in Table 1.

Measures

Four staff educators from the institution were asked to complete questionnaires regarding the social and emotional development of the children in their care. In this orphanage, educators engage in

programs designed to promote children's development, such as daily play groups, and are familiar with the children's daily behavior and functioning. Educators typically have some training in child development. A Romanian translator with a background in social work translated all questionnaire measures from English to Romanian.

Early Childhood Inventory-4 (ECI-4). Child mental health was measured using the parent version of the Early Childhood Inventory-4 (Sprafkin and Gadow, 1996), a 108-item questionnaire used to screen for symptoms associated with *DSM-IV* emotional and behavioral disorders based on the presence of various observable behaviors. The informant is asked to indicate how often the child displays each behavior using a 4-point scale, from never to very often. Sample items include "wets bed at night," "seems like he/she is in a trance," "seeks affection from most adults and even strangers," and "grabs things from other children." Items are divided into categories associated with *DSM-IV* diagnostic categories. Because the ECI-4 does not measure impairment or duration of symptoms, it does not provide diagnostic information. Twelve additional items provide information on developmental deficits (e.g., language, motor skills).

The ECI-4 can be scored categorically (symptom counts exceeding screening cutoffs are scored as present) or dimensionally (symptom severity). In the categorical model, symptoms rated as often or very often are identified as present and a cutoff level determined by *DSM-IV* criteria is used to determine whether a child demonstrates enough symptoms to meet screening cutoffs associated with a diagnosis. In the dimensional model, the symptom ratings for the items in each category are summed. The categorical scoring system is used for descriptive analyses, providing information on the prevalence of symptoms that exceed screening cutoffs for different diagnostic categories within this sample. The dimensional (symptom severity) scoring system is used in analyses examining patterns of associations between variables.

The ECI-4 has demonstrated adequate to strong concurrent validity with psychiatric symptoms (Gadow and Sprafkin, 1994; Sprafkin et al., 2002) and has previously been used cross-culturally with Eastern European children (Gadow et al., 2000). It was selected for use with this sample based on its sensitivity to different psychiatric symptom clusters, previous use in Eastern European cultures, and the emphasis on readily observable behaviors.

Physical Measurements and Demographics. Measurements of each child's physical growth (including height, weight, and head circumference), birth date, and placement history were obtained from orphanage records.

RESULTS

Descriptive Statistics

Physical Development. Measurements of height, weight, and head circumference were transformed into standardized scores using head-circumference-for-age, weight-for-age, stature-for-age, and weight-for-stature growth curve equations (U.S. Centers for Disease Control and Prevention, 2000). Corresponding percentile ranks were obtained. Separate growth equations were used for boys and girls. Means and quartiles of percentile ranks are presented in Table 2. *T* tests were per-

TABLE 1
Sample Demographics

Demographics	Mean	Range
Child age	3 yr, 7 mo	23 mo to 6 yr, 1 mo
Age at abandonment	13 mo	Birth to 4 yr, 10 mo
Duration in orphanage	2 yr, 6 mo	1 mo to 5 yr, 5 mo

formed for each of the physical variables to examine gender differences. The results of these tests were not significant.

Mental Health. The categorical scale of the ECI was used to determine the number of children who met screening cutoffs for symptoms of different psychiatric diagnoses. Screening cutoffs do not necessarily indicate that a child qualifies for a diagnosis. Rather, they indicate whether symptoms typical of a particular diagnosis are present. The term *screening cutoff* is used to indicate the presence of symptoms associated with a disorder. Overall, 96% of the children met screening cutoffs for at least one *DSM-IV* diagnostic category (as measured by the ECI-4). The median number of screening cutoffs exceeded per child was three (ranging as high as 10). The prevalence ratings are presented in Table 3. Reactive attachment disorder screening cutoffs were met for nearly three-fourths of the children. Other frequent diagnostic categories included elimination problems (49.0%), attention-deficit/hyperactivity disorder inattentive (27.5%), oppositional defiant disorder (23.5%), and feeding problems (13.7%).

Associations Among Psychiatric Symptoms, History, and Growth Factors

In further analyses, symptom severity was calculated by summing the severity scores for items within each diagnostic category. Two additional ECI-4 scores were calculated: total symptom severity (ECI-Total), created by summing ratings for all items, and developmental scale, created by summing ratings for 12 additional developmental skills questions included in the ECI-4. One variable, separation anxiety, was dropped from analysis due to references to parents that could potentially be ambiguous with this population. In addition, one item, starts fires, was dropped from conduct disorder due to missing data points and a lack of variability in responses.

