Specific Extreme Behaviors of Post-Institutionalized Russian Adoptees[1]

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Abstract

Parent-reported (CBCL) behavior problems were studied in 329 children adopted from socially-emotionally depriving Russian institutions, based on age-at-adoption (18 month cut-off), age-at-assessment (6-11 and 12-18 years), and gender. Children adopted after 18 months had higher problem scores predominately when assessed at 12-18 years. Although most post-institutionalized children had no behavior problems, 59.1% of later adoptees assessed in adolescence had at least one subscale score in the clinical/ borderline range. A factor analysis of items that significantly related to age at adoption for older children revealed one broad factor, encompassing different antisocial behaviors, social difficulties, and withdrawal, and a smaller factor of inattention problems. These two unweighted factors were highly correlated with each other and with parent-reported problems of executive functioning. These results may suggest a somewhat broader deficiency produced by orphanage experience in the first 24 months of life that underlies a range of behavioral problems displayed later.

Keywords: post-institutional children, behavior problems (CBCL), international adoption, age at adoption, age at assessment

Specific Extreme Behaviors of Post-Institutionalized Russian Adoptees

The frequency of international adoptions has increased substantially in recent years, reaching 22,884 in the United States and 44,872 in the top 20 receiving countries worldwide in 2004 (Selman, 2006). The institutional environments from which approximately 85% (Gunnar, Van Dulmen, & The International Adoption Project Team, 2007) of these children come vary in their degrees of physical, behavioral, social, and emotional deprivation (MacLean, 2003), but most have some degree of deficiency in the social, emotional, and responsive interactions with children by many and changing caregivers (Rosas & McCall, 2009). Many researchers have taken advantage of this unfortunate natural experiment to observe the behavioral outcomes of such children who subsequently are adopted predominately into highly advantaged families.

Behavior Problems in Post-Institutionalized Children

Studies have examined problem behaviors in post-institutionalized (PI) children using many comparisons, the most common being non-adopted children reared by their biological parents (non-PI). Similarly, they use different measures, although the most common is the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), a parent-report measure of child behavior. The most consistent findings across studies comparing PI children to non-PI children show higher levels among PI children of reported CBCL Total Problems, Internalizing problems in children under five years old (comparing between studies), Externalizing problems in older children (comparing between studies), Rule-Breaking behaviors, Aggressive behaviors, and Attention problems (e.g., Ames, 1997; Groza, 1999; Hawk & McCall, 2010; Hoksbergen, Rijk, Van Dijkum, & Laak, 2004; Stams, Juffer, Rispens, & Hoksbergen, 2000). Rutter, Kreppner, and O'Connor (2001), using the Rutter Behavior Scale, compared Romanian PI children with UK children adopted in infancy and showed similar findings, with the most consistent

differences for attachment problems, inattention/overactivity, quasi-autistic problems, and cognitive impairment in PI 1990s Romanian children; however, they did not show increased scores of emotional or conduct problems. Furthermore, Miller, Chan, Tirella, and Perrin (2009) found overall behavior problem rates of 50% on the Behavioral Assessment System for Children in their sample of 8-10-year-old PI children from Eastern Europe, and Juffer and van IJzendoorn (2005) found more behavior problems for PI children in their meta-analysis. Similarly, when investigating executive and cognitive functioning, PI children show more impairment than non-PI children on measures of visual memory and attention, working memory, visually mediated learning, and inhibitory control (Merz & McCall, 2010; Pollak et al., 2009; Bruce, Tarullo, & Gunnar, 2009). Taken together, these studies suggest certain kinds of executive functioning deficiencies in PI children that may be related to observed behavior problems. Importantly, some of these studies claim that most PI children are well within the normal range of behaviors but that the observed differences can be attributed to a small minority of children with many extreme problems (Gunnar et al., 2007). This claim, however, is based on whole samples of PI children, and different conclusions seem possible if age at adoption and age at assessment are considered (see below).

Age at adoption/time in the institution. Studies comparing length of time in an institution show higher rates of Total Problems, Internalizing (in children assessed at younger ages), Withdrawn/Depressed, Anxious/Depressed, Externalizing (in children assessed at older ages), Rule-Breaking behavior, Aggressive behavior, Attention problems, and Social problems for those who spent more than 6-24 months in an institution (usually indexed by age at adoption) than for those who were adopted earlier (Hoksbergen et al, 2004; Gunnar et al., 2007; Merz &

McCall, in press). Similarly, PI children adopted after 18 months score more poorly on measures of executive functioning than those adopted earlier (Merz & McCall, 2010).

Because of the wide variety of dichotomous age-at-adoption cut-offs used by different studies, it is difficult to determine the specific age at which institutionalization begins to relate to poorer outcomes. Thus, a more systematic analysis of age at adoption is necessary to describe this pattern more completely. Some studies (Kreppner et al., 2007; Merz & McCall, in press) describe a step-function, in which problem rates are not higher before but are after the cutoff age, and no continued increase in problem behaviors occurs after that age at adoption. These findings potentially implicate a sensitive period in development somewhere between 6/12 months and 18/24 months during which institutional deprivation is most threatening to later typical behavioral development. However, they could also support a "limited cumulative deficit hypothesis," which states that the accumulation of a certain amount of deficient experience is sufficient during any age period within the first few years of life to produce problems and that after a certain length of time, more exposure does not add to the outcome risk. Unfortunately, it is difficult to distinguish between these two hypotheses because to do so researchers would need to compare children who entered the institution at different ages and who stayed for different lengths of time. This information is usually unavailable and relatively few children enter the institutions after 12-24 months of life. Even if these comparisons were possible, they are confounded by the potentially harmful or beneficial pre-institutional environments of the children who enter the institution later.

Recent findings also suggest that the severity of institutions may relate to appropriate age at adoption cut-offs. In particular, an increase in extreme behaviors seems to occur after an age at

adoption of 6 months for children from globally depriving 1990s Romanian institutions, but after 18 months for children from less severely depriving institutions (Merz & McCall, in press).

Age at assessment. Studies tend to show higher rates of extreme behaviors at different ages of assessment. Within-study comparisons most consistently show higher levels of Somatic Complaints, Anxious/Depressed, Rule-Breaking behavior, and Aggressive behavior at older ages for PI children. Between-study comparisons, however, tend to find Internalizing problems in younger (1½-5-year-old) children and Externalizing problems in older (6+ year-old) children (Groza, Chenot & Holtedahl, 2004; Groza & Ryan, 2002; Hawk & McCall, 2010; Merz & McCall, in press; Verhulst, 2000; Verhulst & Versluis-Den Bieman, 1995). A recent between-study meta-analysis, however, found that Total Problem scores were higher for younger (4-12 years) than older (13-18 years) children as compared to non-PI standardization samples, but found no differences for Internalizing or Externalizing problems (Juffer & Van IJzendoorn, 2005). Although age at assessment and age at adoption differences have generally been widely recognized in the PI literature, few have investigated how these variables jointly relate to problem behaviors. Based on the research describing late adoptees and older children as more problematic, it is expected that older late adoptees will show the most behavior problems. An interaction between these two parameters might account for the discrepancies in study findings and the non-significant meta-analytic findings.

Potential measurement problems. Although many studies have shown that PI children have high scores on many CBCL subscales (Hawk & McCall, 2010), it is possible that the CBCL subscales are not the most appropriate way to characterize the behavior problems of PI children. First, the early experience of institutionalized children is qualitatively and quantitatively different from non-PI children, even those exposed to abuse and neglect. Because the CBCL was created

for the non-PI population, it may not accurately describe the PI population. Second, the CBCL subscales, rather than helping, may be hindering the discovery of the most prominent PI symptoms. For example, the behaviors influenced by institutionalization may be more specific than the broad range of behaviors in the CBCL subscales. This might result in only a few questions within a subscale being related to institutionalization, which might be too few to produce extreme scores. Also, a given type of behavior problem for PI children may be represented on a few items on one subscale or a few items scattered across several subscales. Third, a number of items on the CBCL do not belong to a subscale and only contribute to the Total Problem score, but they may be part of a more specific behavior subset relevant to PI children. Finally, the literature suggests that PI children have extreme scores on most CBCL subscales, so perhaps PI differences range across many subscales. Thus, a more thorough examination of the specific items on the CBCL and how they relate to institutionalization may be helpful in developing a better understanding of the nature of behavioral outcomes of PI children.

