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Parent-Reported Executive Functioning in Post-Institutionalized Children: A Follow-Up Study

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Abstract

Objective—This study compared parent-rated executive functioning (EF) in 6- to 18-year-old children adopted from psychosocially depriving institutions to that in children adopted from severely or “globally” depriving institutions. Individual continuity in EF over two years was examined in children adopted from psychosocially depriving institutions.

Method—There were 471 children adopted from psychosocially depriving Russian institutions which provided adequate physical resources but failed to provide a consistent set of responsive caregivers. There were 111 children adopted in the early 1990s from globally depriving Romanian institutions which were characterized by physical deprivation as well as profound psychosocial neglect. Adoptive parents completed a background questionnaire and the Behavior Rating Inventory of Executive Function (BRIEF).

Results—Children adopted from globally depriving institutions had significantly higher levels of EF difficulties than children adopted from psychosocially depriving institutions. For both groups, adoption after 18 months of age was associated with higher levels of EF difficulties. Children adopted from globally depriving institutions had higher levels of EF difficulties than the BRIEF standardization sample at younger ages at adoption. There was moderate to strong continuity in EF difficulties over two years in children adopted from psychosocially depriving institutions.

Conclusions—These findings suggest that more severe early deprivation may lead to a higher risk of later EF difficulties, which may persist over time.

Keywords

early deprivation; post-institutionalized children; executive function

In the past 20 years, more than 300,000 children have been adopted internationally into the United States (US; US Department of State, 2009). Many of these children have a history of institutionalization, which is associated with poor development in many domains (MacLean, 2003). Following adoption, “post-institutionalized” (PI) children show substantial catch-up in physical, social, and cognitive development (van IJzendoorn, Juffer, & Poelhuis, 2005). However, those exposed to prolonged early institutional deprivation are at risk of attention, cognitive, academic, and social-emotional difficulties that persist years after adoption (Fox, Almas, Degnan, Nelson, & Zeanah, 2011; Loman et al., 2009; Rutter et al., 2007; Stevens et al., 2008).

Recent findings suggest that PI children may be particularly vulnerable to difficulties with executive function (EF), the cognitive skills that facilitate purposeful, goal-directed behavior (Pollak et al., 2010). EF skills include inhibiting goal-irrelevant responses, holding and processing items in working memory, and set-shifting between aspects of a task. Reliant on prefrontal circuitry, EF skills are found to be essential to children's academic achievement and social competence (Hughes, 2011). They have traditionally been measured via task performance, but more recent studies used parent and teacher questionnaires, such as the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000). While tasks have the advantage of direct assessment, rating scale measures have increased ecological validity (Hughes, 2011).

Executive Functioning in Post-Institutionalized Children

PI children perform poorly on EF tasks compared to children reared in their biological homes and those adopted from non-institutional settings, such as foster care (Bauer, Hanson, Pierson, Davidson, & Pollak, 2009; Bos, Fox, Zeanah, & Nelson, 2009; Colvert et al., 2008; Pollak et al., 2010). In the few studies of parent- or teacher-rated EF in everyday contexts, PI children had greater EF difficulties than children reared in their biological families (Bruce, Tarullo, & Gunnar, 2009; Groza, Ryan, & Thomas, 2008; Jacobs, Miller, & Tirella, 2010; Merz & McCall, 2011). PI children's EF task performance was significantly associated with parent-rated EF (Bruce et al., 2009) and with parent- and teacher-rated attention problems (Colvert et al., 2008; Stevens et al., 2008).

EF difficulties have been found in PI children ranging in age at assessment from 5–17 years, suggesting that such deficits emerge or persist into older ages. However, there are no studies that have investigated individual continuity in EF problems. In a study of attention problems, children adopted after 6 months from severely depriving institutions were found to persist in their inattention and hyperactivity/impulsivity from 8 to 11 years of age (Stevens et al., 2008). This question is important because it addresses whether EF difficulties may represent transient adjustment problems or persistent vulnerabilities perhaps associated with changes in neural development that occurred as a result of early institutional rearing. It also reflects the extent to which EF difficulties may improve with time in a supportive family setting or whether these difficulties may be less amenable to recovery following early deprivation.

