

**BEHAVIOR PROBLEMS IN CHILDREN ADOPTED FROM SOCIALLY-
EMOTIONALLY DEPRIVING ORPHANAGES**

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Exposure to poor social-emotional conditions during early childhood may contribute to higher rates of behavior problems found among children adopted from orphanages. Behavior problem rates and scores were compared among school-aged children adopted from three different types of orphanages: 1) Russian orphanages in which children received adequate nutrition, health care, toys, and activities but were exposed to insensitive, unresponsive care from numerous, changing caregivers (“social-emotional” deprivation), 2) orphanages worldwide that varied in their levels of deprivation (Gunnar et al., 2007), and 3) severely or “globally” depriving 1990s Romanian orphanages (Groza & Ryan, 2002). Results indicated that socially-emotionally deprived children had higher rates and mean levels of Attention Problems and Aggressive Behavior than the Child Behavior Checklist (CBCL) standardization sample. Rates of these problems and also Social Problems showed a stepwise increase after 12 months of exposure to the orphanage. Children exposed to global deprivation and varying levels of deprivation showed a similar set of behavior problems. These results suggest that inadequate early social-emotional interactions and relationships may increase risk of behavior problems in post-institutionalized children. Globally deprived children had higher rates of Attention, Social, and Thought Problems than the other two post-institutionalized groups, providing evidence that these problems may be specifically associated with the severity of the orphanage environment.

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1.0 INTRODUCTION

In 2004, nearly 23,000 children were adopted internationally to the United States (U.S. Department of State, 2006). Prior to adoption, most of these children resided in orphanages characterized by various forms of deprivation. After placement into a family environment, children catch-up rapidly in many developmental domains, such as physical growth and cognitive development, but may not fully recover from early institutionalization (see reviews, Gunnar, 2001; MacLean, 2003). In some post-institutionalized (PI) children, emotional and behavioral problems emerge or persist many years after removal from the orphanage environment. It is important to determine types and rates of behavior problems in this growing population to prepare adoptive parents and to plan effective interventions. In addition, adoption entails a radical change in environment that can be used to examine how exposure to early adversity impacts later development (Rutter, Pickles et al., 2001).

Among the behavior problems associated with early institutional privation are inattention and hyperactivity, externalizing and internalizing problems, social and peer difficulties, and autistic-like features. PI children are at higher risk for these problems than parent-reared children, children adopted in their first few months, and non-institutionalized adopted children (Gunnar, 2001; MacLean, 2003). Comparisons with the latter two groups are important because they suggest that behavior problems in PI children are not attributable solely to genetic and prenatal factors (Fisher et al., 1997; see also Beckett et al., 2002; Rutter et al., 2001; Gunnar, van

Dulmen, & The International Adoption Project (IAP) Team, 2007; Juffer & van IJzendoorn, 2005; see also, Roy, Rutter, & Pickles, 2000, 2004). In addition, many studies have reported a positive association between the length of institutionalization and rates of behavior problems, supporting the contention that the orphanage environment contributes to later behavior problems (e.g., Rutter, Kreppner, & O'Connor, 2001).

1.1 TYPES OF BEHAVIOR PROBLEMS

1.1.1 Attention problems

PI children are consistently reported to have problems in the area of attention (Andresen et al., 1992; Groza & Ileana, 1996; Marcovitch, Cesaroni, Roberts, & Swanson, 1995; Stevens et al., 2007; Verhulst et al., 1990b). Specifically, PI Romanian-adopted children have been observed to score higher than home-reared children, children adopted from Romania under 4-6 months of age, and non-institutionalized adopted children on parent-report attention problem measures (Ames, 1997; Hoksbergen et al., 2004; Le Mare & Audet, 2002; Kreppner, O'Connor, & Rutter, 2001; Groza & Ryan, 2002). A large sample of children adopted from orphanages worldwide had significantly higher rates of Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) Attention Problems than non-institutionalized internationally adopted children (28% vs. 13%; Gunnar et al., 2007). Teachers also report increased attention problems in children adopted from Romanian orphanages (Ames, 1997; Kreppner et al., 2001; Le Mare & Audet, 2002). These problems persist with age, even after the children have had time to adapt to their adoptive homes (Ames, 1997; Kreppner et al., 2001; Le Mare & Audet, 2002). In one sample, 29% of the

children adopted from Romanian orphanages and none of the comparison group children had met diagnostic criteria for an attention disorder (Le Mare & Audet, 2002). Thus, there is consistent evidence that post-institutionalized children exhibit deficits in attention.

1.1.2 Externalizing and internalizing problems

A review of the literature indicates that early institutional rearing has been associated with both externalizing (Hoksbergen, Rijk, van Dijkum & Ter Laak, 2004) and internalizing problems. A recent meta-analysis found increased rates of externalizing but not internalizing problems among internationally adopted children with adverse pre-adoption histories (mainly Romanian and Russian orphanage experience) in comparison to internationally adopted children without such backgrounds (Juffer & van IJzendoorn, 2005). A Canadian longitudinal study revealed that at 3 and 8 years post-adoption, children who had spent 8 or more months in a Romanian orphanage scored higher than parent-reared children and children who had been adopted from Romania under the age of 4 months on CBCL Externalizing Problems (Ames, 1997; MacLean, 2003; Warford, 2002).

Some studies have reported internalizing problems in PI children (Groza & Ryan, 2002). For example, an English longitudinal study found that at 11 years of age, parent- and teacher-rated emotional difficulties were significantly more prevalent in children adopted from Romanian orphanages than in children adopted within the United Kingdom (UK) before 6 months of age (Colvert, Rutter, Beckett, Castle, Groothues, Hawkins et al., 2007). However, at 6 years of age, these same Romanian-adopted children were not at significantly higher risk for either externalizing or internalizing problems (Rutter et al., 2001).

Several other studies found *neither* externalizing nor internalizing symptoms to be associated with early institutional privation (e.g., Cederblad et al., 1999; Goldney et al., 1996; Tan & Marfo, 2006). Gunnar et al. (2007) found that rates of CBCL Externalizing and Internalizing Problems were not significantly higher in PI than in non-institutionalized internationally adopted children, most of whom had been in foster care prior to adoption. However, the authors noted that some of the children in the non-institutionalized group had multiple foster care placements, which may have increased their risk for later problems. Thus, the evidence linking early institutional privation to externalizing or internalizing problems is inconsistent.

1.1.3 Social and peer problems

PI children, particularly those adopted from Romanian orphanages, have been shown to exhibit higher rates of social problems than parent-reared and early-adopted children (Ames, 1997; Groza & Ryan, 2002; Hoksbergen et al., 2004). In addition, PI children had significantly higher rates of CBCL Social Problems than non-institutionalized adopted children (22% vs. 11%; Gunnar et al., 2007).

Some evidence suggests that peer relationships pose difficulties to children adopted following early institutional privation (e.g., Rutter et al., 2001). Children adopted from Romanian orphanages had more peer difficulties than parent-reared children 11 months and 3 years post-adoption (e.g., 32% vs. 5%; Ames, 1997; Fisher et al., 1997), but not after 8 years in an adoptive home, according to parent- and teacher-report and peer acceptance ratings (Warford, 2002). PI status significantly predicted high scores on a Peer Problems subscale created by summing only the peer items from the CBCL Social Problems subscale (Gunnar et al., 2007).

1.1.4 Autistic-like behaviors

Rutter and colleagues (1999), using the Autism Screening Questionnaire (ASQ; Berument et al., 1999) and Autism Diagnostic Interview – Revised (ADI-R; Le Couteur et al., 1989; Lord et al., 1994), found higher rates of autistic-like features in children adopted from Romanian orphanages than in children adopted in the first 6 months of life within the UK. Autistic-like features included repetitive stereotyped behavior, such as intense circumscribed interests and abnormal preoccupations, and poor social skills, characterized by poor reciprocity and poor appreciation of social cues and boundaries.

Although the CBCL Thought Problems subscale is not specific to autism, it has been shown to differentiate children with autism from normal school children and children with other psychiatric disorders (Duarte, Bordin, Oliveira, & Bird, 2003). PI Romanian-adopted children have been found to exhibit greater CBCL Thought Problems than a parent-reared standardization sample, children internationally adopted under 6 months of age (Hoksbergen et al., 2004), and non-institutionalized Romanian-adopted children (Groza & Ryan, 2002; see also Gunnar et al., 2007). Thus, early institutional privation may be associated with autistic-like problems.

1.2 EARLY SOCIAL-EMOTIONAL DEPRIVATION AND BEHAVIOR PROBLEMS

Orphanages vary in their quality of care and degree of deprivation. Some of the most comprehensively studied PI children were adopted from Romanian orphanages in the early 1990s, which have been described as “globally depriving” environments (Rutter et al., 1998). These orphanages lacked adequate nutrition, medical care, sensory and motor stimulation, social-

emotional interactions, and opportunities to build relationships with caregivers. There is a high rate of behavior problems among children adopted from these severely depriving environments (as reviewed above).

Other orphanages are characterized by deficiencies limited primarily to the social-emotional domain. These “relationship” or “socially-emotionally” depriving orphanage environments have also been associated with later behavior problems (see Gunnar, 2001). For example, in the UK, Tizard and colleagues (1975, 1978, 1989) conducted a longitudinal study of children selected to have been healthy, full-term babies who had spent the first 2 to 3 years of their lives in high-quality orphanages in which the child-to-caregiver ratio was 3:1. However, the caregivers were discouraged from forming any type of emotional attachment to the children, and there was high staff turnover, with children experiencing an average of 24 caregivers in 24 months (Tizard & Tizard, 1971).

Children adopted from these socially-emotionally depriving environments were described by their teachers as having more behavior problems than their working-class, parent-reared classmates at both 8 (Tizard, 1977; Tizard & Hodges, 1978) and 16 years of age (Hodges & Tizard, 1989). Thus, even though their early deprivation was limited to the social-emotional domain, these children demonstrated vulnerability to behavior problems many years later.