Institutional Experience

Studies examining PI children have evaluated children from numerous countries, including Romania, where children experienced global and severe deprivation in the early 1990s, and countries with more moderately depriving institutions with better care and facilities. Most institutions share some similar characteristics, such as high children:caregiver ratios, many changing caregivers (Rosas & McCall, 2008), and lack of warm, responsive, caring, and sensitive interactions with caregivers (Chisholm, 1998). Because of these characteristics, children do not have the opportunity to form attachment relationships or to experience many consistent reciprocal, response-contingent interactions. The lack of warm, sensitive, and contingently responsive interactions with a few consistent caregivers may be the main

contributor to the lack of attachment relationships (Bowlby, 1982) and later poor social interactions and relationships more generally. This lack of early attachment has been theorized to result in later attachment and behavior problems similar to those seen in PI children and to difficulties with self-regulation and inhibitory control (Ainsworth, Blehar, Waters, & Wall, 1978). Research has also suggested that an early non-social atmosphere may be related to diminished growth and functioning of the prefrontal cortex in PI children (Pollak et al., 2009) and monkeys (Sanchez, Hearn, Do, Rilling, & Herndon, 1998), which is associated with these behavioral deficits as well as certain aspects of cognitive functioning (e.g., executive functioning).

Russian institutional experience. The Russian institutions represented in this study provide a scientifically special situation because children experience a constantly changing set of different caregivers whose interactions with the children are not warm, sensitive, and responsive and who do not develop relationships with the children, whereas most other aspects of the institutions are relatively adequate, including medical care, nutrition, and sanitation. A child may experience 50-100 different caregivers during the first 19 months in residence, and the caregivers are behaviorally cold and unresponsive to the children. Because in all other ways the children are relatively adequately cared for, any extreme behaviors seen in these children may be more specifically attributed to this social-emotional deprivation than in most studies (The St. Petersburg-USA Orphanage Research Team, 2005, 2008). This lack of appropriate social-emotional and responsive caregiving is predicted to result in poor behavioral outcomes, a prediction supported by interventions aimed at improving the psychosocial environment of institutions that produced substantial improvements in developmental outcomes (Sparling,

Dragomir, Ramey, & Florescu, 2005; The St. Petersburgh-USA Orphanage Research Team, 2008).

Goals of this Study

This study aims to describe the dimensions of the effects of early social-emotional deprivation as defined by the Russian orphanage experience in PI children adopted into advantaged USA families using the total and subscales of the CBCL and the individual CBCL items. Three major parameters are considered, namely age at adoption (a surrogate for time in the institution), age at assessment, and gender. First, preliminary analyses identify trends in age at adoption to determine an appropriate cut-off age for categorizing children into early and late adoptees. Second, to address whether parent-reported CBCL total score and subscales vary with age at adoption, age at assessment, and gender, analyses investigating these three parameters are performed using metric standardized scores. Third, to address whether behavior problems are found only in a minority of PI children, the percentage of children with scores in the clinical and borderline range is also examined. Fourth, to examine how many and which CBCL items show age at adoption differences when assessed at 6-11 and separately at 12-18 years, individual CBCL items are identified for each group that relate to the extent of exposure to the institutions. Fifth, to describe the dimensions that characterize these items, a factor analysis is performed on the identified items. In this way, the CBCL subscale outcomes can be compared to the empirically discovered factorial outcomes. Finally, to address whether these behaviors relate to measures of executive functioning, unweighted factor scores are compared to measures of executive functioning.

Methods

Participants

Participants were 329 children (142 male, 187 female), aged 6-18 years, from institutions in the Russian Federation adopted by USA parents who were contacted through a Pittsburgh-based adoption agency. Parents (mostly mothers) returned completed surveys that included the demographic data, CBCL, and BRIEF. The collection of data occurred in three waves over a span of six years (40%, 37%, and 51% response rate over the three waves). In wave three, reminder phone calls were made to parents several weeks after the packets were mailed, which may have contributed to the higher response rate. If a parent completed a survey for a single child in more than one wave, the data from the most recent wave were used in analyses.

Age at adoption was determined from the completed survey. It has been shown in this population to be highly correlated with time in an institution (e.g., $r = .77$; Merz & McCall, in press) and is generally more available and accurate for the parents to report. Children were divided into five groups of age at adoption, < 6 months (n=11), 6-11 months (n=156), 12-17 months (n=71), 18-23 months (n=27), and ≥ 24 months (n=61) at adoption. These age blocks were selected arbitrarily and conformed to blocks for this variable in other studies of this database.

Children were divided into two age-at-assessment groups, 6-11-year-olds (n=224) and 12-18-year-olds (n=100), corresponding to middle childhood and adolescence. Children were excluded from analyses if they had marked functional deficits (nine with diagnosed autism and two with severe cognitive impairment). For those who reported it, the mean birth weight was 5.99 lbs (n =186), mean birth height was 19.07 inches (n = 137), and 26.4% were born prematurely. Parents reported that 6.1% of children had experienced physical neglect, 6.7% experienced social neglect, 1.5% were physically abused, 0% were sexually abused, and 8.5% had been exposed to alcohol during pregnancy. Services received by children included tutors

(4.3%), articulation (3.3%), language (2.4%), sensory (1.8%), motor (1.5%), physical therapy (1.2%), audiologist (2.4%), psychologist (3.3%), psychiatrist (1.2%), and social worker (0.9%) services. Years in the adoptive home ranged from 1.89 to 16.01 (M = 8.99). The mean household income was $125,000 to $150,000, 68% of parents had at least 4 years of college education, and 99.4% of parental respondents were Caucasian.

Measures

CBCL. The Child Behavior Checklist (CBCL/6-18; Achenbach & Rescorla, 2001) is a parent-report instrument with different forms for younger and older children. The CBCL for ages 6-18 consists of 120 behavioral questions for which parents mark 0 (not at all), 1 (sometimes), or 2 (all the time). The sum of scores constitutes a Total Problem score, which consists of Internalizing broadband (including Withdrawn/Depressed, Somatic Complaints, and Anxious/Depressed subscales), Externalizing broadband (including Rule-Breaking behavior and Aggressive behavior), Thought Problem subscale, Attention Problem subscale, and Social Problem subscale. *T* scores and percent extreme scores (i.e., top 15% of the standardization sample scores) were computed according to the *Manual for the ASEBA School-Age Forms & Profiles* (Achenbach & Rescorla, 2001) using a non-PI normative sample of 2,368 typically developing 4-18-year olds stratified for SES, ethnicity, region of the country, and urban/suburban/rural residence (Achenbach & Rescorla, 2001). *T* scores have the effect of removing any age and gender differences inherent in the non-PI sample. Higher scores signify more problems. The CBCL has well documented reliability and validity in children with various backgrounds (see Achenbach & Rescorla, 2001).

Missing data were imputed by using the child's average for the subscale containing the missing item, rounded to the nearest whole number (0, 1, or 2; n = 17). If more than two

questions per subscale were unanswered, the data were not used. Five children were excluded in subscale analyses because of missing data in one subscale, and nine children were excluded in Total Problem analyses because of missing subscale data and/or missing items that are not part of subscales.