PI children are also at risk of academic difficulties, including increased learning support service use (Loman et al., 2009). Given the importance of EF to academic achievement in typically-developing populations (Hughes, 2011), it is valuable to examine whether EF difficulties are associated with academic difficulties in PI children.

Level of Early Deprivation

Institutions vary in the extent to which they are characterized by physical and psychosocial deprivation (Gunnar, 2001). The severely or “globally” depriving Romanian institutions of the late 1980s/early 1990s failed to provide adequate nutrition, supplies, and medical care and were profoundly negligent in terms of caregiver responsiveness and stimulation (Rutter et al., 2007). Psychosocially depriving institutions provide adequate physical resources but inadequate levels of caregiver consistency and responsiveness. For instance, the children in the current study were adopted from psychosocially depriving Russian institutions characterized by frequent changes in caregivers who rarely initiated social interactions, did not respond to infants' social bids or emotional distress, and provided little warmth and affection (Muhamedrahimov, 1999; St. Petersburg–USA Orphanage Research Team, 2005; Tirella et al., 2008). Child-to-caregiver ratios were estimated to be 10–30:1 in globally depriving institutions (Chisholm, 1998; Rutter et al., 2007) versus approximately 6:1 in

psychosocially depriving institutions (St. Petersburg-USA Orphanage Research Team, 2005).

Globally depriving institutions may lead to a higher risk of EF difficulties than psychosocially depriving institutions due to their more severe physical and psychosocial inadequacies. Although children exposed to both global and psychosocial deprivation separately show EF difficulties (Colvert et al., 2008; Merz & McCall, 2011), EF in these groups has not been directly compared before. In a study of behavior problems, children adopted from globally depriving institutions had higher rates than those exposed to early psychosocial deprivation (Merz & McCall, 2010).

Age at Adoption

PI children's risk of EF difficulties increases with age at adoption, although only a few studies have examined age at adoption effects. Studies of school-aged PI children have found a step function or threshold effect; risk is increased among children adopted after a certain age relative to younger-adopted and non-adopted children, but among the older-adopted group there is no association between age at adoption and EF. This effect has been found at ages ranging from 6 to 18 months at adoption, perhaps due in part to differences in the level of early deprivation across samples. The step function may occur at 6 months for children adopted from globally depriving institutions (Beckett et al., 2010; Colvert et al., 2008) but at 18 months for children adopted from psychosocially depriving institutions (Merz & McCall, 2011).

Current Study

The current study is a follow-up and extension of a prior study of parent-rated EF in children adopted from psychosocially depriving institutions (PSD group; Merz & McCall, 2011). Results of the prior study indicated that school-aged PSD children adopted after 18 months of age had greater EF difficulties on the BRIEF (Gioia et al., 2000) compared to younger-adopted children, who did not differ from the BRIEF standardization sample. The current study extended the previous analyses by examining individual continuity in PSD children's EF two years later. Based on past studies, we expected that there would be moderate to strong continuity in the level of EF difficulties.

Another major objective was to examine whether more severe early deprivation was associated with greater EF difficulties. We compared EF in school-aged PSD children to that in children exposed to early global deprivation (GD group) at three levels of age at adoption: <9, 9–17, and 18 months. These age at adoption groups were selected to be consistent with prior literature while also preserving within-group sample size. We explored whether GD children may have elevated EF difficulties at a younger age at adoption than PSD children. We then compared both PI groups to the BRIEF standardization sample as a function of age at adoption. Finally, we also examined the association between EF problems and the use of learning support services in school, as well as whether learning support service use was associated with level of early deprivation and age at adoption.

Method

Children Adopted from Psychosocially Depriving Institutions (PSD Group)

In 2008 and 2010, questionnaires were sent to all adoptive parents on the list of an adoption agency specializing in the placement of Russian children with US families. In 2008, 512 surveys were returned (51% response rate), and in 2010, 424 surveys were returned (49% response rate). PSD children were adopted from institutions that the adoption agency

carefully screened for relatively high quality. Moreover, most of the PSD children were adopted from institutions in St. Petersburg, Russia that were found to be psychosocially depriving (Muhamedrahimov, 1999; St. Petersburg–USA Orphanage Research Team, 2005).