All mental health and risk factor variables were examined for normality, and transformations were performed as necessary to correct for skew.

Table 4 presents Pearson correlations between duration of institutionalization, age at abandonment, and physical growth. Age at abandonment and duration of institutionalization were significantly correlated ($r = -0.595, p < .01$). No other associations reached significance. As expected, physical growth variables correlated highly with each other.

Correlations among duration of institutionalization, age at abandonment, and physical growth with psychiatric symptoms are presented in Table 3. Age at abandonment showed no significant relationship to psychiatric symptoms. Duration of institutionalization significantly correlated with the ECI-Total score as well as feeding problems, depressive symptoms, dysthymic symptoms, posttraumatic stress symptoms, and generalized anxiety symptoms. Physical stature was significantly negatively correlated with symptoms of almost all the mental health disorders (Table 3).

To ascertain whether the association between duration in orphanage and psychiatric symptoms was accounted for by physical stature, partial correlations were calculated covarying stature. The pattern of associations between duration in institution and symptoms of the various ECI-4 disorders was similar, although correlations between duration in orphanage and the two variables of ECI-Total and feeding problems were no longer significant. The pattern of correlations between physical stature and mental health symptoms did not change significantly when variance associated with duration of institutionalization was partialled out.

Prediction of Specific Psychiatric Symptom Clusters by History and Growth Variables

To examine whether specific psychiatric symptom clusters associated differentially with different patterns of history and growth (age at abandonment, duration of institutionalization, and physical size), several sequential multiple regressions were performed. First, mental health diagnostic scales were aggregated into theoretically related categories: disruptive behavior, anxiety/affective symptomatology, and disorders of development. Scales that did not clearly fit theoretically within these specified diagnostic clusters (e.g., reactive attachment disorder or feeding problems) were excluded. Convergent validity was assessed through an

TABLE 2
Physical Development: Percentile Ranks According to Age Norms

Physical Measurement (N = 51)	Mean Percentile Rank of Size for Age	First to Third Quartile Range of Percentile Rank for Age
Head circumference	33	9–58
Stature	6	3–15
Weight	3	1–25
Weight for stature	13	2–50

TABLE 3
Frequency of Symptoms and Correlation of Symptom Severity With History and Growth Variables

Symptoms of Disorder Types	% of Children Above Cutoff	Stature	Age at Abandonment	Duration in Orphanage
Summary ECI-Total	N/A	-0.344*	-0.248	0.298*
Developmental scale	N/A	-0.385**	-0.065	0.112
Peer conflict scale	N/A	0.292*	-0.137	0.142
Reactive attachment	38	-0.061	-0.175	0.222
Elimination problems	25	-0.351*	-0.218	0.021
ADHD hyperactive/impulsive	14	-0.124	-0.213	0.068
Oppositional defiance	12	0.325*	-0.053	0.088
Feeding problems	7	-0.606**	-0.112	0.316*
Motor tic	6	-0.436**	-0.061	0.181
Selective mutism	6	0.226	0.079	-0.022
Major depression	5	-0.484**	-0.160	0.433**
Autism	5	-0.515**	-0.169	0.065
Asperger's	5	-0.488**	-0.162	0.074
Conduct problems	2	0.362**	-0.021	0.071
Dysthymia	2	-0.440**	-0.134	0.492**
Social phobia	2	-0.111	-0.128	0.221
Sleep problems	2	-0.080	0.081	-0.055
Posttraumatic stress	1	-0.190	-0.084	0.335*
Generalized anxiety	1	-0.469**	-0.087	0.298*
ADHD inattentive	1	-0.415**	-0.066	0.020

Note: ECI = Early Childhood Inventory; ADHD = attention-deficit/hyperactivity disorder.
* $p < .05$; ** $p < .01$.

examination of correlations of items within each category, and one diagnostic scale was dropped from further analyses due to poor correlation with other variables in the category. Table 5 presents the diagnostic scales included in each category. Scores of items that contribute to diagnostic scales within each category were then summed, and the resulting variables were used in the following regression analyses.

Disruptive Behavior, Anxiety/Affective Symptomatology, and Developmental Delays

Three separate sequential multiple regression analyses were performed, regressing the history and growth

variables (duration in orphanage, age at abandonment, and physical stature) on disruptive behavior, anxiety/affective symptoms, and developmental delays. Duration in orphanage was entered first because it is theoretically strongly linked to developmental outcomes, including physical size. Age at abandonment and physical stature were then entered sequentially.