Further, the types of behavior problems these children exhibited were similar to those found in studies of children adopted from globally depriving orphanages. At 8 years, the items on the teacher-report measure that significantly differentiated the socially-emotionally deprived from the comparison children reflected poor attention and hyperactivity, externalizing problems, and peer difficulties (Tizard & Hodges, 1978). Peer difficulties due to externalizing problems were also apparent at 16 years of age (Hodges & Tizard, 1989). However, Tizard’s sample was

small and much of the data consisted of answers to a few questions in each potential area of concern.

More recently, several orphanages in St. Petersburg, Russia were identified as socially-emotionally depriving (St. Petersburg-USA Orphanage Research Team, 2005). Specifically, these orphanages were found to be acceptable with respect to medical care, nutrition (Kossover, 2004), safety, sanitation, toys, and equipment, but deficient in terms of exposing children to frequent changes in caregivers and insensitive, unresponsive care. Nine or more different caregivers often worked with a group of 12 to 14 children in a given week, and children were periodically “graduated” to new groups with different caregivers. Thus, by the time children were 2 years old they had experienced 60-100 caregivers. Moreover, caregivers rarely initiated social interactions; they responded to infants’ social bids less than 1% of the time, did not respond promptly when infants started crying, and rarely provided warmth and affection (Muhamedrahimov, 1999).

Children in these orphanages showed the same delayed physical and behavioral development as children from globally deficient orphanages, and an intervention that improved the social-emotional environment produced substantial increases in every major aspect of children’s development (St. Petersburg-USA Orphanage Research Team, 2005; in press).

1.3 MODERATORS OF THE ASSOCIATION BETWEEN EARLY INSTITUTIONALIZATION AND CHILDHOOD BEHAVIOR PROBLEMS

There is considerable heterogeneity of outcome among children adopted from orphanages. Factors such as time in an orphanage (age at adoption), time in an adoptive home, and age at assessment may contribute to whether or not children demonstrate problems.

1.3.1 Time in an orphanage (age at adoption)

Being older at adoption has often been associated with an increased risk of behavior problems probably due to increased pre-adoption exposure to adverse circumstances. Across studies, it has been consistently found that the more time children spent in an orphanage the higher their rates of externalizing, internalizing, attention, social, and thought problems (Ames, 1997; Fisher et al., 1997; Groza & Ryan, 2002; Gunnar et al., 2007; Hoksbergen et al., 2004; Kreppner et al., 2001; Le Mare & Audet, 2002; Marcovitch et al., 1997, Verhulst et al., 1992).

Various cutoffs, usually dichotomous, have been examined, including 6, 12, and 24 months. Some results suggest that children adopted from orphanages before 6-12 months may not be at increased risk of later behavior problems (Fisher et al., 1997; MacLean, 2003; Rutter et al., 2001). Children adopted at various ages beyond 6-12 months may be at higher but *equal* risk for behavior problems (Kreppner et al., 2007).

1.3.2 Time in an adoptive home

Once adopted, children begin to experience more consistent parental care and a stable, advantaged environment relative to the orphanage. There is some evidence that behavioral functioning, like physical growth and cognitive development (Johnson et al., 1992, 2001; Rutter & the ERA Study Team, 1998), improves with time in an adoptive home (Hoksbergen et al., 2004; Juffer & van IJzendoorn, 2005).

However, other findings suggest that certain behavior problem rates either do not change or *increase* with time in the adoptive home (e.g., Groza & Ryan, 2002; Gunnar et al., 2007; O'Connor, Rutter & the ERA Team, 2000; Verhulst et al., 1990a). This may be accounted for by the correlation between time in an adoptive home and child age at assessment (e.g., adolescents may be more prone to display consequences of early institutionalization), changes in the expectations of adoptive parents, or stresses in the home. Thus, although development in other areas tends to improve with time in an adoptive home, behavior problems may be more persistent.

1.3.3 Age at assessment

Little is known about behavior problems in preschool-age PI children because most prior studies used samples of school-age PI children. In general, behavior problems tend to be more common in older children. Although some studies of preschool-age PI children have indicated higher rates of behavior problems (Fisher et al., 1997; Marcovitch et al., 1997), there is also some evidence that preschool-age PI children may not be at increased risk of behavior problems (Rutter et al., 2007) and may have lower mean levels of behavior problems than school-age PI

children (Tan & Marfo, 2006). A further examination of behavior problems in preschool-age children is warranted, especially compared to rates in school-age children.

1.4 CURRENT STUDY

The purpose of this study was to examine behavior problems in school-age children adopted from the socially-emotionally depriving Russian orphanages described above (“school-age SED” children). It was predicted that children adopted from these orphanages would be vulnerable to the same types of CBCL behavior problems as children adopted from globally depriving Romanian orphanages (Groza & Ryan, 2002; “GD children”) and orphanages worldwide that varied in their levels of deprivation (Gunnar et al., 2007; “VLD children”). Based on the literature review above, the three groups were predicted to have higher rates of Attention, Social, and Thought Problems than parent-reared children. Rates of these behavior problems were expected to be higher in globally deprived children relative to the other two post-institutionalized groups because of the extreme severity of their early deprivation.

Additional analyses were conducted to at least partially address the influence of potential confounds. First, to examine the influence of adoption itself, American-born children domestically adopted in their first few months (non-deprived; “ND children”) were compared to the CBCL standardization sample. Second, the role of perinatal circumstances was explored by examining the association between birth status and behavior problems in the socially-emotionally deprived group.

Focusing on the socially-emotionally deprived children, rates of behavior problems were predicted to increase with longer exposure to the orphanage environment. Specifically, it was

expected that problems should be more likely to occur in SED children adopted after 6 or 12 months of life. Three groups (≤ 12 , 13-24, and > 24 months at adoption) were examined. Too few children were adopted before 6 months to include a meaningful birth-6 months group.

Among SED children, the association between rates of behavior problems and the length of time spent in a family environment was investigated. It was predicted that behavior problems would increase with time in an adoptive home, largely because recent studies suggest that these problems are persistent.

Another aim of this study was to investigate behavior problems in preschool-age children adopted from socially-emotionally depriving orphanages (“preschool-age SED group”). Preschool-age SED children were *not* expected to have increased behavior problem rates relative to parent-reared children. This follows from reports showing that behavior problems emerge or persist over time rather than being present early on and diminishing thereafter.

Finally, it was expected that mental health service use would be more frequent among SED children with parent-reported behavior problems relative to those who scored in the normal range, which would partly validate the CBCL results.

2.0 METHOD

2.1 SAMPLE DESCRIPTION

2.1.1 Socially-emotionally deprived (SED) group

Most of the SED children (69%) were adopted from the three orphanages in St. Petersburg, Russia described above. All the orphanages from which the SED children were adopted were carefully screened for relatively high quality by the International Assistance Group (IAG), a Pittsburgh-based adoption agency.

Data on the SED group came from two Waves of data collection. In Wave I, surveys were sent in the spring of 2001 to all parents of 6-month- to 18-year-old children adopted through the IAG, and 254 were returned (a 40% response rate). Wave II data were similarly collected in the spring of 2003, and 235 questionnaires were returned (37% response rate). An undetermined number of questionnaires did not reach parents due to relocation, meaning the response rates were actually somewhat higher than these figures imply.

SED children ($N = 260$) were divided into a preschool-age ($N = 133$) and a school-age group ($N = 127$), which corresponded to the version of the CBCL the parent completed. Children were excluded from the sample if they had an incomplete CBCL ($n = 17$) or if they were older than 24 months at adoption and had spent fewer than 10 months in an orphanage ($n =$

3). For the 87 children who had CBCL data from both Waves, the Wave II data were analyzed to select the oldest children. Characteristics of the SED and other groups are given in Table 1.

Table 1. Descriptive data on 127 school-age SED, 899 VLD, 97 GD, 133 preschool-age SED, and 40 ND children

	PI groups				Non-I group
	School-age SED	VLD	GD	Preschool-age SED	ND
Mean (SD) years of age	8.74 (2.09) ^k	8.83 (3.47)	6.74 (1.89) ^g	3.70 (1.41)	12.14 (3.41)
Number of boys / girls	65/62 ^j	319/580	43/54	62/71	21/19
Mean (SD) months at adoption	21.13 (16.84) ^{h,k}	29.5 (30.7)	27.49 (24.71)	13.17 (9.71)	1.61 (2.23)
Birth region of the world	St. Petersburg, Russia (113), other Russian cities (8), FSU (6)	Russia/ E. Europe (267), Latin America/ Carib. (182), Asia (443),	Romania (97)	St. Petersburg (90), other Russian cities (28), FSU (15)	Pittsburgh, PA, USA (40)
Mean (SD) years post-adoption	6.97 (1.57) ^{h,k}	6.4 (2.6) ⁱ	4.45 (.62)	2.60 (1.42)	12.01 (3.40)
Two-parent household	92%	85%	91%	94%	93%
Parents with 4-yr college	68%	71%	--	66%	74%
Mean income	\$100,000 to \$125,000 ^b	\$107,500	\$73,000 ^c	\$125,000 to \$150,000 ^c	--
Stressful family event	3% ^d	4.3%	--	5% ^f	--

Note. PI = post-institutionalized; Non-I = non-institutionalized; FSU = former Soviet Union; E. Europe = Eastern Europe; Carib. = Caribbean; -- = unavailable.

^b *n* = 94; ^c *n* = 85; ^d *n* = 104; ^e *n* = 92; ^f *n* = 91.

^g = significantly different from SED, VLD groups

^h = significantly different from VLD, GD groups

ⁱ = significantly different from GD group

^j = significantly different from VLD group

^k = significantly different from preschool-age SED group

2.1.2 Various levels of deprivation (VLD) group

The VLD group was recruited by Gunnar et al. (2007) as part of the International Adoption Project. All children who were internationally adopted by non-relatives in Minnesota from 1990 through 1998 were selected from the Minnesota Department of Human Services adoption records. In 2001, surveys were mailed to adoptive parents with children between the ages of 4 and 18. Parents returned completed surveys that included the CBCL for 1,948 adopted children (66% response rate).