Cross-sectional sample—A cross-sectional sample of PSD children was formed by selecting 2010 data if available ($n=343$) and 2008 data if 2010 data were not available ($n=134$). PSD children were 6–18 years of age at assessment and 5–74 months of age at adoption ($N=471$; see Table 1). Children were excluded if they had marked functional deficits (10 children diagnosed with autism and 3 with severe cognitive impairment) or if they had spent less than 25% of their pre-adoption lives in an institution ($n=2$).

Longitudinal sample—The longitudinal PSD sample, formed by selecting children with both 2008 and 2010 data, consisted of 150 children who ranged in age at adoption from 5–72 months ($M=15.91$, $SD=12.22$; 109 adopted <18 months, 41 adopted 18 months). At time 1, they ranged in age at assessment from 6–17 years ($M=10.66$, $SD=3.45$), and at time 2, they ranged from 8–19 years ($M=12.77$, $SD=3.47$).

Children were excluded if they had marked functional deficits ($n=4$), had spent less than 25% of their pre-adoption lives in an institution ($n=1$), or were 20+ years of age at time 2 ($n=2$). In most cases, respondents at the two time points were the same parent (mother: 79%; father: 13%), but in a few instances the mother responded at one time point and the father at the other (8%). Children were excluded if different parents responded and their T scores differed by >20 points ($n=2$). This was thought to call into question the validity of the data by suggesting that the ratings may be more a function of the parents' differing perceptions than of the child's true behavior.

Children Adopted from Globally Depriving Institutions (GD Group)

GD children were adopted from Romanian institutions between 1990 and 1997 (87% were adopted between 1990 and 1991). Parents of these children were recruited through 10 parent support groups located throughout the US (Groza & Ryan, 2002). Data for the current study were collected in 2003 on 123 children (28–36% response rate in the second round of data collection; 53% of the sample was retained in the third round of data collection) from families who agreed to be recontacted after two rounds of data collection. Preliminary analyses gave little indication of sample bias (Groza & Ryan, 2002). The GD group ($N=111$) consisted of children who met the same inclusionary criteria as the PSD group; two children were excluded for intellectual disability. GD children were 6–15 years at assessment and 1–71 months at adoption (see Table 1).

Survey Description

The questionnaire packets mailed to PSD and GD families included a background questionnaire, the BRIEF, 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.

Behavior Rating Inventory of Executive Functioning (BRIEF)—The BRIEF (Gioia et al., 2000) asks parents to rate 86 EF problems in their 5- to 18-year-old children as occurring never, sometimes, or often. Responses are summed to form eight scales: Inhibit (10 items), Shift (8 items), Emotional Control (10 items), Initiate (8 items), Working Memory (10 items), Plan/Organize (12 items), Organization of Materials (6 items), and Monitor (8 items). These eight scales are combined to form the Global Executive Composite (GEC; GD group Cronbach's $\alpha=.98$; PSD group Cronbach's $\alpha=.98$). BRIEF scales and indices yield T scores (with population $M=50$, $SD=10$) based on age and gender. Higher

scores indicate more EF problems, with scores 1.5 *SD* above the normative mean of potential clinical significance. The BRIEF standardization sample ($N=1419$; 43% male) included children 5–18 years at assessment ($M=11$) without any history of developmental delay.

The BRIEF has adequate reliability and validity (Strauss, Sherman, & Spreen, 2006). The Cronbach alpha measure of internal consistency ranges from .80 to .98 for both clinical and normative samples, and the test–retest reliability correlation was .81 (range: .76–.85) for an average two-week interval (Gioia et al., 2000). Some studies of associations between BRIEF parent ratings and children's EF task performance have yielded mixed results (McAuley, Chen, Goos, Schachar, & Crosbie, 2010).

Pre-adoption history—Parent-reported time in an institution was strongly correlated with age at adoption, $r=.84$, $p<.001$, reflecting that most children were placed in institutions in the first few months of life. Age at adoption was used in analyses rather than time in an institution because it was more frequently and likely more accurately reported.