BRIEF. The Behavior Rating Inventory of Executive Functioning (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) is an 86-item parent-report measure of children's executive functioning intended for children 5-18 years old. Parents use a three-point Likert scale (never, sometimes, often) to assess functioning in eight domains. A Metacognitive Index consists of Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor subscales, and a Behavior Regulation Index includes subscales of Inhibitory Control, Shift, and Emotional Control subscales. A total score is called the Global Executive Composite. Higher scores are indicative of greater perceived impairment. *T* scores for the BRIEF were computed from the normative sample of 1419 control children selected to be representative of socioeconomic status, ethnicity, and gender distributions. The BRIEF has high internal consistency (Chronbach's α = .80 to .98), and validity has been supported in many diagnostic groups (Gioia et al., 2000). Missing data was treated in the same way as CBCL data.

Results

Preliminary Analyses

Preliminary one-way ANOVAs and a priori analytical comparisons were used to determine appropriate cut-off points for age at adoption. Consistent with previous research on this sample (Merz & McCall, in press), age at adoption effects were significant for Total Problem, $F(4,312)=4.65$, $p < .01$, $R^2=.06$, Internalizing, $F(4,313)=4.89$, $p < .01$, $R^2=.06$, and Externalizing, $F(4,313)=.,87$, $p < .05$, $R^2=.04$, broadband scales. All subscales also revealed a

significant effect of age at adoption, with R^2 effect sizes ranging from .05 (Rule-Breaking) to .11 (Social Problems), except Somatic Complaints, $F(4, 316)=1.47$, ns, and Thought Problems, $F(4,316)=1.58$, ns. Figure 1 presents the age-at-adoption functions for all CBCL subscales. A priori comparisons included comparing pairs of groups before and after each possible cut-off point (i.e., 6, 12, 18, 24 months). For every broadband and subscale, the largest effect was found when dividing the groups at 18 months (i.e., <6, 6-11, and 12-17 vs. 18-23 and ≥ 24; all *p*-values < .025). The general form is a step function at 18 months with no further increase with longer exposures (the apparent declines at the older age at adoption period were generally not significant). Thus, future analyses will use an 18-month cut-off for age at adoption.

Insert Figure 1 about here

CBCL Scales – *T* Scores

A 2x2x2 ANOVA was performed on the Total Problem *T* scores, and a similar MANOVA was conducted on the Internalizing and Externalizing CBCL *T* scores, with age at adoption (<18 and ≥ 18 months), age at assessment (6-11 years and 12-18 years), and gender as the independent variables. A similar MANOVA was also performed for the *T* scores for the CBCL subscales (see Table 1). Importantly, according to the manual, *T* scores for narrowband subscales are truncated at $T=50$ (i.e., no scores awarded below the 50% cut-off of 50); thus, the standardization sample means range from 53.7 to 55.7 (Achenbach & Rescorla, 2001). In general, although not all tests were significant, the results reveal a consistent tendency for adoptees who were older at adoption to score more poorly than earlier adoptees, and this was most clear for children assessed during adolescence.

Insert Table 1 about here

CBCL total and broadband scales. Specifically, the ANOVA on Total Problems showed a significant age at adoption main effect, $F(1,304)=12.64$, $p < .01$, $R^2=.04$, as did the MANOVA on the broadband scales, $F(2,304) = 6.44$, $p < .01$, with older adoptees having higher (poorer) scores. Univariate tests were significant for Internalizing, $F(1,305) = 12.46$, $p < .01$, and Externalizing, $F(1,305)=7.42$, $p < .01$ (see Table 1). A significant age at assessment by gender interaction was found for Internalizing, $F(1,305) = 5.11$, $p < .05$, with higher scores for older females, but none of the cell means exceeded the standardization sample mean of 50. Finally, a significant age at adoption X age at assessment interaction was found for Externalizing, $F(1,305) = 4.27$, $p < .05$, which showed children adopted after 18 months had higher scores than earlier adoptees for the children assessed between 12 and 18 years, but this was not the case for younger children (See Table 1). Compared to the standardization sample, both early-adopted groups had significantly *lower* scores on Total Problems, Internalizing, and Externalizing, whereas older late adoptees had significantly *higher* Total Problem and Externalizing scores (see Table 1). No other findings were significant.

CBCL subscales. The MANOVA on the subscales revealed significant effects for age at adoption, $F(8,298)=5.24$, $p < .01$, age at assessment, $F(8,298)=3.24$, $p < .01$, age at adoption X age at assessment interaction, $F(8,298)=2.25$, $p < .05$, and age at assessment X gender interaction, $F(8,298)=2.05$, $p < .05$. Generally, these results suggested that children adopted after 18 months who were assessed between 12-18 years of age had higher (poorer) CBCL subscale scores.

Univariate analyses showed significant age at adoption effects for Anxious/Depressed, $F(1,305)=19.07$, $p < .01$, Withdrawn/Depressed, $F(1,305)=13.63$, $p < .01$, Rule-Breaking, $F(1,305)=11.14$, $p < .01$, Aggressive, $F(1,305)=12.31$, $p < .01$, Attention, $F(1,305)=7.71$, $p < .01$,

and Social Problems, $F(1,305)=27.57$, $p < .01$, with R^2 between .02 (Attention) and .08 (Social Problems), in which late adoptees had higher scores than early adoptees. Univariate tests also showed age at assessment effects for Withdrawn/Depressed, $F(1,305)=4.23$, $p < .05$, $R^2=.01$, and Social Problems, $F(1,305)=10.66$, $p < .01$, $R^2=.03$, with older children reporting more problems than younger children. The interaction of age at adoption and age at assessment was significant for Withdrawn/Depressed, $F(1,305)=5.34$, $p < .05$, Rule-Breaking, $F(1,305)=7.59$, $p < .01$, Aggressive, $F(1,305)=5.97$, $p < .05$, and Social Problems, $F(1,305)=9.51$, $p < .01$ (R^2 between .02 and .03) with older late adoptees having the highest scores (see Table 1). Finally, one significant interaction of gender and age at assessment was found for Anxious/Depressed, $F(1,305)=6.66$, $p < .01$, $R^2=.02$, in which older females had the highest scores ($M=54.5$, $SD=7.5$), followed by younger males ($M=53.6$, $SD=6.2$), older males ($M=52.9$, $SD=7.5$), and younger females ($M=52.5$, $SD=5.0$).

None of the subscale scores for younger children or for older early adoptees were significantly higher (poorer) than for the non-PI standardization means, except Attention Problems for both younger earlier and later adoptees, which were higher than the standardization sample. The 12-18-year-olds who were adopted after 18 months, however, had significantly higher scores than the standardization sample on all but the Somatic Complaints subscales (see Table 1).

Although not all significance tests were in conformity, the overall trend was for there to be higher scores for children adopted after 18 months, visible predominately or only in children assessed between 12-18 years of age. This trend was present to varying extents for all subscales except Somatic Complaints and Thought Problems, and Attention problems were higher for PI children at younger ages at assessment.

CBCL Scales - Percent Extreme Scores

Extreme scores were defined as scores exceeding the 84th percentile of scores in the normative sample ($T \geq 61$). Children received scores of 0 (below the 85th percentile) or 1 (at or above the 85th percentile). Given the relative lack of gender differences found above, further analyses collapse across gender. The percent of children with extreme scores in each age-at-adoption by age-at-assessment cell was compared to the percentage (15%) for the non-PI standardization sample (see Table 2).

Insert Table 2 about here

CBCL total problem and broadband scores. For Total Problems, 12-18-year-olds adopted after 18 months had a significantly higher percentage of extreme scores (39%) than the standardization sample (15%), $z = 4.46$, $p < .05$. Figure 2 shows the relation between age at adoption and age at assessment in regard to percent extreme Total Problems. The older late-adopted group also had higher Externalizing scores (36%), $z = 3.90$, $p < .05$, and the pattern of scores was similar to Total Problems. All other groups had percent extreme Total Problem and broadband scores at or below the standardization sample (see Table 2).