VLD children ($N = 899$) were those who had spent 75% of their lives in institutions prior to adoption (see Table 1). Very little is known about the quality of these specific orphanages, but they can be assumed to have varied in their levels of deprivation consistent with reports of orphanages in different countries (Nelson, 2007).

2.1.3 Globally deprived (GD) group

Parents of children adopted from Romania were recruited through 10 parent support groups located throughout the US (Groze & Ileana, 1996; Groza & Ryan, 2002). Data were collected in the fall of 1995 on 238 children (approximately 30% response rate). The GD group ($N = 97$) consisted of children in this sample adopted from orphanage environments and was subject to the same exclusionary criteria as the SED group.

2.1.4 Non-deprived (ND) group

This comparison group is composed of American-born children who were domestically adopted during their first few months of life. The ND group was conceptualized as being similar to Rutter et al.'s (1998) within-UK adoptee group; both groups were domestically-adopted before the age of six months. The ND group controls for the experience of adoption and of rearing in advantaged adoptive homes, but differs from the post-institutionalized groups with respect to an absence of early deprivation.

In 2003, the same Wave II questionnaire was mailed to parents who had adopted American children during the last 8 years through The Children's Home in Pittsburgh. A total of 69 questionnaires were returned (41% response rate); 42 surveys were from parents of 6- to 18-year-old children.

The ND group ($N = 40$) comprised school-age children for whom parents completed the CBCL/6-18. They were subject to the same exclusionary criteria as the other groups. Table 1 presents the demographics for this group.

2.2 SURVEY DESCRIPTION (SED AND ND GROUPS)

The package mailed to families contained a battery of numerous assessments, including a 111-item questionnaire used in the International Adoption Project (Gunnar, 2000; Gunnar et al., 2007), the CBCL, an instruction sheet, a consent form, and a stamped return envelope. The instruction sheet described the purpose of the study and assured parents of confidentiality for the information they provided.

2.3 MEASURES

2.3.1 Behavior problems

2.3.1.1 Child behavior checklist for ages 6 - 18 (CBCL/6 - 18)

The CBCL/6-18 (Achenbach & Rescorla, 2001) asks parents to report the extent to which each of 113 listed behaviors is true of their child on a 3-point Likert scale (0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true). Behavior problem scores for each child are obtained by adding the 1's and 2's circled by his or her parent on each scale. The CBCL/6-18 has 2 broadband scales and 8 narrow-band subscales. The broadband Internalizing Problem scale consists of Anxious/Depressed (13 items), Withdrawn/Depressed (8 items), and Somatic Complaints (11 items); the broadband Externalizing Problem scale consists of Rule-Breaking Behavior (17 items) and Aggressive Behavior (18 items). Three subscales (Attention Problems [10 items], Social Problems [11 items], and Thought Problems [15 items]) fit neither the Externalizing nor the Internalizing scales. The CBCL/6-18 has well-documented reliability and validity for assessing problem behaviors among nonadopted as well as adopted children from various ethnic backgrounds (Crijnen, Achenbach, & Verhulst, 1999; Liu et al., 1999; Mattison & Spitznagel, 1998; Verhulst et al., 1990a, 1990b; Weine, Philips, & Achenbach, 1995).

Both the average raw scores and the percentage of scores in the borderline plus clinical range ($T \geq 61$; Gunnar et al., 2007; Achenbach, 1991, pg. 58) were examined for each CBCL/6-18 broadband scale and subscale. $T \geq 61$ corresponds to the top 14% of the normative sample (Achenbach & Rescorla, 2001). T scores were normed separately for boys and girls and adjusted for differences in levels of behavior problems during childhood (6 – 11) versus adolescence (12

– 18) based on a nationally-representative sample of nonreferred children (Achenbach & Rescorla, 2001).

2.3.1.2 Child behavior checklist for ages 1½ - 5 (CBCL/1½ - 5)

Although similar in format to the CBCL/6-18, the CBCL/1½ - 5 (Achenbach & Rescorla, 2001) has 100 items. This measure has 2 broadband scales and 7 subscales. The Internalizing Problem scale consists of the Emotionally Reactive (9 items), Anxious/Depressed (8 items), Somatic Complaints (11 items), and Withdrawn (8 items) subscales. The Externalizing Problem scale consists of the Attention Problems (5 items) and Aggressive Behavior (19 items) subscales. The Sleep Problems subscale (7 items) does not factor into either broadband scale. The CBCL/1½-5 has high test-retest reliability, high internal consistency, and most parents agree as to whether or not their child is in the problem range (Achenbach & Rescorla, 2001).

2.3.2 Time in an orphanage

Only 80% of school-age SED parents were able to provide the amount of time the child had been in an orphanage, whereas all of them were able to provide the child's age at adoption. Time in an orphanage was strongly correlated with age at adoption in the school-age, $r = .86, p < .01, n = 102$, and in the preschool-age SED groups, $r = .83, p < .001, n = 109$. Therefore, age at adoption was used as a proxy for time in an orphanage, because it was deemed more accurately reported, it was highly correlated with time in an orphanage, and it was available for more cases. For one set of analyses, the school-age SED and GD children were divided into three groups: ≤ 12 , 13-24, or > 24 months at adoption. For another set of analyses, they were grouped into those who were \leq and > 12 months at adoption.

2.3.3 Time in an adoptive home

To obtain a measure of time in an adoptive home, age at adoption in months was subtracted from age at assessment in months.

2.3.4 Birth circumstances

Birth weight (in grams) and prematurity (1=yes, 0=no) served as rough measures of birth circumstances for the SED groups only. Adoptive parents provided the birth weight of their child and also reported whether the child was born prematurely. Children were coded as low birth weight (LBW) if they weighed less than 2500 grams (5 pounds 8 ounces) at birth. Prematurity was strongly associated with LBW in the school-age, $\chi^2(1, N = 70) = 48.69, p < .001$, and preschool-age SED groups, $\chi^2(1, N = 90) = 27.00, p < .001$. Therefore, if children were reported to be *either* premature *or* LBW, they were coded as having poor birth circumstances.

Parents provided birth data for 101 out of 127 school-age SED children, so there was potential for bias in the sample of parents who reported on birth circumstances compared to those who did not provide this information. Children whose parents did not provide birth information were older at adoption ($M = 35.94, SD = 19.89$) than children with birth data ($M = 17.36, SD = 13.70; t(31)=4.51, p < .001$), perhaps because birth data were less frequently available years ago.

2.3.5 Parent education

Parent education was reported as the highest level of education completed. These responses were dichotomized to distinguish families in which the parent(s) had *4-yr college degree or more* from those with less education.

2.3.6 Family income

Family income prior to taxes in the year prior to completion of the survey was reported in \$25,000 increments up to \$200,001+. Each income increment was assigned a numeric value from 1 for < \$50,000 to 8 for \geq \$200,001.

2.3.7 Two-parent household

Parents also reported the composition of the family, including their marital status (married, partnered, separated, divorced, single never married, widowed; scored as 0=not married, 1=married including partnered) to reflect children with two adults in the home serving in the parenting role.

2.3.8 Stressful family event

Parents reported on the presence or absence of the following life stressors in the family within the past year: divorce, separation, or death of a family member (0 = none, 1 = any occurred).

2.3.9 Mental health services

In both Waves of data collection, parents reported on whether they had ever provided services from a psychologist, psychiatrist, or social worker for their children (0 = none, 1 = any services used). Additionally, in the Wave II survey, another question asked parents to indicate whether they had provided psychological counseling, anger management counseling, attachment counseling, or behavior modification for their children. Data from this question were used either 1) to code for mental health service use if parents did not complete the first question or 2) to check the parent's response to the first question.

2.4 ANALYSES

Where appropriate, analyses were conducted using *t* tests for unequal variances. There were very few cases with missing data because those with a large number of missing answers were excluded from the analyses altogether. For missing CBCL data, the average of the subscale in which the missing item belonged was calculated; the average was rounded to the nearest whole number (0, 1, or 2) and then entered in place of the missing item.

3.0 RESULTS

3.1 DIFFERENCES IN DEMOGRAPHICS BETWEEN GROUPS

Preliminary analyses were conducted to determine which variables needed to be involved in the main analyses. This section presents significant between-group differences for the demographics displayed in Table 1, and the subsequent sections show how these demographic factors are related to behavior problems. Based on these analyses, age at assessment was included as a covariate in comparisons with the GD group and time in an orphanage (age at adoption) in comparisons with the school-age SED group. Gender, time in an adoptive home, and birth circumstances were not used as covariates.

3.1.1 School-age SED and VLD groups

The VLD group was older at adoption, $t(1024) = 3.01, p < .01$, had spent less time in an adoptive home, $t(1024) = 2.41, p < .05$, and had a higher ratio of girls to boys, $\chi^2(1, N = 1026) = 11.71, p < .01$, than the SED group.

3.1.2 School-age SED and GD groups

The GD sample was significantly younger at assessment, $t(227) = 7.95, p \leq .001$, had spent less time in their adoptive homes, $t(200) = 16.48, p \leq .001$, and was older at adoption, $t(173) = -2.02, p < .05$, than the SED sample.

3.1.3 VLD and GD groups

The VLD group was significantly older at assessment, $t(974) = 5.86, p < .001$, and had been in their adoptive homes longer, $t(999) = 8.03, p < .001$, than the GD group. The groups were not significantly different in gender or time in an orphanage.

3.1.4 School-age and preschool-age SED groups

The school-age SED children were significantly older at assessment, $t(220) = 22.52, p < .001$, older at adoption, $t(199) = 4.64, p < .001$, and had spent more time in an adoptive home, $t(258) = 23.61, p < .001$, than the preschool-age SED group. They did not significantly differ in the percentage of children with poor birth circumstances.