Post-adoption history—Parents indicated whether their child had ever used learning support services in school. Parents also reported on their own education, family income, and marital/partnership status (see Table 1).

Statistical Analyses

After examining the GEC for deviations from the required assumptions (e.g., normality), this score was log-transformed. GEC *T* scores were significantly associated with age at assessment, $r=.24$, $p<.001$, and time in adoptive home, $r=.17$, $p<.001$, but not gender, $r=.03$, *ns*, parent education, $t(520)=.20$, *ns*, parental marital/partnership status, $t(520)=1.19$, *ns*, or family income, $r=-.06$, *ns*. Age at assessment and time in adoptive home were strongly correlated, $r=.95$, $p<.001$. GD and PSD group differences in EF were examined using analysis of covariance (ANCOVA) with level of deprivation (PSD vs. GD) and age at adoption (<9, 9–17, 18 months) as factors and age at assessment as a covariate. Non-significant interaction effects were omitted from the final analysis. Cohen's *d* effect sizes were reported; the conventions for small, medium, and large effects are .20, .50, and .80, respectively. For the PSD group, continuity in EF over time was examined using a regression examining the effect of time 1 GEC *T* score, age at adoption (adopted < or 18 months), and their interaction on time 2 GEC *T* score. We report the interaction and the main effect of time 1 EF, which gives a coefficient reflecting the stability of the scores.

Results

Cross-sectional Analyses Comparing PSD and GD Children

The interaction between level of deprivation and age at adoption was not significant. GD children had significantly higher levels of EF problems than PSD children, $F(1,561)=14.99$, $p<.001$, $d=.44$. Children adopted at older ages had significantly higher levels of EF problems than younger-adopted children, $F(2,561)=7.54$, $p<.01$. Pairwise comparisons of the age at adoption groups indicated that children adopted <9 and 9–17 months did not differ significantly in EF, $F(1, 561)=.40$, *ns*, but children adopted 18 months had higher levels of EF problems than children adopted <9, $F(1, 561)=13.80$, $p<.001$, $d=.61$, and between 9–17 months, $F(1, 561)=10.83$, $p<.01$, $d=.56$. An additional ANCOVA with level of deprivation as a factor and age at adoption and age at assessment as covariates also indicated that GD children had greater EF difficulties than PSD children, $F(1,562)=14.87$, $p<.001$. Supplemental analyses indicated significant level of deprivation and age at adoption effects for nearly all BRIEF scales¹.

An ANCOVA with level of deprivation and age at adoption as factors and age at assessment and family income as covariates yielded similar results. GD children had significantly higher levels of EF difficulties than PSD children, $F(1,498)=9.83$, $p<.01$, $d=.38$. Children adopted at older ages had higher levels of EF difficulties than children adopted at younger ages, $F(2, 498)=5.00$, $p<.01$. Pairwise comparisons indicated that children adopted <9 and between 9–17 months did not differ significantly, $F(1,498)=.19$, ns . Children adopted 18 months had higher levels of EF difficulties than children adopted <9 months, $F(1,498)=8.91$, $p<.01$, $d=.55$, and between 9–17 months, $F(1,498)=7.53$, $p<.01$, $d=.51$. An ANCOVA with level of deprivation as a factor and age at adoption, age at assessment, and family income as covariates revealed that GD children had significantly higher levels of EF difficulties than PSD children, $F(1,499)=9.04$, $p<.01$, $d=.38$.

PSD children adopted 18 months had higher levels of EF problems than the BRIEF standardization sample, but PSD children adopted <9 months and between 9–17 months did not. GD children adopted <9 months and 18 months had higher levels of EF problems than the BRIEF standardization sample, but GD children adopted between 9–17 months did not (see Table 2).

Longitudinal Analyses of Continuity in EF among PSD Children

Mean GEC *T* scores remained fairly constant across time (time 1: $M=52.00$, $SD=13.13$; time 2: $M=53.19$, $SD=14.40$). Regression analysis indicated that the age-at-adoption group by time interaction was not significant, $B=.05$, $SE=.11$, ns . There was a significant main effect of time 1 GEC, $B=.78$, $SE=.15$, $p<.001$.