Insert Figure 2 about here

CBCL subscales. Older late adoptees had a significantly higher percentage of extreme scores for Withdrawn/Depressed (30%), $z = 2.79$, Rule-Breaking (34%), $z = 3.53$, Aggressive (30%), $z = 2.79$, Attention (39%), $z = 4.46$, and Social Problem (41%), $z = 4.83$, all $p < .05$, subscales than the standardization sample. The 6-11-year-old late adoptees also had a higher percentage of extreme scores than the standardization sample on the Attention Problems subscale

(29%), $z = 2.35$, $p < .05$. All patterns of subscale extreme scores were similar to that shown in Figure 2 for Total Problems, except Somatic Complaints. All other comparisons were the same as or less than the standardization sample (see Table 2).

Multiple extreme scores (co-morbidity). Some reports state that a small minority of PI children have extreme scores that inflate the mean for the whole group (e.g., Ames, 1997; Gunnar et al., 2007, Rutter et al., 2001). To examine this, the percentage of children with at least one extreme subscale score was computed, first in the whole sample and then separately for age at adoption X age at assessment groups.

In the non-PI population, 15% of children have extreme Total Problem scores (see above), and 25-30% have at least one extreme subscale score (Achenbach & Rescorla, 2001). Thus, the percentage of children with at least one subscale score was compared to 30%. First, in the entire sample, 40.1% of children had at least one extreme subscale score, $z = 4.00$, $p < .05$. Children were then divided into the four age-at-adoption X age-at-assessment groups. Neither early adoptees (6-11: 36.3%, $z = 1.85$, n.s.; 12-18: 32.1%, $z = 0.34$, n.s.) nor younger late adoptees (43.6%, $z = 1.85$, n.s.) had percentages of children with at least one extreme subscale score that were significantly different than the standardization sample. In contrast, 59.1% of older later adoptees had at least one extreme subscale score, significantly higher than the standardization sample, $z = 4.21$, $p < .05$.

Although no information is given regarding the pattern of multiple extreme subscale scores in the standardization sample, descriptions of the present sample reveal a different pattern in the older later-adopted group than the other three groups. Early adoptees and younger later adoptees showed a high percentage of children with no extreme scores, and most of the children with extreme scores had between 1 and 3 (Figure 3). In contrast, older later adoptees were more

likely to have at least one extreme score than to have none, and they tended to have several extreme scores. In fact, more of these children had between 4 and 7 extreme scores than between 1 and 3 extreme scores (Figure 3). Thus, the previous reports that a small proportion of the total PI sample has extreme scores is confirmed here when the sample as a whole is considered and especially when children are assessed in childhood; however, a majority of children who were adopted after 18 months and assessed between 12 and 18 years had extreme scores, often several.

Insert Figure 3 about here

Individual CBCL Items

The next question addressed how many and which CBCL items were sensitive to the institutional experience as indicated by being related to age at adoption. Because gender was generally not significant in the above analyses but age at assessment was, children were divided based only on age at assessment. A MANOVA on all 120 items would have had too many dependent variables for the sizes of the available samples; therefore, separate univariate ANOVAs were performed for each item with age at adoption as the independent variable. For 6-11-year-olds, 13 of the 120 items (i.e., 11%) significantly distinguished between early and late adoptees (see Table 3). Five of these items were from the Anxious/Depressed subscale; otherwise, each subscale only accounted for one of the items. Although the largest proportion of items came from the Anxious/Depressed scale, later adoptees did not have higher Anxious/Depressed scores than the standardization sample (see Table 1). In contrast, although Attention *T* scores were significantly higher than the standardization sample for both early and late adoptees (see Table 1), only one individual item from the Attention scale was significantly

related to age at adoption for younger children. This is most likely due to both age-at-adoption groups having high Attention scores.

For 12-18-year-olds, however, 47 items (39%) showed significantly higher scores for late than early adoptees (see Table 3). These significant items were fairly evenly distributed among the a priori CBCL subscales except Somatic Complaints and Thought Problems, which had few items related to age at adoption. Otherwise, 23% - 71% of items in each other subscale were related to age at adoption for 12-18-year-olds.

Insert Table 3 about here

Factor Analyses of Individual Items

A principal components factor analysis with varimax rotation was performed on scores for 12-18-year-olds for the items that were significantly related to age at adoption for that group (see Table 4). Because the CBCL subscales were not related to age at adoption for 6-11-year-olds and only 13 of 120 items were related, it did not seem instructive to factor these items. The following analyses attempted to describe empirically the dimensions of CBCL items that were related to institutionalization.

Insert Table 4 about here

The factor analysis for 12-18-year-olds primarily produced two factors (see Table 4). Factor 1 accounted for 22.4% of the variance and seemed to include a variety of antisocial behaviors, social difficulties, and social withdrawal. Factor 2 accounted for 9.9% of the variance and is comprised almost entirely of items from the Attention subscale that are associated with inattention or the span of attention, in contrast to the “attention seeking behaviors” on the CBCL

Attention subscale, which tended to load on the first factor reflecting social problems. The factors include items from most of the CBCL subscales except Somatic Complaints.

Rather than create true factor scores, which are highly influenced by specific weightings that tend to be unreliable, factor scores were created by adding the unweighted scores for the items that loaded most highly on each factor, in the same way that CBCL subscales are defined. Thus, although the varimax rotation created uncorrelated, independent factors, the unweighted factor scores for the two factors were highly correlated (r = .71), which suggests that, whereas inattention can be distinguished from social behavior problems, it is nevertheless highly correlated with it. As might be expected, Factor 1 (antisocial, social difficulties, loneliness) was most highly correlated with similar CBCL subscales of Aggression, Withdrawn/Depressed, Rule-Breaking, and Social Problems (see Table 5), whereas Factor 2 (inattention) was most highly related to CBCL Attention (see Table 5). It should be noted that this factor analysis had a small sample size (n = 100) relative to the number of items (47) and should be interpreted accordingly.

Insert Table 5 about here

Nevertheless, the general result is that behaviors on the CBCL that relate to age at adoption (time in the institution) for adolescents come from all the CBCL subscales except Somatic Complaints, do not cluster into several separate dimensions, and represent primarily inattention and a variety of different antisocial behaviors, social difficulties, and withdrawal. Thus, later adopted older PI children may display a variety of behaviors that appear different on the surface but are rather intercorrelated or co-occurring.

Correlations between CBCL factors and BRIEF subscales. Correlations were performed on the entire sample between the unweighted factors and subscales of the BRIEF to

determine whether the observed behavior problems were related to certain executive functioning deficits. The entire sample was used for a more general understanding of the relation between the factors and BRIEF subscales; however, the patterns of correlations within more specified samples based on age-at-assessment and age-at-adoption are discussed briefly below. For all correlations, $p < .01$. The BRIEF's Global Executive Composite score was highly correlated with both Factor 1 ($r = .61$) and Factor 2 ($r = .73$). Similarly, BRIEF composite scores of Behavior Regulation and Metacognition were related to Factor 1 ($r = .76, .50$, respectively) and Factor 2 ($r = .75, .67$, respectively). Factor 1, reflecting antisocial and social difficulties, was also highly related to every BRIEF subscale except Organization of Materials, with the highest correlations for Inhibitory Control, Emotional Control, and Monitor (Table 5). Factor 2, inattention, was highly correlated with every subscale, with the highest correlations for Working Memory, Monitor, Plan/Organize, and Inhibitory Control (Table 5). Note that correlations are higher for Factor 2 than Factor 1, although Factor 2 contained fewer but more focused items; and the pattern of correlations between the executive functioning subscales and the factors correspond to common sense (i.e., behavior regulation subscales correlated most highly with antisocial behaviors, social problems, and withdrawal, whereas metacogniton subscales, especially working memory, correlated most highly with inattention). Correlations were similar for earlier adopted (Factor 1: $r = .44$ to $.74$; Factor 2: $r = .51$ to $.81$) and later adopted (Factor 1: $r = .46$ to $.77$; Factor 2: $r = .53$ to $.80$) children; however, correlations were generally higher for 12-18-year-olds (Factor 1: $r = .54$ to $.81$; Factor 2: $r = .62$ to $.85$) than for 6-11-year-olds (Factor 1: $r = .42$ to $.73$; Factor 2: $r = .53$ to $.78$), ignoring age at adoption. This suggests that there is not only a general degree of correspondence between CBCL and BRIEF parent ratings but that the correspondence is higher when children are older, regardless of institutionalization.