3.2 GENDER DIFFERENCES

3.2.1 SED groups

Results of chi-square tests calculated separately for the preschool- and school-age SED groups indicated that boys and girls within these groups did not differ in their rates of clinical/borderline scores on the CBCL broadband scales and subscales. In addition, *t* tests indicated no gender differences in behavior problem mean *scores* in both the preschool-and school-age SED groups.

3.2.2 GD group

Globally-deprived boys had higher rates of Withdrawn/Depressed problems, 23% vs. 7%, Fisher's exact test, $p < .05$. Girls had higher rates of Thought Problems, 61% vs. 40%, Fisher's exact test, $p < .05$, and Attention Problems, 57% vs. 33%, Fisher's exact test, $p < .05$. However, boys and girls did not significantly differ in their mean scores on any of the CBCL broadband scales or subscales or in their mean time in an orphanage.

3.3 BIRTH CIRCUMSTANCES

Poor birth status was not found to be associated with behavior problems in either the school-age or preschool-age SED groups.

3.3.1 School-age SED group

Out of the 101 school-age SED children with birth information, 46 children had poor birth circumstances. Chi-square tests showed that children with normal birth status and those with poor birth status did not significantly differ in the rates of any type of behavior problem. Two multivariate analyses of variance were conducted to examine differences between children with poor birth status and those with normal birth status on scores 1) on the broadband scales and 2) on the subscales. Neither MANOVA was significant. An ANOVA examining mean differences on the Total Problems scale among the two birth circumstance groups was not significant.

3.3.2 Preschool-age SED group

Out of the 126 preschool-age SED children with birth information, 46 children had poor birth circumstances. Preschool-age SED children with and without birth complications did not differ in behavior problem rates or scores.

3.4 TIME IN AN ORPHANAGE

3.4.1 School-age SED group

In the school-age SED group, time in an orphanage correlated significantly with age at assessment, $r = .67, p < .001$. Therefore, the effects of these variables cannot be separated.

Analyses for rates provide some control for age at assessment, because the *T* score cutpoints are different for 6- to 11-year-olds versus 12- to 18-year-olds.

Children who spent longer in orphanages had higher rates of clinical/borderline scores on the Anxious/Depressed, Rule-Breaking Behavior, Aggressive Behavior, and Attention Problems subscales, and on the Internalizing, Externalizing, and Total Problems broadband scales (see Table 2). Table 3 shows that as time in an orphanage increased, scores on the Withdrawn/Depressed, Anxious/Depressed, Rule-Breaking Behavior, Attention Problems, and Social Problems subscales, and the Internalizing and Externalizing broadband scales increased¹.

¹ Semipartial correlations of age at adoption and behavior problem scores, controlling for age at assessment, were significant only for scores on the Withdrawn/Depressed subscale and Internalizing broadband scale. Since the correlation between these two age-related variables was so high, semipartial correlations were likely to have partialled out the effect of age at adoption. Also, these correlations use the entire range of scores, which might not be meaningful.

Table 2. Percentage of SED and GD children with clinical/borderline behavior problems ($T \geq 61$) by time in an orphanage (age at adoption)

CBCL scales	SED group				GD group			
	Months in an orphanage			$\chi^2(2)$ N=125	Months in an orphanage			$\chi^2(2)$ N=97
	≤ 12 n = 52	13-24 n = 38	> 24 n = 35		≤ 12 n = 29	13-24 n = 31	> 24 n = 37	
Anxious/ Depressed	2%	30%	29%	15.37***	7%	13%	38%	11.17**
Withdrawn/ Depressed	10%	19%	20%	ns	10%	16%	16%	ns
Somatic Complaints	2%	11%	9%	ns	7%	6%	8%	ns
Rule-Breaking Behavior	2%	22%	34%	16.40***	21% _b	10%	35%	6.33*
Aggressive Behavior	10%	38%	31%	10.78**	24%	19%	35%	ns
Attention Problems	13%	37%	31%	7.17*	24%	39%	70% _b	14.99**
Social Problems	8%	21%	20%	ns	21%	29%	51% _b	7.44*
Thought Problems	13%	27%	17%	ns	48% _b	35%	68% _b	7.13*
Internalizing	2%	24%	23%	11.48**	7%	13%	24%	ns
Externalizing	6%	35%	34%	14.49**	24%	13% _a	38%	ns
Total Problems	4%	38%	31%	17.33***	24% _a	29%	49%	ns

_a significantly different from the SED subgroup in the same time in an orphanage category, Fisher's exact test, $p < .05$

_b significantly different from the SED subgroup in the same time in an orphanage category, Fisher's exact test, $p < .01$

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3. Correlation of time in an orphanage (age at adoption), age at assessment, and time in an adoptive home with behavior problem scores in the SED and GD groups

CBCL scales	SED group			GD group		
	Age at adoption (months)	Age at assessment (years)	Time in home (years)	Age at adoption (months)	Age at assessment (years)	Time in home (years)
Withdrawn/Depressed	.23**	.13	-.03	.13	.14	-.00
Somatic Complaints	.07	.01	-.05	-.01	.02	.08
Anxious/Depressed	.24**	.19*	.05	.24*	.27**	.01
Rule-Breaking Behavior	.30**	.29**	.11	.30**	.31**	-.03
Aggressive Behavior	.14	.18*	.12	.26*	.28**	-.01
Attention Problems	.21*	.25**	.14	.50**	.50**	-.16
Social Problems	.20*	.14	.01	.29**	.32**	.01
Thought Problems	.03	-.02	-.05	.34**	.31**	-.21*
Internalizing	.24**	.16	.01	.20	.22*	.02
Externalizing	.24**	.29**	.18	.28**	.30**	-.02
Total Problems	.23**	.22*	.09	.33**	.34**	-.06

* $p < .05$, ** $p < .01$

3.4.2 GD group

Time in an orphanage and age at assessment were highly correlated in the GD group as well, $r = .96, p < .001$. Results displayed in Table 2 indicate that as time in an orphanage increased, rates of clinical/borderline scores on the Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, and Rule-Breaking Behavior subscales also increased. Table 3 shows that time in an orphanage correlated significantly with scores on the Anxious/Depressed, Rule-Breaking Behavior, Aggressive Behavior, Attention, Social, and Thought Problems subscales, and on the Externalizing and Total Problems broadband scales.

3.4.3 Correlation with SES variables

There was no correlation between time in an orphanage (age at adoption) and adoptive mother's education, $r = -.01$, *ns*, or adoptive family income, $r = .07$, *ns*, although the ranges of the SES variables were limited. This suggests that the positive association between time in an orphanage and behavior problems could not be attributed to selective adoption.

3.5 AGE AT ASSESSMENT

3.5.1 School-age SED group

Age at assessment was significantly correlated with rates of Attention Problems ($r_b = .33$, $p < .01$), Rule-Breaking Behavior ($r_b = .31$, $p < .01$), and broadband Externalizing ($r_b = .24$, $p < .05$). Age at assessment was positively associated with scores on the Anxious/Depressed, Rule-Breaking Behavior, Aggressive Behavior, and Attention Problems subscales, and on the Externalizing Problems broadband scale (see Table 3).

3.5.2 GD group

Age at assessment was significantly correlated with rates of Anxious/Depressed ($r_b = .31$, $p < .01$), Attention Problems ($r_b = .64$, $p < .001$), Social Problems ($r_b = .33$, $p < .05$), Rule-Breaking Behavior ($r_b = .23$, $p < .05$), Aggressive Behavior ($r_b = .36$, $p < .01$), Externalizing ($r_b = .32$, $p < .01$), and Total Problems ($r_b = .35$, $p < .01$). Age at assessment was positively correlated with

scores on the Anxious/Depressed, Rule-Breaking, Aggressive Behavior, Attention, Social, and Thought Problems subscales, and on the Externalizing and Total Problems broadband scales (see Table 3).

3.6 TIME IN AN ADOPTIVE HOME

3.6.1 School-age SED group

As shown in Table 4, there was only one significant correlation between time in an adoptive home and behavior problem rates; rates of Attention Problems *increased* with time in an adoptive home. This could be attributed to age at assessment, since age was positively correlated with time in an adoptive home, $r = .74, p < .001$. There were no significant correlations between time in an adoptive home and *scores* on any behavior problem scale (see Table 3).

Table 4. Biserial correlations of time in an adoptive home with rates of clinical/borderline behavior problems in the SED and GD groups

CBCL/6-18 scales	SED group	GD group
	Years in home	Years in home
Withdrawn/Depressed	.06	.07
Somatic Complaints	.01	.03
Anxious/Depressed	.02	-.01
Rule-Breaking Behavior	.10	-.17
Aggressive Behavior	.02	.14
Attention Problems	.32**	-.13
Social Problems	-.02	-.03
Thought Problems	.01	-.33**
Internalizing	-.03	.07
Externalizing	.08	-.04
Total Problems	.01	-.08

* $p < .05$, ** $p < .01$

3.6.2 GD group

As shown in Table 4, globally-deprived children who spent more time in an adoptive home had lower rates of CBCL Thought Problems. Time in an adoptive home was also negatively correlated with *scores* on the Thought Problems subscale (see Table 3). Note that in the GD group, time in an adoptive home was negatively correlated with time in an orphanage, $r = -.41$, $p < .001$.

3.7 COMPARISONS WITH PARENT-REARED CHILDREN

The post-institutionalized groups (SED, VLD, and GD) had higher percentages of clinical/borderline scores on the Aggressive Behavior and Attention Problems subscales and on the Externalizing Problems broadband scale than the CBCL standardization sample. Rates of Social Problems, Thought Problems, and Rule-Breaking Behavior were significantly higher in the VLD and GD groups, and higher, but not significantly so, in the SED group. There were no significant differences between the ND group and the normative sample on rates of any CBCL behavior problem.