EF and Learning Support Service Use

Clinical range EF difficulty was significantly associated with a higher rate of using learning support services in school, $\chi^2(1, N=577)=63.38$, $p<.001$. PI children exposed to more severe early deprivation, $\chi^2(1, N=577)=3.89$, $p<.05$, and adopted at older ages, $\chi^2(2, N=577)=31.00$, $p<.001$, were more likely to use learning support services (see Table 2).

Discussion

The main goals of this follow-up study of parent-rated executive functioning (EF) in school-aged children adopted from psychosocially depriving institutions were to compare this group to children adopted from globally depriving institutions and to examine individual continuity in EF difficulties over two years. Results indicated that children adopted from globally depriving institutions had greater EF difficulties compared to children adopted from psychosocially depriving institutions. Given that the rapid development of EF during early childhood may rely on caregiver responsiveness and scaffolding (Bernier, Carlson, & Whipple, 2010), group differences in EF may be due in part to the more severe psychosocial neglect in globally depriving relative to psychosocially depriving institutions. The lack of adequate physical resources in globally depriving institutions may also have contributed to an increased risk of later EF problems.

At both levels of deprivation, EF difficulties were higher among children adopted after 18 months compared to the groups adopted before 9 months and between 9–17 months, which did not differ. Although few studies have examined age at adoption effects with regard to

¹GD children had significantly higher scores on the Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, and Monitor scales than PSD children, $F(1,560)=5.22-24.66$, $p<.05-.001$. GD and PSD children did not differ on the Organization of Materials scale. Children adopted at older ages had significantly higher scores on the Inhibit, Shift, Emotional Control, Working Memory, Plan/Organize, and Monitor scales than younger-adopted children, $F(2,560)=5.21-13.01$, $p<.01-.001$. Age at adoption was not significant for the Initiate and Organization of Materials scales.

EF, this result contrasts previous findings for globally deprived children indicating a step function at 6 months of age at adoption (Colvert et al., 2008). Methodological differences (e.g., age at adoption cutpoints, measurement of EF) may provide a partial explanation for this difference in results. It is also possible that a shared aspect of PSD and GD children's early institutional experience, such as psychosocial deficiencies, may be responsible for the increase at 18 months. There may be a sensitive period during infancy in which the early development of EF and the underlying neurobiological systems rely heavily on expected environmental input (Marshall & Kenney, 2009).

Only children adopted from psychosocially depriving institutions after 18 months had higher EF problems than the normative sample. However, children adopted from globally depriving institutions had higher levels of EF problems than the normative sample at younger ages at adoption. This suggests that children adopted from globally depriving institutions may be at risk of EF difficulties at younger ages at adoption perhaps due to an increased level of adversity faced by this group.

Consistent with previous findings (Stevens et al., 2008), results of this study indicated continuity in PI children's level of EF difficulties during middle childhood and adolescence. EF problems among older-adopted PI children may be persistent rather than transient issues associated with adjustment or short-term stressful events; they may show little improvement with time in an adoptive home. Persistence of EF difficulties is consistent with the possibility that prolonged early deprivation may have long-lasting consequences potentially due to alterations in brain development that are resistant to reversal later in life (Sheridan, Drury, McLaughlin, & Almas, 2010). Continuity should be further explored with younger children over a longer period of time and using direct assessments of EF to complement rating scale measures.

Findings from this study also revealed that EF difficulties were associated with an increased likelihood of using learning support services in school. It is possible that poor EF may partially explain PI children's academic difficulties. However, this association should be addressed in future studies using a more direct measure of academic achievement. Based on these results and others suggesting that EF difficulties may lead to poor socioemotional functioning (Bruce, Tarullo, & Gunnar, 2009), prevention and intervention efforts targeting EF should be provided early in the adoptive home and school settings. These findings also imply the need for a public policy to both improve the quality of institutional care as well as decrease the length of time children spend in institutions.

This study had a number of limitations. PI children adopted from Russia or Eastern Europe have higher behavior problem rates than those adopted from other regions (Gunnar et al., 2007), perhaps due to a higher likelihood of prenatal alcohol exposure, which is associated with EF deficits in never-institutionalized children (Rasmussen & Bisanz, 2009).