Discussion

CBCL scores were higher for children adopted after 18 months, and this was especially true for children assessed between 12 and 18 years. The age at adoption results were generally consistent with the literature, in which later adoptees are found to have higher Total Problem and subscale scores than earlier adoptees on the CBCL and other measures (Ames, 1997; Audet, Kurytnik, & Le Mare, 2006; Fisher, Ames, Chisholm, & Savoie, 1997; Gunnar et al., 2007; Hoksbergen et al., 2004; Kreppner et al., 2007; Marcovitch et al., 1997; Merz & McCall, in press; Rutter et al., 2001; Stevens et al., 2008). These findings must be interpreted in light of a possible confound of secular changes in the institutions between the time that children who are older at assessment and children who are younger at assessment were in attendance. However, studies that examined children from many different countries have also found age at assessment effects (e.g., Gunnar et al., 2007; Merz & McCall, in press), and it is unlikely that institutions in all these countries underwent enhancements at the same time. Further, two orphanage directors said changes had occurred in Russian orphanages but only in the last 3-5 years, which would not have influenced these results (N.Nikiforova, D.Penkov, personal communication, October 19, 2009).

The plots of the function relating age at adoption to behavior problems (Figure 1) represent step functions rather than a progressive accumulation of risk for problems with increased exposure. That is, PI children adopted before 18 months displayed no higher risk for behavior problems than would be expected of non-PI children, but those children adopted after 18 months did have higher problem scores, and longer exposures to the institution were not associated with still higher scores (the apparent declines were rarely significant).

This step function is not unprecedented in the few studies that have examined a range of age-at-adoption values. This function has been found for 1990s severely deprived Romanian PI children (Kreppner et al., 2007; Stevens et al., 2008) and for this sample of PI children from predominately socially-emotionally depriving Russian orphanages (Merz & McCall, in press). The specific age-at-adoption cutoff, however, appears at a younger age (6 months) for PI children from more globally and severely depriving orphanages (i.e., 1990s Romanian institutions) versus later ages (e.g., 18 months) for PI children from less severe and predominately socially-emotionally depriving institutions. Moreover, with few exceptions (Groza, 1999; Verhulst, Althaus, & Versluis-Den Bieman, 1990 II), these samples also support the fact that additional exposure beyond the cut-off age does not increase the likelihood of behavior problems.

Collectively, these results suggest hat the institutional experience produces some type of deficiency very early in resident children's lives (as early as the first 12-24 months). Note that exposure to the institution before these cut-off ages may provide necessary length of exposure and not be benign. Also, whereas additional exposure does not increase risk, it may maintain the previously established level of risk.

The age-at-adoption effects in the current sample were visible only for children assessed at 12-18 years of age (except for Attention Problems, see below). Previous studies have similarly found that older children score higher than younger children on measures of behavior problems (Groza et al., 2004; Groza & Ryan, 2002; Merz & McCall, in press; Verhulst, 2000; Verhulst et al., 1990 II; Verhulst & Versluis-Den Bieman, 1995). However, most of these studies did not examine age at assessment as a possible moderator of age at adoption. Also, as with age-at-adoption, severe and global orphanage environments can be hypothesized to produce

behavior problems at younger ages than socially-emotionally depriving institutions (Kreppner et al., 2007; Miller et al., 2009; Rutter et al., 2001). The present findings are consistent with Iftene and Roberts' (2004) case study of Romanian children adopted in Romania and Canada. They identified a pattern of behavior, not using a measurement scale, in children from institutions in which children were described initially by parents as overly friendly and "good children" then in adolescence became characterized by disrespect for rules, lack of feelings of guilt, and inability to maintain relationships (Iftene & Roberts, 2004). Studies that find high degrees of indiscriminate friendliness (Bruce, et al., 2009; Chisholm, 1998) and internalizing behaviors in young children (e.g., Ames, 1997; Fisher et al., 1997) are also consistent with this narrative report.

In contrast, these results apparently are not consistent with Miller et al.'s (2009) study, which discovered high percentages of problem behaviors in 8-10 year olds and no relation to age at adoption. However, half of the children were adopted from Russia and one-third were adopted from Romania, which had globally depriving institutions, the mean age at adoption for the sample was 21 months, and half of the sample was recruited from a clinic. Based on evidence that increased severity of institutions is related to an earlier age at adoption cut-off (Merz & McCall, in press), it seems probable that many of the children in Miller et al.'s sample were adopted after the cut-off for severe institutions, decreasing the likelihood of finding a correlated relation with age at adoption. Thus, Miller et al.'s findings of high behavior problem rates in somewhat younger children (i.e., 8-10-year-olds) and no age-at-adoption effect may not be inconsistent with the current findings, given the presumption of more severe institutions in their study.

Percentage of children affected and co-morbidity. Many researchers have suggested that most PI children have normal outcomes, but that a minority of children have extreme problems (Ames, 1997; Gunnar et al., 2007; Rutter, 2001). The present study qualifies this statement by showing that this "minority" is actually a majority of PI children adopted after 18 months and assessed between 12 and 18 years in this sample. Early adoptees and younger late adoptees had scores and percentages of extreme scores very similar to the normative non-PI sample. However, 59.1% of older late adoptees had at least one extreme subscale behavior, and most of them had many more than one. Further, the current data are cross-sectional; the rates for older children are more likely characteristic of the likelihood of PI children ever having an extreme score before age 18 years.

These results, along with those of Miller et al. (2009) in which high percentages of extreme scores were found in younger children from apparently more severe institutions, suggest that the institutional experience may contribute to behavior problems that are more prevalent than previously believed. Because more severe institutions may have lower age at adoption cut-offs and earlier age at assessment effects (Merz & McCall, in press), studies of more severely depriving institutions may find more extreme scores in children who are slightly younger at adoption and assessment than those with extreme scores in this study. Importantly, extreme scores are not always seen as problematic by parents; only approximately half of parents of children with extreme behaviors reported that the problems interfere with daily life and/or sought professional help for the children (Merz & McCall, in press; Miller et al., 2009).

Factor structure and relations. The findings of the factor analysis also support the pervasiveness of problems in later adopted adolescents. The factor analysis revealed two main factors that were associated with length of institutionalization in 12-18-year-olds. The first

factor, however, seemed to encompass many different kinds of behaviors, including antisocial behaviors, social difficulties, and social withdrawal. This result is consistent with the fact that items reflecting many different kinds of behavior problems were significantly related to age at adoption and that most children with extreme behaviors had extreme scores on more than three subscales. It is also consistent with non-PI literature that finds strong relations between social difficulties and loneliness (Parker & Asher, 1993). This high co-morbidity suggests a single underlying broad deficiency that may influence these many different behaviors.

Further, the unweighted sum of items loading on this factor correlated highly with all BRIEF subscales, especially Inhibit, Emotional Control, and Monitor. These subscales are all part of the Behavior Regulation index, which deficits would theoretically be expected to impact the difficulties with social situations represented on this factor. Thus, difficulties controlling impulses, poor emotional control, and self-regulation, which may be a consequence of prolonged institutional experience, may relate to the many kinds of behavior problems seen on factor 1. These correlations were higher for 12-18-year-olds than 6-11-year-olds but did not differ based on age at adoption. This finding suggests that certain aspects of executive functioning are related to certain behaviors in all people. Although institutionalization does not change this mechanism, the institutional experience may interfere with the development of these necessary skills, which inflates both means, consistent with findings of an 18-month age-at-adoption cut-off for BRIEF scores (Merz & McCall, 2010). However, the relations between executive functioning and behavior problems may change with age, consistent with findings that the prefrontal cortex changes in adolescence (Steinberg, 2005).