The full model for anxiety/affective symptoms was significant ($F_{3,47} = 6.49, p < .01$). An inspection of the R^2 change scores showed that physical stature, but not age at abandonment, significantly added to the significance of the model ($F_{3,47} = 8.002, p < .01$). β values indicated that both duration in institution and physical

TABLE 4
Intercorrelation of History and Physical Growth Variables

	Duration	Abandonment	Stature	Weight	Weight for Height	Head Circumference
Duration in orphanage	1					
Age at abandonment	-0.595**	1				
Stature	-0.273	0.274	1			
Weight	-0.255	0.212	0.709*	1		
Weight for height	-0.130	0.088	0.270	0.862**	1	
Head circumference	0.01	0.195	0.506**	0.583**	0.451**	1

* $p < .05$; ** $p < .01$.

TABLE 5
Scales Included in Disorder Clusters

Developmental Delays	Anxiety/Affective Symptoms	Behavioral Disruptions
Autism/Asperger's ECI Developmental Scale score	Posttraumatic stress disorder Generalized anxiety disorder Social phobia Major depression/dysthymia	ECI Peer Conflict Scale Attention-deficit/hyperactivity disorder Oppositional defiant disorder Conduct disorder

Note: ECI = Early Childhood Inventory.

stature were significantly associated with the dependent variable anxiety/affective symptoms in the final model, with higher levels of anxiety/affective symptoms associated with longer institutionalization and smaller physical stature (Table 6).

After physical stature was entered, the full regression model for developmental delays was also significant ($F_{3,47} = 5.603, p < .01$). An inspection of the β weights shows that physical stature alone was significantly associated with developmental delays. Smaller physical stature was associated with greater developmental delays. Similarly, the full model for disruptive behavior was significant ($F_{3,47} = 2.832, p < .05$). Physical stature alone accounted significantly for the variance in the dependent variable. An inspection of the β values indicates that larger physical stature was related to higher levels of disruptive behavior.

DISCUSSION

Results support previous research suggesting that children in Romanian orphanage care demonstrate severe deficits in physical and emotional development

and in mental health (Fisher et al., 1997; Gunnar, 2000; Johnson, 2000; Miller et al., 1995; Rutter et al., 1998; Sweeney and Bascom, 1995). Nearly all the children in this sample exhibited at least one area of concern in their mental health, and the majority of children had problems in several domains. The most frequent symptoms were those associated with reactive attachment disorder; elimination problems; attention-deficit/hyperactive disorder, impulsive type; and oppositional defiance. Children were also physically small, with the average percentile ranks for stature and weight being the sixth and third, respectively.

These results are particularly noteworthy because they suggest that, despite recent changes in orphanage care, institutionalization continues to have a profound impact on children's development. These children entered orphanage care in 1994 or later, at least 4 years after the fall of Ceacescu and subsequent international pressure and domestic initiatives to improve institutional care. Thus, current results cannot be explained by Ceacescu era neglect. In addition, these findings suggest that the children who are currently being moved toward alternative family-environment place-

TABLE 6
Sequential Regression of History and Physical Growth Factors on Anxiety/Affective Symptoms

Variables	Mood Disorders (DV)	Duration in Institute	Age at Abandonment	Physical Stature	B	β	<i>t</i>
Duration	0.395**				0.149	.455	2.989**
Age at abandonment	-0.099	-0.595**			2.816	.271	1.782
Stature	0.418**	-0.273	0.274		5.853	-.368	2.883**
					Intercept = 24.9		
Mean	41.5	30.4	0.88	-1.6			
SD	5.1	15.7	0.49	0.32			
						$R^2 = 0.307$	
						Adjusted $R^2 = 0.263$	
						$R = 0.554^{**}$	

** $p < .01$.

ments are particularly at risk and will require intervention services.

History and Physical Growth Factors

As expected, duration of institutionalization and physical growth were both associated with psychiatric symptoms. Children who had been reared for a longer duration in the institution or who were of smaller physical stature scored higher in terms of overall severity of psychiatric symptoms. Physical growth and duration of institutionalization have been robustly linked in the literature and showed a modest, although insignificant, negative correlation within this sample. However, although these two factors are related, they do not appear to be redundant.