Results for mean scores were very similar to those for rates. The SED group had significantly higher mean scores than parent-reared children on the Aggressive Behavior and Attention Problems subscales. The GD group had higher mean scores on these subscales and also on the Rule-Breaking Behavior, Thought Problems, and Social Problems subscales and on the Externalizing and Total Problems broadband scales. Similar to results for behavior problem rates, ND children did *not* have significantly higher mean levels of any type of behavior problem than the CBCL standardization sample.

Table 5. Percentage of SED, VLD, GD, and ND children with clinical/borderline behavior problems ($T \geq 61$)

	PI groups			Non-I group
	SED (<i>N</i> =127)	VLD (<i>N</i> =899)	GD (<i>N</i> =97)	ND (<i>N</i> =40)
Withdrawn/Depressed	17% ^a	11%	14%	8%
Somatic Complaints	7%	11%	7%	15%
Anxious/Depressed	18%	15%	21%	8%
Rule-Breaking Behavior	17%	21% ^b	23% ^b	10%
Aggressive Behavior	25% ^b	19% ^b	27% ^b	10%
Attention Problems	27% ^b	28% ^b	46% ^{b, c}	18%
Social Problems	17%	22% ^b	35% ^{b, c}	8%
Thought Problems	20%	22% ^b	52% ^{b, c}	13%
Internalizing	15%	12%	15%	13%
Externalizing	24% ^b	19% ^b	26% ^b	8%
Total Problems	23% ^b	18% ^b	35% ^{b, c}	15%

Note. PI, post-institutionalized; Non-I, non-institutionalized.

^a differs significantly from the VLD group

^b differs significantly from the CBCL standardization sample ($N = 438$; 14% rate)

^c differs significantly from the VLD and SED groups

3.7.1 Rates of behavior problems

Table 5 displays the percentage of children in each group scoring in the clinical plus borderline range ($T \geq 61$) on each of the narrow-band and broadband CBCL scales. Figure 1 shows results for the CBCL subscales.

The SED group had higher rates of clinical/borderline scores on the Externalizing, $\chi^2(1, N=565) = 6.85, p < .01$, and Total Problems, $\chi^2(1, N=565) = 5.83, p < .05$, broadband scales, and

on the Aggressive Behavior, $\chi^2 (1, N=565) = 9.09, p < .01$, and Attention Problems, $\chi^2 (1, N=565) = 11.61, p < .001$, subscales than the standardization sample.

The VLD group had significantly higher rates of clinical/borderline scores on the Externalizing, $\chi^2 (1, N=1337) = 5.33, p < .05$, and Total Problems, $\chi^2 (1, N=1317) = 4.02, p < .05$, broadband scales, and on the Aggressive Behavior, $\chi^2 (1, N=1337) = 5.33, p < .05$, Rule-Breaking Behavior, $\chi^2 (1, N=1337) = 9.76, p < .01$, Attention Problems, $\chi^2 (1, N=1337) = 32.68, p < .001$, Social Problems, $\chi^2 (1, N=1337) = 12.36, p < .001$, and Thought Problems, $\chi^2 (1, N=1337) = 12.36, p < .001$, subscales than the standardization sample.

The GD group had higher rates of clinical/borderline scores on the Externalizing, $\chi^2 (1, N=535) = 8.26, p < .01$, and Total Problems, $\chi^2 (1, N=535) = 24.27, p < .001$, broadband scales, and on the Aggressive Behavior, $\chi^2 (1, N=535) = 9.67, p < .01$, Rule-Breaking Behavior, $\chi^2 (1, N=535) = 4.64, p < .05$, Social Problems, $\chi^2 (1, N=535) = 24.27, p < .001$, Attention Problems, $\chi^2 (1, N=535) = 52.68, p < .001$, and Thought Problems, $\chi^2 (1, N=535) = 68.35, p < .001$, subscales than the standardization sample.

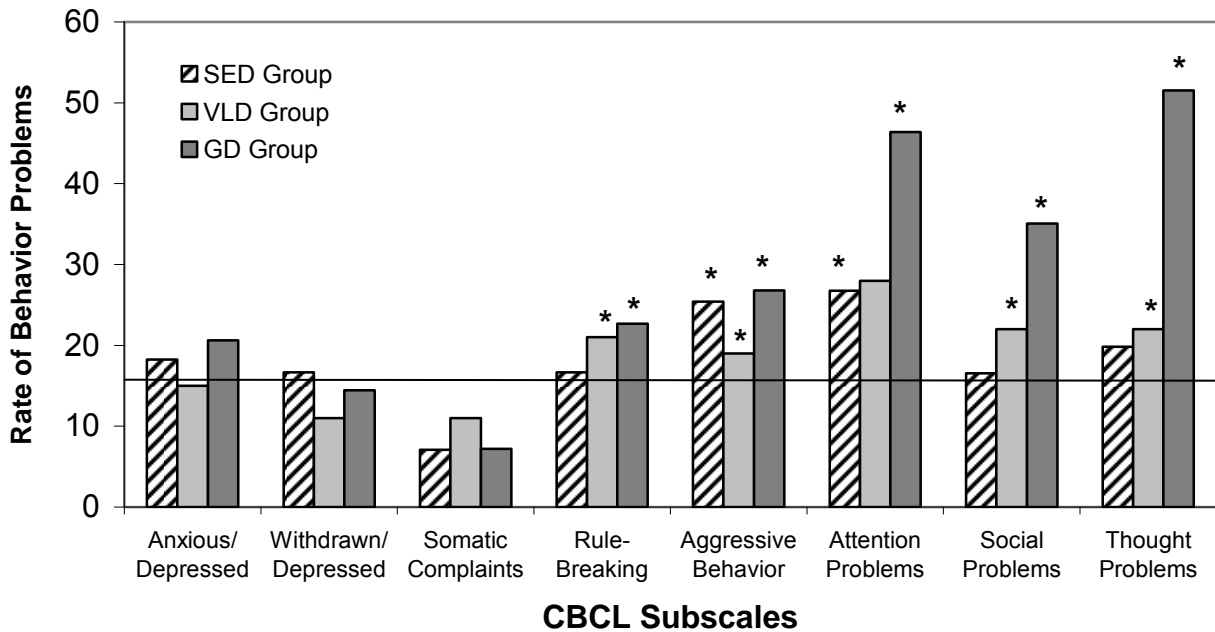


Figure 1. Percentage of clinical/borderline scores on the CBCL subscales in the three post-institutionalized groups and the standardization sample (horizontal line at 14%). Asterisks denote significant differences.

3.7.2 Mean scores

The 6- to 11-year-old SED ($n = 117$) and GD ($n = 93$) groups were compared to the 6- to 11-year-old standardization sample. This SED subgroup had spent less time in orphanages on average than the SED group as a whole. One sample t tests were conducted. The 6- to 11-year-old SED children had higher mean scores on the Attention Problems and Aggressive Behavior subscales than the standardization sample (see Table 6). The 6- to 11-year-old GD group had higher mean scores than the standardization sample on the Attention Problems, Social Problems, Thought Problems, Aggressive Behavior, and Rule-Breaking Behavior subscales, and on the Externalizing and Total Problems broadband scales (see Table 6).

Table 6. Behavior problem mean scores in the SED, GD and CBCL normative sample groups

CBCL scales	School-age SED group	GD group	CBCL norms	SED group vs. norms	GD group vs. norms	SED vs. GD group
	(<i>N</i> = 117) <i>M</i> (<i>SD</i>)	(<i>N</i> = 93) <i>M</i> (<i>SD</i>)	(<i>N</i> = 777) <i>M</i> (<i>SD</i>)	<i>t</i> (116)	<i>t</i> (92)	<i>F</i> (1, 206)
Anxious/Depressed	3.00 (3.22)	3.54 (3.80)	3.00 (2.81)	0	1.36	<i>ns</i>
Withdrawn/Depressed	1.40 (1.81)	1.55 (2.28)	1.25 (1.60)	.92	1.26	<i>ns</i>
Somatic Complaints	.90 (1.43)	.95 (1.24)	1.20 (1.70)	-2.29*	-1.98	<i>ns</i>
Rule-Breaking Behavior	2.01 (2.62)	2.69 (3.52)	1.75 (1.96)	1.06	2.58*	<i>ns</i>
Aggressive Behavior	5.80 (5.78)	7.97 (7.09)	4.60 (4.25)	2.24*	4.58***	3.92*
Attention Problems	4.86 (4.40)	6.77 (5.47)	3.50 (3.27)	3.35**	5.77***	4.05*
Social Problems	2.38 (2.75)	3.78 (3.67)	2.50 (2.55)	-.45	3.38**	6.77*
Thought Problems	2.13 (2.62)	4.20 (4.46)	1.75 (1.90)	1.56	5.31***	11.90**
Internalizing	5.20 (5.16)	5.84 (5.89)	5.50 (5.23)	-.63	.56	<i>ns</i>
Externalizing	7.59 (7.77)	10.18 (9.46)	6.35 (5.81)	1.73	3.91***	<i>ns</i>
Total Problems	26.28 (21.28)	35.51 (27.47)	23.15 (16.75)	1.58	4.34***	4.58*

Note. These are for the 6- to 11-year old children in these groups.

p* < .05, *p* < .01, ****p* < .001

3.8 COMPARISONS AMONG THE POST-INSTITUTIONALIZED GROUPS

The three post-institutionalized groups (SED, GD, and VLD) did not differ in their rates of clinical/borderline scores on the Internalizing or Externalizing broadband scales or associated subscales. However, the GD group had higher rates of clinical/borderline scores on the Attention, Social, and Thought Problems subscales than the VLD and SED groups, who had similar rates of these problems. This was the case after accounting for time in an orphanage. Results for the mean scores closely resembled those for rates; the GD group had higher mean

scores than the SED group on the same three subscales and also on the Aggressive Behavior subscale, controlling for time in an orphanage.