Sleeper effect. The present findings suggest a "sleeper effect" of institutionalization, in which spending more than 18 months in the institution has detrimental effects that do not present

until adolescence. These poor outcomes seem to focus around social problems, antisocial behaviors, and loneliness/withdrawal. The lack of response-contingent interactions in the institution may result in children's not learning how their actions affect others and in difficulties with behavior regulation. During middle childhood these deficits may not be readily apparent for several reasons. Perhaps because they are not as severe in this sample as for children from more deficient institutions, they are not necessary to most functioning, other children have problems with the same situations, adolescence presents its own challenges that exacerbate these tendencies (e.g., increased hormone levels, restructuring of many body systems, and changes in prefrontal cortex; Steinberg, 2005), and/or because they are not as readily apparent to parents.

Attention problems. One exception to this finding is Attention Problems, which seem to manifest earlier in childhood. Both younger and older later adoptees had high rates of extreme Attention Problem scores, and this finding is consistent with other studies that found increased attention difficulties in later-adopted PI children assessed as young as 6 years of age (Hoksbergen et al., 2004; Rutter et al., 2001; Stevens et al., 2008). Because of the early occurrence of the problems, attention difficulties may be hypothesized to form a basis for some of the problems seen later in these samples (Stevens et al., 2008).

Similarly, in the factor analysis, the second factor seemed to show problems with inattention. This inattention score was highly correlated with all BRIEF subscales, especially Working Memory, Monitor, Plan/Organize, and Inhibit. These findings correspond to non-PI literature, which implicates working memory and inhibitory control problems in Attention Deficit Hyperactivity Disorder (Alloway, Gathercole, Kirkwood, & Elliot, 2009; Berlin, Bohlin, & Rydell, 2003; Nigg, 2001). Because children in institutions do not experience response-contingent interactions with their caregivers, and child-directed behaviors are minimized, they

may rarely need to use their working memory. Similarly, because their actions do not have many consequences, they may not adequately develop inhibitory control. These executive functioning deficits may be associated with later inattention. Further, because extreme Attention Problems were seen in 6-11-year-olds, whereas all other extreme behaviors were not apparent until 12-18 years, this behavior problem may occur earlier developmentally and may contribute to other behavior problems.

Limitations. The CBCL and BRIEF are parent-report measures and are susceptible to all of the potential limitations inherent with this kind of assessment. Especially as children get older, it may be difficult for parents to know what their children are thinking or doing. However, parents have more experience with their children and can integrate over those experiences, and parent-reports have been correlated highly between both parents (Gunnar et al., 2007) and with teacher-reports (Miller et al., 2009), which lends credibility to these measures. Another potential limitation with the parent-report measures is that the same parent reported both CBCL and BRIEF scores. Thus, the scores may be highly correlated in part because the responder is the same rather than because of a relation between behavior problems and executive functioning.

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Table 1

Means and Standard Deviations for CBCL Subscales and Broadband T-Scores by Age at Assessment and Age at Adoption

Subscale	6-11 years			12-18 years		
	<18 mos	>18 mos	Standard	<18 mos	>18 mos	Standard
	n= 177	*n* = 36	*n* = 777	*n* = 56	*n* = 44	*n* = 976
Total	46.9 (10.7)[b]	49.1 (11.8)	49.8 (9.9)	45.0 (11.5)[b]	54.0 (14.5)[a]	49.9 (10.0)
Internalizing	44.8 (9.6)[b]	48.8 (11.8)	50.2 (9.6)	44.9 (9.8)[b]	50.8 (13.1)	50.2 (9.6)
Externalizing	47.5 (11.5)[b]	48.2 (12.7)	50.1 (9.5)	45.9 (10.2)[b]	54.1 (14.5)[a]	50.1 (9.6)
Anxious	52.5 (4.9)[b]	55.1 (7.9)	54.2 (5.6)	51.1 (5.1)[b]	56.2 (8.1)[a]	54.1 (5.7)
Withdrawn	52.4 (4.7)[b]	53.6 (6.7)	54.3 (5.7)	52.3 (4.7)[b]	57.3 (10.5)[a]	54.5 (5.7)
Somatic	52.0 (3.8)[b]	52.7 (2.8)	53.9 (5.4)	53.5 (6.1)	53.6 (4.7)	54.2 (5.7)
Rule-Breaking	53.9 (6.3)	54.6 (7.2)	54.3 (5.4)	52.5 (4.6)[b]	58.3 (9.5)[a]	54.5 (5.8)
Aggressive	53.7 (6.1)	54.5 (7.1)	54.2 (5.8)	53.1 (5.1)	58.6 (10.6)[a]	54.3 (6.1)
Attention	55.4 (7.9)[a]	56.8 (9.5)[a]	54.5 (5.7)	55.3 (8.6)	60.8 (10.1)[a]	54.5 (6.0)
Thought	54.5 (6.3)	54.6 (6.2)	54.2 (5.5)	54.0 (6.2)	56.4 (8.6)[a]	54.2 (5.5)
Social	52.6 (4.7)[b]	54.0 (5.5)	54.4 (5.6)	52.7 (5.6)	58.8 (7.5)[a]	54.1 (5.5)

Note. Scores are based on truncated *T* scores, per CBCL manual.

[a] sample mean is significantly higher (poorer) than standardization sample mean

[b] sample mean is significantly lower (better) than standardization sample mean

Table 2

Percent Extreme Scores for CBCL Total Problems, Broadband Scales, and Subscales by Age at Assessment and Age at Adoption

Subscale	6-11		12-18	
	<18 mos	>18 mos	<18 mos	>18 mos
	n= 176	*n* = 36	*n* = 56	*n* = 44
Total	13%	14%	7%	39%[a]
Internalizing	6%[b]	19%	4%[b]	21%
Externalizing	15%	19%	9%	36%[a]
Anxious	10%	18%	5%[b]	23%
Withdrawn	7%[b]	17%	2%[b]	30%[a]
Somatic	5%[b]	8%	11%	9%
Rule-Breaking	15%	19%	7%	34%[a]
Aggressive	14%	19%	9%	30%[a]
Attention	20%	29%[a]	18%	39%[a]
Thought	17%	13%	9%	23%
Social	6%[b]	13%	11%	41%[a]

Note. Significance is based on $p < .05$

[a] sample percentage is significantly *higher* (worse) than standardization percentage (15%)

[b] sample percentage is significantly *lower* (better) than standardization percentage (15%)

Table 3

Items that were Significantly Related to Age at Adoption in Univariate ANOVAs of Individual CBCL Items for 6-11 and 12-18-year-olds

Item	Effect Size (R^2) 6-11	Effect Size (R^2) 12-18
Anxious (Internalizing)		
35 - feels worthless	0.05	
29 - fears	0.03	
112 - worries	0.03	
52 - feels too guilty	0.02	
30- fears school	0.02	
45 - nervous		0.15
33 - feels unloved		0.06
32 - must be perfect		0.04
% Significant (13 Total)	38.5%	23.1%
Withdrawn (Internalizing)		
69 - secretive		0.09
5 - enjoys little		0.08
111 - withdrawn		0.06
103 - sad		0.05
42 - rather be alone		0.05
% Significant (8 Total)	0.0%	62.5%
Somatic Complaints (Internalizing)		
47 - nightmares	0.02	
% Significant (11 Total)	9.1%	0.0%
Rule-Breaking (Externalizing)		
67 - runs away	0.04	
26 - lacks guilt		0.13
43 - lies, cheats		0.08
90 - swearing		0.08
28 - breaks rules		0.07
81 - steals at home		0.07
39 - bad friends		0.06
2 - drinks alcohol		0.05
82 - steals outside home		0.05
Attention Problems		
80 - stares blankly	0.02	
41 - impulsive		0.1
74 - shows off		0.08
1 - acts young		0.06
10 - can't sit still		0.06
4 - fails to finish		0.06
61 - poor schoolwork		0.06
7 - brags		0.06
93 - talks too much		0.06
13 - confused		0.04
8 - can't concentrate		0.04
% Significant (14 Total)	7.1%	71.4%
Thought Problems		
18 - harms self	0.07	
66 - repeats acts		0.05
70 - sees things		0.04
92 - sleep talk/walk		.07[a]
% Significant (15 Total)	6.7%	20.0%
Social Problems		
48 - not liked		0.16
27 - jealous		0.13
25 - doesn't get along		0.09
34 - others out to get him	0.07	0.06
11 - too dependent		0.05
64 - prefers younger kids		0.05
% Significant (11 Total)	9.1%	54.5%
Not Part of Subscale		
98 - thumb-sucking	0.03[a]	
24 - doesn't eat well	0.02[a]	0.06