In regression analyses exploring the contributions of the different history and growth factors, physical stature consistently was associated with mental health symptomatology even after duration of institutionalization was taken into account. Specifically, anxiety/affective symptoms, developmental delays, and disruptive behavior were all associated with the physical size of the child, even after variance associated with duration of institutionalization was removed. Thus, physical size appears to be strongly associated with a range of mental health problems in institutionalized children. Interestingly, although smaller physical size was related to greater anxiety/affective symptoms and developmental delays, it was inversely related to disruptive behavior, suggesting that children of larger physical size showed greater disruptive behavior and fewer anxiety/affective symptoms. This suggests that the potential mechanisms linking physical size to these outcomes should be considered separately.

Physical size may be related to anxiety/affective symptoms and development delays in a variety of ways. One possibility is that size is a marker of the effects of some other factor, such as the degree of neglect experienced by the child, an underlying physiological abnormality, or severe malnutrition. Alternatively, anxiety/affective symptoms and developmental delays, such as depression or feeding disorders, may be associated with poor nutritional intake. Children who are depressed and/or developmentally delayed may be less likely to incur the favor or attention of a caregiver (especially in an institutional setting) and may suffer both emotionally and nutritionally as a result. This is consistent with the argument of Puckering et al. (1995)

that poor physical growth may reflect poor nutritional intake, which results in part from impoverished interaction between caregiver and infants in which an infant with depression may not provide cues for engagement and feeding.

It is also possible that smaller physical size places children at risk of a variety of negative environmental experiences that could contribute to the development of anxiety/affective symptoms and developmental delays. Smaller children are likely to be at a physical disadvantage among their peers and may experience higher levels of stress as a result. Institutions are characterized by poor adult supervision, and peer traumatization may be prevalent. This chronic stress may, in turn, result in greater emotional and developmental disruptions. Additional research examining longitudinal change, response of physical growth to intervention, and underlying physiological systems is necessary to better explicate potential mechanisms relating physical size to anxiety/affective symptoms and developmental delays.

In contrast to the results for small stature, larger physical size was related to greater disruptive behavior and fewer anxiety/affective symptoms. The association between size and disruptive behavior may be explained in several ways. Larger children may exhibit higher levels of aggression because they are able to use physical size to their advantage in establishing themselves in the hierarchy of their peer group. More aggressive children may also benefit from accessing food that belongs to other children. Additionally, disruptive behavior is likely to garner attention from adults, which may diminish the experience of neglect. These bidirectional influences (larger size leading to increased engagement in bullying, and bullying leading to more food and attention) may operate simultaneously, giving relatively larger children an advantage over smaller children.

In considering these results, it is important to acknowledge that larger stature for age is relative within the sample under investigation; in fact, the *Z* score mean of stature for age was 1.6 standard deviations below the mean. Thus, it is possible that disruptive behavior may also simply represent typical orphanage-reared child behavior in the absence of severe physical delays.

In light of the higher rates of anxiety/affective symptoms and developmental delays seen in smaller children, children's disruptive behavior may be viewed as a

protective factor within the institutional setting. Although high levels of aggression may be maladaptive in the community, within the institutional setting, this may actually function as a highly adaptive behavior. Children's bullying may serve as a protective factor against anxiety and affective symptoms, both by helping them to access more attention and resources and by diminishing the likelihood of peer victimization.

This possibility is consistent with recent work by Smyke et al. (2002), who noted an inverted U pattern of aggression within young children in the institution, with children demonstrating either very high or very low levels of aggression. This pattern was in contrast to children raised in families who displayed moderate levels of aggression. They concluded that aggression may serve a unique role within an institutional setting (Smyke et al., 2002). Taken together, these findings point toward the importance of exploring different etiologies of different disorders, and the potential for some symptoms to be indicative of resilience within the institutional context.

Age at Abandonment

Counter to our expectations, age at abandonment was not significantly associated with any of the mental health disorders. Although age at abandonment and duration of institutionalization were significantly correlated, psychiatric symptomatology was more strongly associated with duration of institutionalization. Within this sample, age at abandonment varied widely, from birth to 64 months. We had expected greater symptom severity in children who were abandoned earlier and thus had experienced deprivation during periods of critical importance to brain development. It is possible, however, that children who were abandoned at a older age were abandoned because they demonstrated problems in their development, although children abandoned in their infancy were more likely to be abandoned for reasons unrelated to their own development. In this case, the negative effects of early abandonment would be masked in the correlation that included children abandoned at a older age due to developmental problems. Alternatively, it is also possible that children abandoned later also experienced severe early deprivation. Families who abandon children in Romania are likely to do so as a result of severe financial or emotional stressors, and these factors may

lead to adverse circumstances for children even before abandonment.