3.8.1 Rates of behavior problems

3.8.1.1 SED and VLD groups

As shown in Table 5, the only significant difference found between the SED and VLD groups was a *higher* rate of clinical/borderline range scores on the Withdrawn/Depressed subscale in the SED group, $\chi^2(1, N=1026) = 4.26, p < .05$.

3.8.1.2 SED and GD groups

The GD group had a higher proportion of clinical/borderline range Attention Problems, $\chi^2(1, N=229) = 8.36, p < .01$, Social Problems, $\chi^2(1, N=229) = 9.68, p < .01$, Thought Problems, $\chi^2(1, N=228) = 25.84, p < .01$, and Total Problems, $\chi^2(1, N=228) = 4.17, p < .05$, than the SED group (see Figure 2).

Behavior problem rates were then compared between the SED and GD children according to time in an orphanage (age at adoption; see Table 2). Among those adopted at ≤ 12 months, GD children had significantly higher rates of Thought Problems, Rule-Breaking Behavior, and Total Problems than the SED group. Among those adopted between 13 and 24 months, the SED children had significantly higher rates of Externalizing Problems than the GD children. Among those adopted at > 24 months, the GD children had significantly higher rates of Attention, Social, and Thought Problems than the SED children. Thus, the GD group had higher rates of Attention, Social, and Thought Problems, and Rule-Breaking Behavior than the school-age SED group controlling for time in an orphanage (age at adoption).

3.8.1.3 VLD and GD groups

Similarly, the globally-deprived children had higher rates of Attention Problems, $\chi^2(1, N=1001) = 12.76, p < .001$, Social Problems, $\chi^2(1, N=1001) = 7.75, p < .01$, Thought Problems, $\chi^2(1, N=1001) = 40.99, p < .001$, and Total Problems, $\chi^2(1, N=976) = 15.30, p < .001$, than the children adopted from orphanages of varying levels of deprivation (see Table 5). The VLD and GD children did *not* significantly differ on mean time in an orphanage so they were not compared according to this variable.

3.8.2 Mean scores

Multivariate analyses of covariance (MANCOVA) were conducted to test the differences in mean scores on the CBCL broadband scales and subscales between the 6- to 11-year-old children in the SED and GD groups ($n = 117, 93$, respectively) while controlling for time in an orphanage. Only the MANCOVA with scores on the CBCL subscales was significant, $F(8, 199) = 3.31, p < .01$ (Wilks' $\lambda = .88$). Univariate tests revealed that the GD group had higher mean scores than the SED group on the Attention Problems, Social Problems, Thought Problems, and Aggressive Behavior subscales (see Table 6). A separate ANCOVA controlling for time in an orphanage indicated that the GD group had a significantly higher mean score than the SED group on the Total Problems broadband scale.

3.9 COMPARISONS BETWEEN SED CHILDREN ADOPTED BEFORE AND AFTER 12 MONTHS OF AGE

The SED subgroup adopted > 12 months of age was significantly older at assessment than the SED subgroup adopted \leq 12 months, $M (SD) = 9.58 (2.15), 7.59 (1.37)$, respectively. Therefore analyses involving the behavior problem mean scores controlled for age at assessment. Two children who had been diagnosed with autism were excluded from these analyses (all previous analyses were re-run with these children removed and found to be the same).

SED children adopted after 12 months of age had higher percentages of clinical/borderline scores *and* higher mean scores (controlling for age at assessment) on the Anxious/Depressed, Attention Problems, Aggressive Behavior, and Social Problems subscales and Internalizing and Total Problems broadband scales compared to those adopted at 12 months of age or younger. They also had higher rates and mean levels of these behavior problems (with the exception of Social Problems) than the CBCL standardization sample, whereas those adopted at 12 months or younger did not.

Table 7. Percentage of SED children who spent 12 or fewer and greater than 12 months in an orphanage with clinical/borderline behavior problems

CBCL scales	Months in an orphanage		≤ vs. > 12 months $\chi^2(1, N=125)$	> 12 months vs. norms $\chi^2(1, N=511)$
	≤ 12 (n=52)	> 12 (n=73)		
Anxious/Depressed	2%	29%	15.36***	10.23**
Withdrawn/Depressed	10%	19%	<i>ns</i>	<i>ns</i>
Somatic Complaints	2%	10%	<i>ns</i>	<i>ns</i>
Rule-Breaking Behavior	2%	28%	14.35***	8.51**
Aggressive Behavior	10%	35%	10.38**	20.84***
Attention Problems	13%	34%	6.89**	18.46***
Social Problems	8%	21%	3.89*	<i>ns</i>
Thought Problems	13%	22%	<i>ns</i>	<i>ns</i>
Internalizing	2%	24%	11.45**	5.51*
Externalizing	6%	35%	14.48***	20.84***
Total Problems	4%	35%	16.90***	20.84***

Note. Rate of clinical/borderline behavior problems in standardization sample ($N=438$): 14%.
* $p < .05$; ** $p < .01$, *** $p < .001$

3.9.1 Rates of behavior problems

SED children adopted at > 12 months of age had significantly higher rates of clinical/borderline scores compared to both those adopted at ≤ 12 months of age and the standardization sample on the Anxious/Depressed, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior subscales, and on the Internalizing, Externalizing, and Total Problems broadband scales (see Table 7 and Figure 2). They also had significantly higher rates of Social Problems compared to those adopted at ≤ 12 months but not the CBCL standardization sample. The SED children

adopted at 12 months of age or younger had rates of behavior problems that were not significantly different from the 14% found in the standardization sample.

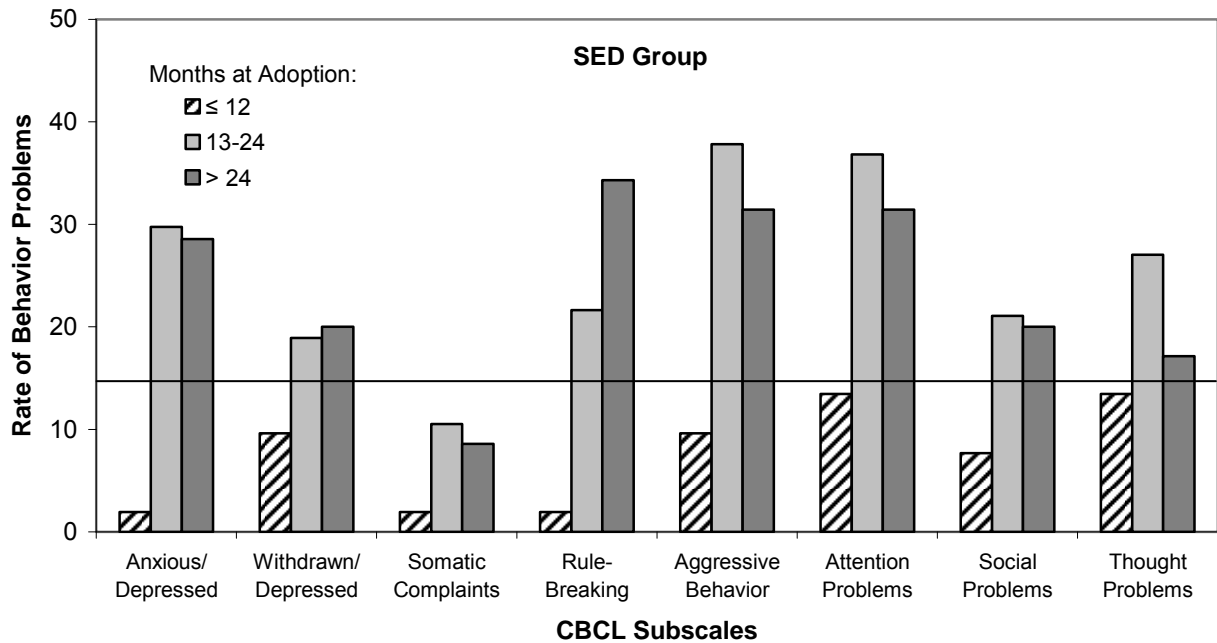


Figure 2. Percentage of clinical/borderline scores on the CBCL subscales for SED children adopted at or before 12, between 13 and 24, and after 24 months, and for children in the standardization sample (horizontal line at 14%).

3.9.2 Mean scores

Two MANCOVAs were conducted to determine whether there were significant differences between the SED children adopted \leq and $>$ 12 months controlling for age at assessment; the dependent variables were the mean scores on the CBCL 1) subscales and 2) broadband scales. The former was marginally significant, $F(8,114) = 1.94, p = .06$, (Wilks' $\lambda = .88$), and the latter was significant, $F(2, 120) = 6.33, p < .01$, (Wilks' $\lambda = .91$). Univariate tests indicated that SED children adopted at $>$ 12 months of age had higher mean scores on the Anxious/Depressed,

Withdrawn/Depressed, Somatic Complaints, Attention Problems, Social Problems, Thought Problems, and Aggressive Behavior subscales, and the Internalizing and Total Problems broadband scales than those adopted at ≤ 12 months of age, controlling for age at assessment (see Table 8).

The SED children (6- to 11-year-olds only) adopted \leq and $>$ 12 months ($n = 52, 63$, respectively) were compared to the standardization sample separately. SED children adopted $>$ 12 months of age had significantly higher mean scores than the standardization sample on the Anxious/Depressed, Withdrawn/Depressed, Thought Problems, Attention Problems, Aggressive Behavior, and Rule-Breaking Behavior subscales, and on the Externalizing and Total Problems broadband scales (see Table 8). In contrast, SED children ≤ 12 months at adoption did *not* have significantly higher scores than the standardization sample on any CBCL behavior problem scales.