96 - thinks of sex		0.04	44 - bites fingernails	0.16
% Significant (17 Total)	5.9%	52.9%		
Aggressive (Externalizing)				
88 - sulks	0.04			
3 - argues a lot		0.12		
22 - disobedient home		0.11		
95 - temper		0.09		
68 - screams a lot		0.08		
23 - disobedient school		0.07		
37 - gets in fights		0.07		
20 - destroys own things		0.06		
16 - mean to others		0.05		
19 - demands attention		0.05		
21 - destroys other things		0.05		
% Significant (18 Total)	5.6%	55.6%		

Note: Effect sizes indicate that later adoptees had higher scores than earlier adoptees.

[a]Earlier adoptees > later adoptees

Table 4

Varimax Factor Loadings for 12-18-year-olds

Item	CBCL Subscale	Factor 1	Factor 2
5 - enjoys little	I-Withdrawn	0.86	
21 - destroys other things	E-Aggressive	0.85	
25 - doesn't get along	Social	0.85	
20 - destroys own things	E-Aggressive	0.80	
48 - not liked	Social	0.78	
23 - disobedient school	E-Aggressive	0.74	
82 - steals outside home	E-Rule-Breaking	0.71	
103 - sad	I-Withdrawn	0.66	
42 - rather be alone	I-Withdrawn	0.64	
111 - withdrawn	I-Withdrawn	0.63	
81 - steals at home	E-Rule-Breaking	0.62	
28 - breaks rules	E-Rule-Breaking	0.62	
16 - mean to others	E-Aggressive	0.61	
19 - demands attention	E-Aggressive	0.57	
69 – secretive	I-Withdrawn	0.55	0.42
22 - disobedient home	E-Aggressive	0.54	0.48
27 – jealous	Social	0.52	
43 - lies, cheats	E-Rule-Breaking	0.52	0.41
68 - screams a lot	E-Aggressive	0.51	
33 - feels unloved	I-Anxious	0.46	
95 - temper	E-Aggressive	0.44	
37 - gets in fights	E-Aggressive	0.42	
41 - impulsive	Attention	0.41	0.44
24 - doesn't eat well	None	0.40	
8 - can't concentrate	Attention		0.79
4 - fails to finish	Attention		0.79
61 - poor schoolwork	Attention		0.77
13 - confused	Attention		0.53
10 - can't sit still	Attention		0.48
26 - lacks guilt	E-Rule-Breaking		0.44
% of Variance attributed to Factor		22.4	9.9

Note. I=Internalizing; E=Externalizing.

Table 5

Correlations of Factors with CBCL Subscales and BRIEF Subscales

Subscales	Factor 1	Factor 2
CBCL Subscales		
Anxious/Depressed	.56	.40
Withdrawn/Depressed	.79	.51
Somatic Complaints	.32	.30
Rule-Breaking	.81	.71
Aggressive	.88	.69
Attention	.68	.92
Social	.79	.66
Thought	.64	.61
BRIEF Subscales		
Inhibitory Control	.72	.75
Emotional Control	.66	.58
Shift	.62	.63
Initiate	.57	.68
Working Memory	.53	.81
Plan/Organize	.54	.77
Organization of Materials	.43	.53
Monitor	.63	.78

Note. All correlations significant at $p < .001$.

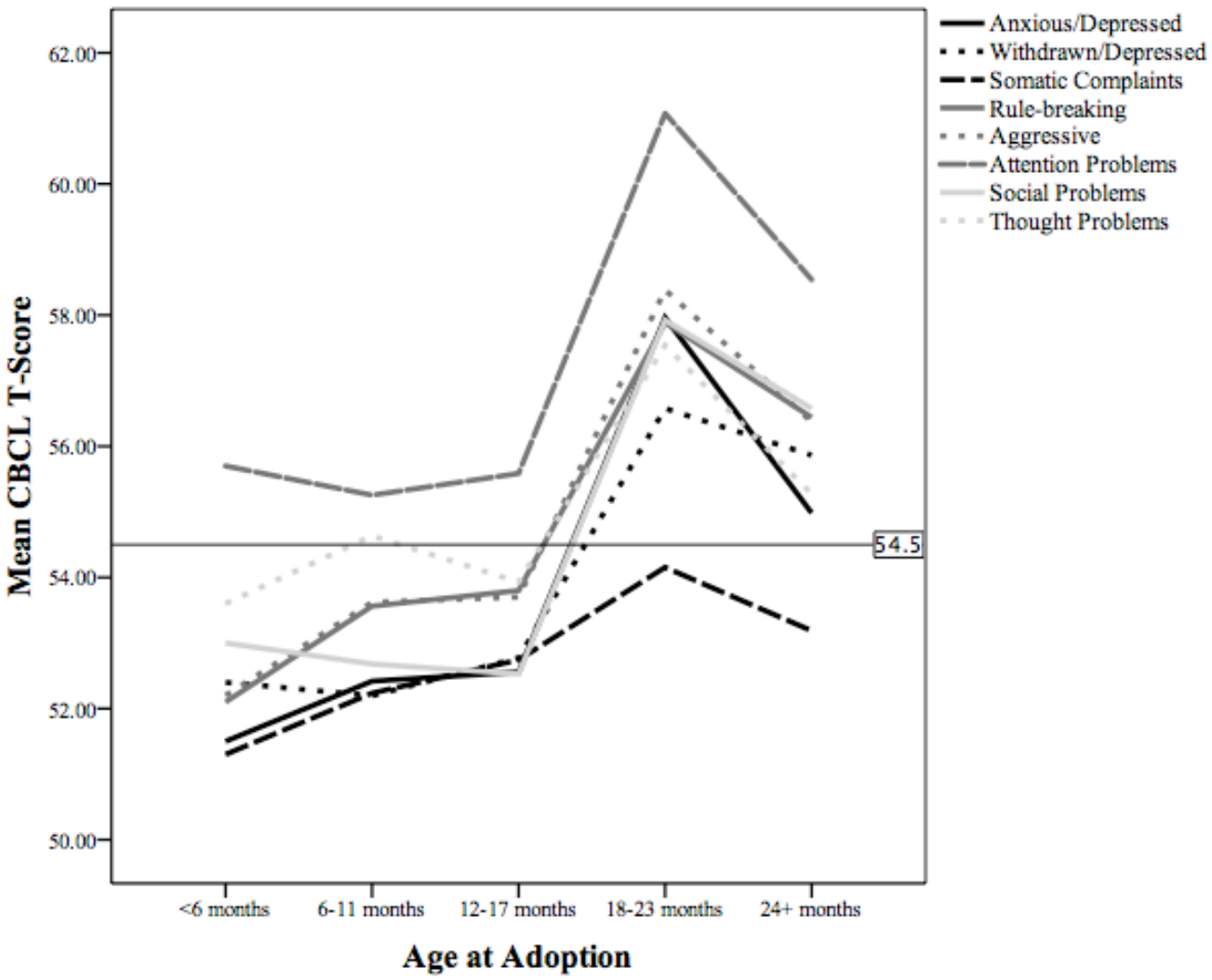

Figure 1. Mean CBCL subscale *T* scores by age at adoption, < 6, 6-11, 12-17, 18-24, and ≥ 24 months. The horizontal line at 54.5 represents the average standardization sample mean *T* score (range = 53.5 to 55.5).