Limitations

This study provides a first step in understanding how different patterns of history and growth factors are differentially associated with diverse mental health outcomes in institutionalized children. However, additional research is needed to replicate these findings and to investigate potential underlying mechanisms that explain the differential association of symptom clusters with profiles of history and growth variables.

Although our data provide important preliminary information about distinct factors and their associations with psychiatric symptoms in institutionalized children, several methodological limitations must be considered. First, the measures in this study were designed for and validated on children from the United States. In addition, the ECI-4 categories are premised on a Western diagnostic system (*DSM-IV*), which may raise concerns regarding cross-cultural validity. In addition, although the ECI-4 has shown adequate criterion validity with some diagnoses in a comparison with chart diagnoses, further research on the validity of this tool in comparison with diagnostic interviews is needed before conclusions can be drawn about the prevalence of disorders in this sample (Sprafkin et al., 2002). Finally, anthropomorphic measurements were converted to standardized scores based on a U.S. sample. Currently, there are no growth curves available that have been validated on a Romanian population. Although using growth curves that are not validated in this population would not affect relative scores among the sample, it may affect percentile ranks.

Because the study is cross-sectional, it is impossible to draw conclusions about the causal relationship between orphanage rearing and mental health symptoms. Although past research suggests that severe neglect experienced by children in institutions leads to severe developmental disruptions, other factors may also contribute. For instance, the same financial and parental factors that place children at greater risk of abandonment may also increase a child's risk of prenatal exposure to toxins or malnourishment. Children who are abandoned at a later age may have experienced extreme poverty, malnourishment, physical illness, or abuse during their early years. The presence of these factors and their impact on children's emotional and physical

development are unknown. Additional longitudinal studies of child development might provide insight into the particular effects of institutionalization. However, given ethical concerns about keeping children in a neglectful environment, such questions about the impact of social environment on the development of institutionalized children might be best addressed via intervention studies that examine the positive changes in development associated with appropriate stimulation and care.

Although sampling the population of an orphanage provides information on currently institutionalized children, it also creates some problems. The range of ages and abandonment history is very wide in the sample, making it difficult to draw conclusions about a particular developmental age or placement history. In addition, because these children are by definition without parents, information about early history and parental characteristics (such as physical height) are missing.

Finally, although this study provides preliminary support for the idea that different factors are associated with different types of psychopathology, the categories of psychopathology examined in this study are conceptually broad. In addition, the ECI-4 does not provide diagnoses. Studies that include diagnostic interviews that yield specific diagnoses would allow more clear conclusions to be drawn about the specific pathways and mechanisms linking institutionalization to mental health outcomes.

Clinical Implications

Overall, these data suggest that children raised in institutions are at risk of a variety of disorders. Although children who show fewer physical growth impairments may be protected from adverse anxiety/affective symptoms and developmental delays, they also appear to be at greater risk of disruptive behavior. It is possible that disruptive behavior is adaptive within the context of an institution, but these same behaviors may be detrimental to a child's experiences in other settings (e.g., foster care). As children move into alternative forms of care, service providers must be prepared to address their emotional, developmental, and behavioral needs.

Although Romania is currently moving toward a child protection policy that prioritizes placing children in family settings, many of the children currently in the institutions continue to show disruptions in their development. These children are likely to require special

services. Traditional U.S. foster care has frequently proven to be overwhelmed by severely troubled children, despite the best intentions and efforts of foster families. The mismatch of child needs and the services offered could lead to a situation in which the foster home environment is unable to contain and stabilize the child, thus leading to multiple placement disruptions and a compounding of a child's attachment problems (Fisher et al., 1999). Romanian foster care may well face the same challenges as it attempts to accommodate institutionalized children. Without adequate preparation, training, and support, foster parents may become frustrated and children may experience failed relationships.

In the past 5 years, Romania has achieved tremendous progress in decreasing the number of children entering institutions. In addition, they have begun to deinstitutionalize children who have already been placed in institutions. As deinstitutionalization efforts expand, interventions will need to accommodate children with extremely demanding physical, social, and emotional needs. Successful deinstitutionalization will require careful assessment of children's needs, development of culturally consistent interventions that are appropriate to these needs, and an integration of child health research and social policy. As children move out of institutions, there may be an unprecedented opportunity to study not only the effects of neglect but also the potential for reversing effects of early deprivation.