Table 8. Behavior problem mean scores for SED children who spent 12 or fewer and greater than 12 months in an orphanage and the CBCL standardization sample

	<u>Months in an orphanage</u>		<u>≤ vs. >12 months</u>	<u>CBCL norms</u>	
	<u>≤ 12</u> (<i>n</i> = 52) <i>M</i> (<i>SD</i>)	<u>> 12</u> (<i>n</i> = 73) <i>M</i> (<i>SD</i>)		<i>F</i> (1,121)	<u>(<i>n</i> = 777)</u> <i>M</i> (<i>SD</i>)
Anxious/Depressed	1.60 (1.59)	4.04 (3.82)	13.70***	3.00 (2.81)	2.43*
Withdrawn/Depressed	.89 (1.16)	1.81 (2.11)	5.46*	1.25 (1.60)	1.97*
Somatic Complaints	.60 (1.24)	1.10 (1.62)	4.02*	1.20 (1.70)	<i>ns</i>
Rule-Breaking Behavior	1.17 (1.26)	2.97 (3.87)	<i>ns</i>	1.75 (1.96)	2.26*
Aggressive Behavior	3.98 (3.87)	6.97 (6.50)	4.46*	4.60 (4.25)	2.93**
Attention Problems	3.19 (3.34)	6.01 (4.54)	6.41*	3.50 (3.27)	4.30***
Social Problems	1.56 (2.02)	2.96 (3.03)	4.90*	2.50 (2.55)	<i>ns</i>
Thought Problems	1.31 (1.75)	2.29 (2.50)	6.26*	1.75 (1.90)	2.33*
Internalizing	3.04 (2.83)	6.79 (6.16)	12.69**	5.50 (5.23)	<i>ns</i>
Externalizing	5.06 (4.60)	9.64 (9.51)	<i>ns</i>	6.35 (5.81)	2.64*
Total Problems	17.48 (12.98)	32.15 (23.23)	9.78**	23.15 (16.75)	3.10**

Note. Analyses comparing SED children adopted ≤ and > 12 months controlled for age at assessment. Only 6- to 11-year-old SED children (*n*=115) were compared to the 6- to 11-year-old CBCL standardization sample. **p* < .05; ***p* < .01, ****p* < .001

3.10 PRESCHOOL-AGE SED CHILDREN: COMPARISONS WITH PARENT-REARED AND SCHOOL-AGE SED CHILDREN

Preschool-age SED children had lower rates of parent-reported behavior problems than the CBCL/1½-5 standardization sample. Indeed, the closest was 10% in the clinical/borderline range compared to the standardization sample's 14% (see Table 9). Given this result, they also had lower behavior problem rates than the school-age SED children. Similar to the results for

behavior problem rates, the preschool-age SED group had significantly *lower* mean scores than the standardization sample on all the CBCL/1½-5 subscales and broadband scales.

Table 9. Percentage of preschool-age and school-age SED children with clinical/borderline behavior problems ($T \geq 61$)

CBCL/1½-5 scales	Preschool-age SED group (N=133)	School-age SED group (N=127)	Preschool-age SED compared to 14% expected rate	Preschool-age compared to school-age SED
			$\chi^2(1, N=833)$	$\chi^2(1, N=260)$
Emotionally Reactive	10%	--	<i>ns</i>	--
Anxious/Depressed	2%	18%	14.47**	18.14**
Somatic Complaints	5%	7%	7.74**	<i>ns</i>
Withdrawn	8%	17%	<i>ns</i>	4.80*
Attention Problems	8%	27%	<i>ns</i>	15.54**
Aggressive Behavior	6%	25%	6.42*	16.14**
Sleep Problems	10%	--	<i>ns</i>	--
Internalizing	7%	15%	5.22*	4.54*
Externalizing	7%	--	5.22*	--
Total Problems	5%	23%	7.74**	16.81**

Note. Rate of clinical/borderline scores in the CBCL/½-5 standardization sample ($N = 700$): 14%
* $p < .05$, ** $p < .01$

The low rate of behavior problems in the preschool-age SED group may have been influenced by their relatively short duration of deprivation ($M = 13.17$ months, $SD = 9.71$). Time in an orphanage was significantly correlated with *rates* of Emotionally Reactive problems, $r_b = .16$, $p < .01$. Time in an orphanage correlated significantly with *scores* on the Emotionally Reactive, $r = .24$, $p < .01$, Attention Problems, $r = .18$, $p < .05$, and Sleep Problems, $r = .20$, $p < .05$, subscales, and on the Internalizing broadband scale, $r = .20$, $p < .05$.

3.11 MENTAL HEALTH SERVICE USE

Mental health service use data was used to examine the validity of the CBCL behavior problem results. Twenty-nine out of 115 parents of school-age SED children (25%) reported that their children had received mental health services. Chi-square tests revealed significant associations between using mental health services and scoring in the clinical/borderline range on all the CBCL broadband scales and subscales (see Table 13). Mental health service use was significantly associated with time in an orphanage, $r_{pb} = .23, p < .05$, time in an adoptive home, $r_{pb} = .24, p \leq .01$, and age at assessment, $r_{pb} = .33, p < .001$.

Table 10. Association between rates of behavior problems and mental health service use in the school-age SED group

CBCL/6-18 scales	$\chi^2(1, N = 115)$
Anxious/Depressed	13.64**
Withdrawn/Depressed	17.10**
Somatic Complaints	5.77*
Rule-Breaking Behavior	12.66**
Aggressive Behavior	22.58**
Attention Problems	25.70**
Social Problems	17.37**
Thought Problems	17.34**
Internalizing	13.48**
Externalizing	21.34**
Total Problems	25.11**

* $p < .05$, ** $p < .01$

4.0 DISCUSSION

Unlike many previous reports of post-institutionalized children, the orphanages from which the children in the current study were adopted had deficiencies limited primarily to the social-emotional domain. Children were provided with adequate nutrition, medical care, toys, and activities, but had a large number of caregivers who worked in shifts and cared for them in an impersonal, routine manner.

Results indicated that early exposure to these orphanages was associated with a higher risk of later behavior problems relative to parent-reared children. Many of the children with behavior problems were reported to have received mental health services. In combination with previous results (Tizard & Hodges, 1978; Hodges & Tizard, 1989), this suggests that early social-emotional deprivation, largely in the absence of other environmental deficiencies, is sufficient to produce higher rates of behavior problems.

At the same time, exposure to early social-emotional deprivation is far from a guarantee of later problems. Rates of Attention Problems, which were the most prevalent type of problem, were between 30 and 40% among children adopted after 12 months of age from socially-emotionally depriving orphanages. This suggests that many children may overcome risk associated with early social-emotional deprivation to exhibit normative behavioral functioning.

There was little evidence that increased risk could be explained by factors other than early social-emotional deprivation, such as poor prenatal care, stressors associated with the

adoptive home, or adoption itself. Poor birth status was not associated with a higher risk of behavior problems among the socially-emotionally deprived children, who had been adopted into highly stable, advantaged families. In addition, children who were adopted domestically at young ages and who were not institutionalized were not at increased risk for behavior problems.

Researchers have long hypothesized that the lack of sensitive, responsive interactions with a small set of caregivers on a regular basis is a key aspect of orphanage environments that leads to later problems (Roy et al., 2000). This deficiency of the orphanage environment may disrupt brain development (Nelson, 2007), which relies on such experiences to proceed in a typical manner (Nelson et al., 2006).

4.1 TYPES OF BEHAVIOR PROBLEMS

4.1.1 Social-emotional deprivation

Socially-emotionally deprived children had significantly higher rates of Attention Problems and Aggressive Behavior than parent-reared children. They also had higher mean scores in these areas. Rates of Rule-Breaking Behavior, Social Problems, and Thought Problems were also higher, but fell short of statistical significance. In contrast, rates and mean levels of Internalizing Problems were not increased relative to parent-reared children.

Greater time in an orphanage was associated with higher rates of Attention Problems, Aggressive Behavior, Social Problems, and Internalizing Problems. This was unlikely attributable to age at assessment, because analyses of mean scores controlled for this variable and produced similar results. In combination with results of prior studies (Tizard & Hodges,

1978; Hodges & Tizard, 1989), these results suggest that early social-emotional deprivation is associated with childhood Attention Problems, Aggressive Behavior, and possibly Social Problems, and *not* associated with Internalizing Problems.

4.1.2 Across levels of deprivation

A very similar set of behavior problems was found for children exposed to global deprivation and varying levels of deprivation during early childhood (see Figure 1). These groups had significantly higher rates of Attention Problems, Aggressive Behavior, Rule-Breaking Behavior, Social Problems, and Thought Problems than parent-reared children.

Most prior studies of post-institutionalized children have indicated attention problems. These include studies of children exposed to both global deprivation (Ames, 1997; Groza & Ryan, 2002; Hoksbergen et al., 2004; Kreppner, O'Connor, & Rutter, 2001; Marcovitch et al., 1995) and varying levels of deprivation (Gunnar et al., 2007; Verhulst et al., 1990b). Some studies also show post-institutionalized children to be at increased risk of externalizing (Ames, 1997; Hoksbergen et al., 2004; Juffer & van IJzendoorn, 2005), social (e.g., Ames, 1997, Gunnar et al., 2007), and thought problems (Groza & Ryan, 2002; Hoksbergen et al., 2004).

Thus, children adopted from orphanages at different levels of deprivation had similar behavior problem profiles. Early exposure to an orphanage environment, regardless of its severity, may be associated with an increased risk of a certain set of behavior problems. These outcomes may be attributed in part to exposure to a large number of caregivers who provide routine, perfunctory care, which characterizes orphanages at all levels of deprivation.

4.2 POSSIBLE UNDERLYING MECHANISMS

These results provoke speculation about the specific aspects of a social-emotional environment that might produce longer-term problems as well as possible mechanisms that might underlie them.