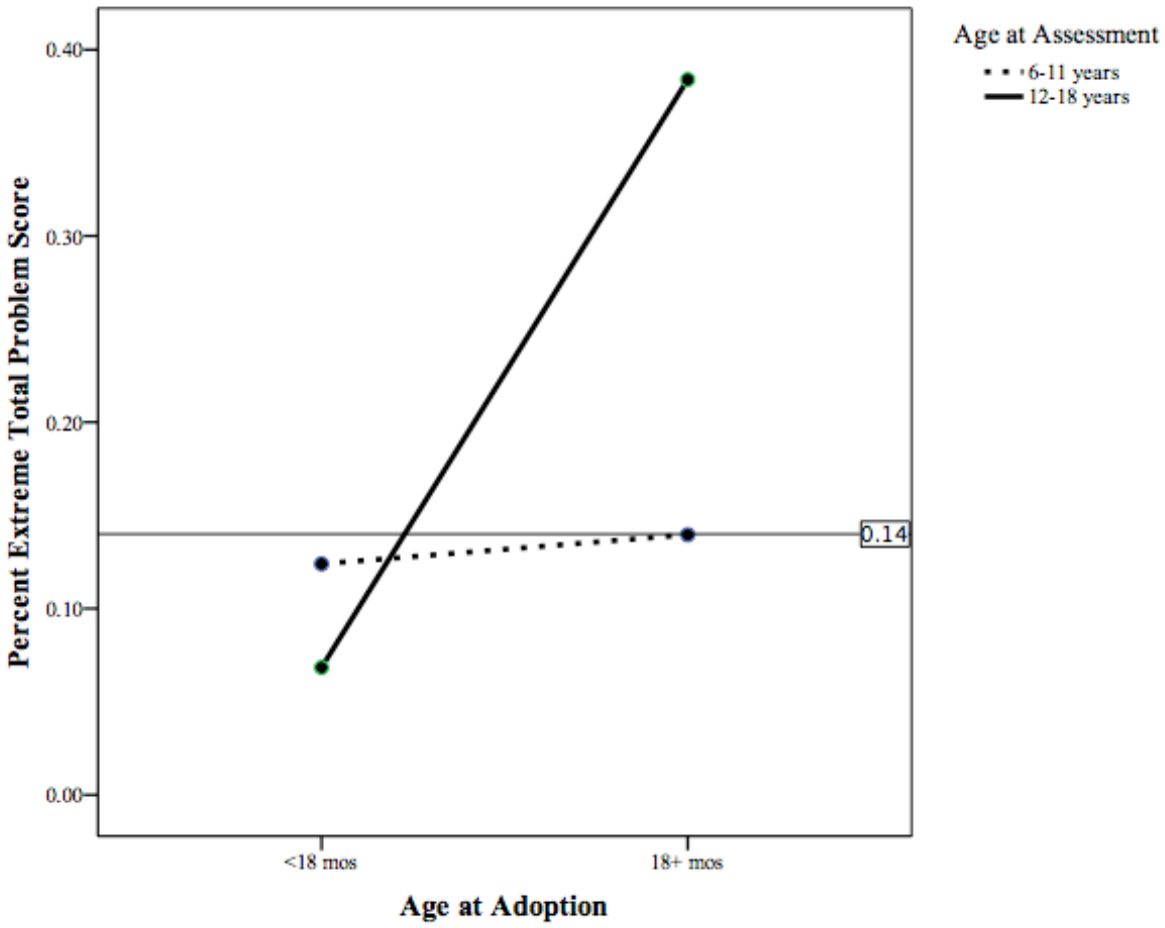

Figure 2. Percent extreme Total Problem scores by age at adoption and age at assessment. The horizontal line at .14 represents the rate of extreme scores ($T \geq 61$) in the standardization sample.

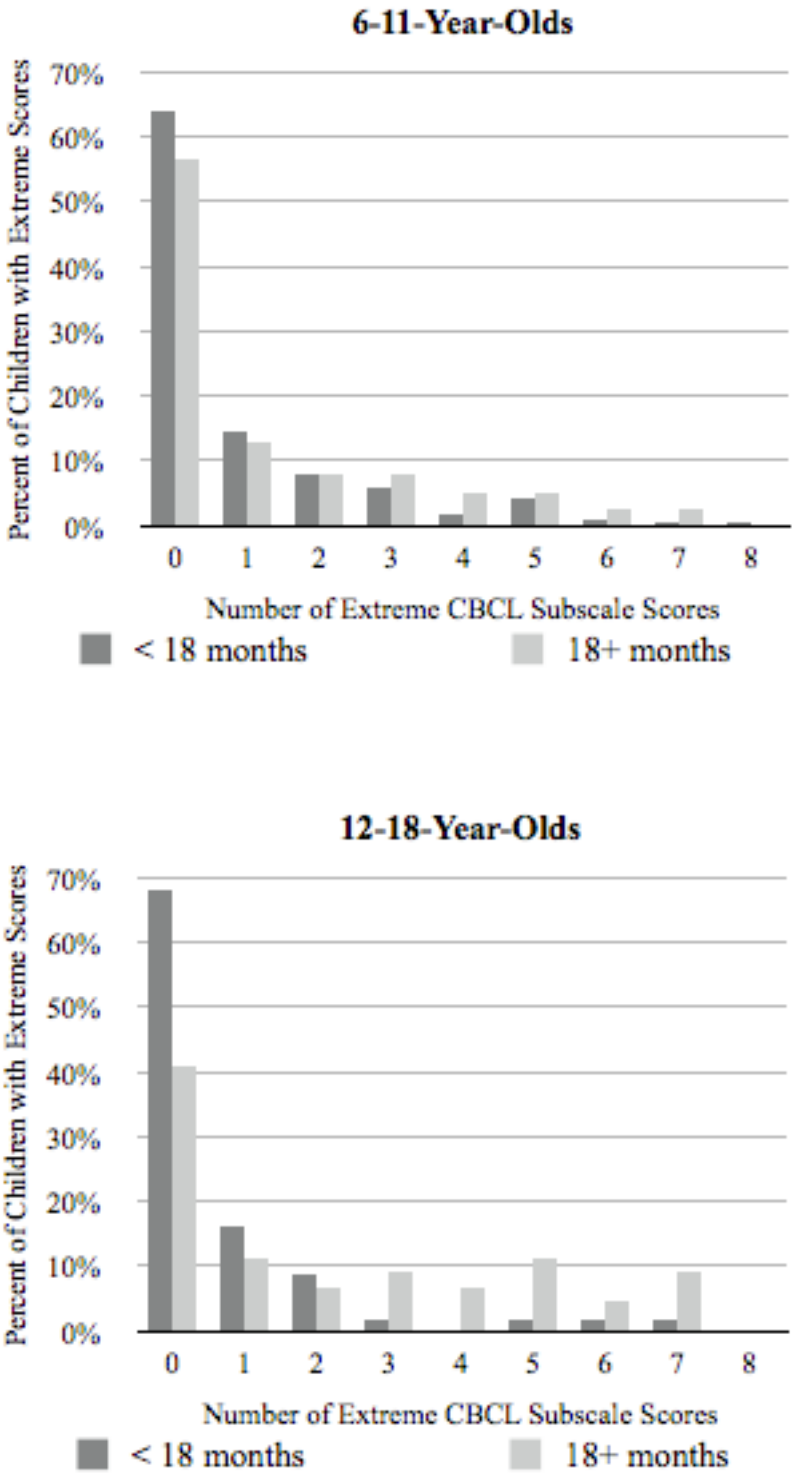

Figure 3. Percent of children with different numbers of extreme CBCL subscale scores for 6-11-year-old and 12-18-year-old earlier and later adoptees.

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