REFERENCES

- Albers L, Johnson D, Hostetter M, Iverson S, Miller L (1997), Health of children adopted from the former Soviet Union and Eastern Europe: comparison with preadoptive records. *JAMA* 278:922-924
- Boddy J, Skuse D, Andrews B (2000), The developmental sequelae of nonorganic failure to thrive. *J Child Psychol Psychiatry* 41:1003-1014
- Carlson M, Earls F (1997), Psychological and neuroendocrinological sequelae of early social deprivation in institutionalized children in Romania. In: *The Integrative Neurobiology of Affiliation*, Carter CS, Lederhendler II, eds. New York: New York Academy of Sciences, pp 419-428
- Chisholm K (1998), A three year follow-up of attachment and indiscriminate friendliness in children adopted from Romanian orphanages. *Child Dev* 69:1092
- Fisher P, Ellis B, Chamberlain P (1999), Early intervention foster care: a model for preventing risk in young children who have been maltreated. *Child Services: Soc Policy, Res Pract* 2: 159-182
- Fisher L, Ames EW, Chisholm K, Savoie L (1997), Problems reported by parents of Romanian orphans adopted to British Columbia. *Int J Behav Dev* 20:67-82
- Gadow K, Nolan E, Litcher L et al. (2000), Comparison of attention-deficit/hyperactivity disorder symptom subtypes in Ukrainian schoolchildren. *J Am Acad Child Adolesc Psychiatry* 39:1520-1527
- Gadow K, Sprafkin J (1994), *Early Childhood Inventories Manual*. Stony Brook, NY: Checkmate Plus

- Groze V, Ileana D (1996), A follow-up study of adopted children from Romania. *Child Adolesc Soc Work* 13:511–565
- Gunnar MR (2000), Early adversity and the development of stress reactivity and regulation. In: *The Effects of Early Adversity on Neurobehavioral Development*, Nelson CA, ed. Mahwah, NJ: Erlbaum, pp 163–200
- Johnson D (2000), Medical and developmental sequelae of early childhood institutionalization in Eastern European adoptees. In: *The Effects of Early Adversity on Neurobehavioral Development*, Nelson CA, ed. Mahwah, NJ: Erlbaum, pp 113–162
- Miller LC, Kiernan MT, Mathers MI, Klein-Gitelman M (1995), Developmental and nutritional status of internationally adopted children. *Arch Pediatr Adolesc Med* 149:40–44
- Nelson R, Camras L, Budd K (2001), Physical, mental and motor developments in adopted Chinese infants. Poster presented at the meeting of the Society for Research in Child Development, Minneapolis, MN, April
- O'Connor TG, Bredekamp K, Rutter M (1999), Attachment disturbances and disorders in children exposed to early severe deprivation. *Infant Ment Health* 20:10–29
- O'Connor TG, Rutter M, the English and Romanian Adoptees Study Team (2000), Attachment disorder behavior following early severe deprivation: extension and longitudinal follow-up. *J Am Acad Child Adolesc Psychiatry* 39:703–712
- Parker SW, Bruce J (2001), Indiscriminate friendliness and fear of strangers in post-institutionalized children. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Minneapolis, MN, April
- Puckering C, Pickles A, Skuse D, Heptinstall E, Dowdney L, Zur-Szpiro S (1995), Mother-child interaction and the cognitive and behavioral development of four-year-old children with poor growth. *J Child Psychol Psychiatry* 36:573–595
- Rutter M (1979), Maternal deprivation, 1972–1978: new findings, new concepts, new approaches. *Child Dev* 50:283–305
- Rutter M, the English and Romanian Adoptees Study Team (1998), Developmental catch-up, and deficit, following adoption after severe global early privation. *J Child Psychol Psychiatry* 39:465–476
- Smyke AT, Dumitrescu A, Zeanah CH (2002), Attachment disturbances in young children. I: The continuum of caretaking casualty. *J Am Acad Child Adolesc Psychiatry* 41:972–982
- Sprafkin J, Volpe R, Gadow K, Nolan E, Kelly K (2002), A DSM-IV-referenced screening instrument for preschool children: the Early Childhood Inventory-4. *J Am Acad Child Adolesc Psychiatry* 41:604–612
- Sprafkin M, Gadow K (1996), *Early Childhood Symptom Inventories*. Stony Brook, NY: Checkmate Plus
- Sweeney J, Bascom B (1995), Motor development and self-stimulatory movement in institutionalized Romanian children. *Pediatr Phys Therapy* 7:124–132
- U.S. Center for Disease Control (2000), CDC Growth Charts: United States (available at <http://www.cdc.gov/growthcharts/>)