4.2.1 Insensitive, unresponsive caregiving

The lack of sensitive, responsive caregiving during early childhood may be related to deficits in self-regulatory abilities which then foster behavior problems in some children. Specifically, orphanage environments are characterized by a lack of contingent responsiveness, or the tendency for the environment to respond predictably to behavior. This deficiency may contribute to later behavior problems by causing self-regulation problems, including emotion regulation difficulties (Gunnar, 2000). The lack of predictability and controllability of the environment may lead institutionalized infants to experience increased stress responses (Averill, 1973; Gunnar, 2000).

Animal research has demonstrated that exposure to unresponsive caregiving early in life leads to the development of a more reactive and poorly regulated hypothalamic-pituitary-adrenal (HPA) system and long-term disturbances in behavior (see reviews, Cirulli & Alleva, 2003; Sanchez, Ladd, & Plotsky, 2001). The stress response is also socially regulated in humans and early disruptions in care may have longer-term consequences (Gunnar & Quevedo, 2007).

The lack of sensitive, responsive caregiving during early childhood is also related to deficits in inhibitory control, defined as the ability to withhold an immediate response to make a thoughtful decision about how to act (Kochanska, Murray, & Harlan, 2000; Lewis, Dozier,

Ackerman, & Sepulveda-Kozakoski, 2007; Olson, Bates, Sandy, & Schilling, 2002). Deficits in inhibitory control are linked with inattention and hyperactivity (Berlin, Bohlin, & Rydell, 2003; Schachar & Logan, 1990; Sonuga-Barke, Dalen, Daley, & Remington, 2002). Not surprisingly, recent evidence suggests that PI children perform poorly on inhibitory control tasks (Pollak et al., 2007; Stevens et al., 2007).

Development of the prefrontal cortex, one of the brain areas that mediates attention and inhibitory control (Poggi Davis, Bruce, Snyder, & Nelson, 2003; Schulz et al., 2005), may be altered by HPA dysregulation (e.g., Murmu et al., 2006). Therefore, the lack of contingent responsiveness in the orphanage environment may lead to elevated stress levels, which, in turn, may compromise the development of the prefrontal cortex, producing susceptibility to attention problems.

4.2.2 Attachment

On the surface, the current results seem to correspond to many aspects of the attachment quality literature, especially given that most institutionalized children are insecurely attached to their caregivers (St. Petersburg-USA Orphanage Research Team, in press; Vorria et al., 2003; Zeanah, Smyke, Koga, Carlson, & the Bucharest Early Intervention Project Core Group, 2005) and early insecure attachment may increase the likelihood of later behavior problems (Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Munson, McMahon, & Spieker, 2001; Thompson, 1999).

However, insecure attachment does not accurately describe what happens when a child experiences frequent changes in caregivers in an institutional environment. Institutionalized children have many different and unresponsive caregivers and thus no opportunity to develop an attachment, which may be different in important respects than a child reared in a family who

does have that opportunity but develops an insecure attachment. Thus, an attachment insecurity explanation is not well-suited to this population; however, disruption of the attachment system is likely to be salient to these children and should be explored further in future studies.

4.3 INCREASED RISK FOLLOWING SEVERE EARLY INSTITUTIONAL DEPRIVATION

Results indicated that globally deprived children had higher rates of Attention, Social, and Thought Problems than both socially-emotionally deprived children and those exposed to varying levels of deprivation. Thus, an increase in the severity of early institutional deprivation is associated with increased risk for certain types of behavior problems. These differences cannot be attributed simply to other risk factors, such as adoption or poor prenatal care, because the groups were similar in these respects. Further, it is highly unlikely that these results are due to an increased incidence of prenatal alcohol exposure because both the socially-emotionally and globally deprived groups were adopted from Eastern European orphanages.

Since globally deprived children experienced a range of early adversities, it is not possible to be very specific about which aspect of this more severe orphanage environment may have contributed to their increased behavior problem rates. Although deprivation of basic needs, such as nutrition and medical care, may have been a factor, the globally deprived children were also likely to have been more severely deprived of social-emotional interactions and caregiver responsiveness. For instance, the child-caregiver ratio in the socially-emotionally depriving orphanages was approximately 4-6:1 (St. Petersburg-USA Orphanage Research Team, 2005),

whereas in globally depriving orphanages it ranged from 10-30:1 (Chisholm, 1998; Rutter et al., 2007).

4.4 STEPWISE INCREASE IN RISK AFTER 12 MONTHS IN AN ORPHANAGE

Results indicated that after 12 months in a socially-emotionally depriving orphanage, there was a marked stepwise increase in the rates of Attention Problems, Aggressive Behavior, Social Problems, and Internalizing Problems, with only the older-adopted group at higher risk relative to parent-reared children. Rates of these behavior problems did not increase with exposure longer than 12 months to the orphanage environment (see Figure 2). These results could not be attributed to more educated, affluent parents selecting younger children for adoption. Likewise, the English longitudinal study has shown that time in an orphanage (age at adoption) results cannot be explained simply by selection bias (Beckett, Bredenkamp, Castle, et al., 2002; Rutter & the ERA Team, 1998).

Previous studies of post-institutionalized children have demonstrated a stepwise increase in rates of behavior problems after 6 months in an orphanage. Children adopted from globally depriving orphanages *before* 6 months of age did not have a higher rate of behavior problems than parent-reared children (Chisholm, 1998; Marcovitch et al., 1997; O'Connor et al., 2003). In contrast, children adopted *after* 6 months of age were at higher risk, but within this group, risk did not increase as a function of time in an orphanage (Chisholm et al., 1995; Chisholm, 1998; Kreppner et al., 2007; Marcovitch et al., 1997; Stevens et al., 2007). One explanation for the difference between 6 and 12 months is that exposure to a more globally and severely depriving

environment may be sufficient to produce greater vulnerability to later behavior problems even if it occurs earlier (i.e., 6-12 months) or over shorter periods of time.

4.5 TIME IN AN ADOPTIVE HOME

Risk of behavior problems was not found to be associated with time in an adoptive home among socially-emotionally deprived children. Although non-significant, the correlations indicated that rates/scores of Externalizing and Attention Problems *increased* with time in an adoptive home. Although this is consistent with some results (e.g., Gunnar et al., 2007), the literature as a whole is inconsistent regarding the direction of association between time in an adoptive home and behavior problem rates.

In this study, time in an adoptive home was confounded with age at assessment, which was positively associated with behavior problem rates. Thus, behavior problems may persist or even emerge with more time in an adoptive home or at older ages of assessment.

4.6 PRESCHOOL-AGE SOCIALLY-EMOTIONALLY DEPRIVED CHILDREN

There were low rates of behavior problems among preschool-age socially-emotionally deprived children. When considered relative to results for school-age children, this suggests that behavior problems emerge at later ages in children who were adopted from socially-emotionally depriving orphanages. These results are consistent with those of some prior studies (Tizard & Rees, 1975; Rutter et al., 2007) but not others (Fisher et al., 1997).

In the current study, only 33% of the preschool-age socially-emotionally deprived children were adopted after 12 months of age, relative to 57% in the school-age socially-emotionally deprived group. Nonetheless, even among preschool-age children adopted after 12 months, rates of most behavior problems did not exceed the 14% found in the standardization sample. Therefore, findings regarding time in an adoptive home and preschool- vs. school-age children are consistent with one another in showing that risk of behavior problems increases with age among socially-emotionally deprived children.

4.7 LIMITATIONS

There are a number of limitations in this study that should be acknowledged in interpreting the results. First, the entire sample of SED children came from Russian orphanages. This may make the results less generalizable, because children adopted from Russia/Eastern Europe have higher rates of behavior problems than those from other areas of the world (Gunnar et al., 2007). For example, children adopted from orphanages in Russia/Eastern Europe are at higher risk for prenatal alcohol exposure (Miller, Chan, Litvinova, & the Boston-Murmansk Orphanage Research Team, 2006), which is associated with later behavior problems, some similar to those reported here (Sood et al., 2001). However, many children exposed to alcohol prenatally are born with low birth weights, but there were no differences associated with birth status in the SED group.

Second, behavior problems were measured using solely parent report, which leaves open the possibility of rater bias. However, studies of PI children that have collected teacher reports have produced similar results (Rutter et al., 2007).

Third, data could only be collected from 40% of the SED parents, although this rate includes undeliverable mailings. This response rate is lower than the 65% of one of the largest international adoption follow-ups (Verhulst et al., 1992), but it is higher than the 28-36% of the largest follow-up of Romanian adoptees (i.e., GD group; Groze & Ileana, 1996). Access to information about the families who did not respond was not available, so it was not possible to identify sources of potential bias in the sample.

Fourth, comparison with parent-reared children confounds orphanage experience with adoption, poor prenatal care, and possibly higher genetic risk. Adoption and poor perinatal circumstances were not found to be associated with higher rates of behavior problems in this study or in other studies of PI children (e.g., Rutter et al., 2007). Differences associated with genetic risk have yet to be examined in this population, but there have been suggestions that institutional deprivation has effects above and beyond genetic risk (e.g., comparisons with non-institutionalized children; Gunnar et al., 2007; Roy et al., 2000). Furthermore, the CBCL standardization sample served as the parent-reared comparison group. Therefore, characteristics of this group were unknown and not selected to best suit this particular study.

4.8 CONCLUSION

The present study adds to the literature by showing that post-institutionalized children are at higher risk of Attention Problems and Aggressive Behavior even when institutional deficiencies were limited to the assignment of children to a large number of short-term caregivers who provided impersonal, routine care. Although parent-reared children were used as the comparison group, supporting analyses suggested that these results could not be attributed simply to

confounding factors, such as poor prenatal care or adoption. Risk of these behavior problems and Social Problems increased substantially after 12 months in a socially-emotionally depriving orphanage but did not increase again with longer exposure. A similar set of behavior problems was found for children exposed to more severe early deprivation, suggesting that social-emotional deficiencies may play an important role in later problems even in the presence of deprivation in other areas. Finally, early global deprivation was associated with higher risk of Attention, Social, and Thought Problems than social-emotional deprivation, supporting the specific association of these behavior problems with the severity of the orphanage environment.

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