Similar to other studies of internationally adopted PI children, this study was unable to rule out the influence of potentially confounding pre-adoption risk factors, such as genetics, prenatal care, substance exposure, and birth circumstances. Parent-reported birth circumstances were not significantly associated with EF in PSD children in a previous study (Merz & McCall, 2011). Also, it was not ideal to compare the PI samples to the BRIEF standardization sample because the groups were not assessed at the same time or using the same protocol.

There may be other differences between the GD and PSD samples, such as historical cohort, reasons for institutionalization, and details about institutional environments, that could contribute to group differences in EF. Although there is evidence that the samples differed in level of early institutional deprivation, there is some imprecision in quantifying this

difference. While the PSD children were adopted primarily in the late 1990s/early 2000s, the GD children were adopted primarily in the early 1990s. In addition, PSD children were recruited via adoption agency whereas GD children were recruited via support groups. At the time the GD children were adopted, these support groups served several purposes, including helping families adopt from Romania, socially connecting adoptive families, and supporting families dealing with problems in their children (Groza & Ryan, 2002).

The 49–51% response rate of the PSD sample is fairly low. According to a selective responding check, parents of children with more difficulties were no more likely to respond to a single questionnaire than parents of children with fewer adjustment difficulties, although there was a small trend for parents of children with more adjustment problems to not respond to any of four rounds of data collection (Hawk et al., 2011). Therefore, the longitudinal analyses may slightly underestimate the level of problems in the PSD population. Although it was not possible to examine whether low IQ might have influenced group differences in EF, it should be noted that children with parent-reported cognitive impairment were excluded from analyses.

While the attribution of age at adoption effects to the selective adoption of healthier children at younger ages cannot be ruled out in the current study, prior study designs suggest that selective adoption is unlikely to explain age at adoption effects (e.g., Bucharest Early Intervention Project; Fox, Almas, Degnan, Nelson, & Zeanah, 2011).

This study examined parent-reported EF in school-aged post-institutionalized children. Results suggest that more severe early institutional deprivation and adoption after the first 18 months of life may be linked with an increased risk of later EF difficulties. There was strong continuity in post-institutionalized children's EF over two years suggesting persistence in EF difficulties over time.

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Table 1

Sample characteristics of 471 PSD and 111 GD children

	Level of deprivation		Statistical test
	PSD	GD	
	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency	
Age at assessment (years)	10.42 (3.64)	9.77 (1.45)	$t(449)=3.01, p<.01$
Male	44%	51%	$\chi^2(1, N=582)=2.22, ns$
Age at adoption (months)	14.31 (10.40)	19.23 (17.55)	$t(580)=3.85, p<.001$
Birth country	Russia (405) Belarus (54) Uzbekistan (8) Other (4)	Romania (111)	--
Time in adoptive home (years)	9.23 (3.51)	8.17 (1.10)	$t(580)=3.16, p<.01$
Parent married/partnered	90%	88%	$\chi^2(1, N=582)=.29, ns$
Parent education (4-year college degree)	92%	90%	$\chi^2(1, N=582)=.40, ns$
Family income	\$100,000–\$125,000	\$92,136	$t(517)=5.55, p<.001^a$

Note. PSD, adopted from psychosocially depriving institutions; GD, adopted from globally depriving institutions; '4-year college degree' was coded if *either* parent had attained this level of education; Other = Ukraine, Kazakhstan, Bulgaria.

^aGiven that PSD group family income was reported in \$25,000 increments, the mean level of income within each endorsed range was used in analyses

Table 2
Executive functioning difficulties and learning support service use in PSD and GD children by age at adoption

Outcome	Level of deprivation					
	PSD			GD		
	Age at adoption (months)			Age at adoption (months)		
	<9 (n=159)	9–17 (n=218)	18 (n=94)	<9 (n=39)	9–17 (n=30)	18 (n=42)
	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency	<i>M(SD)</i> or frequency
BRIEF GEC	49.95 (11.75)	50.81 (13.19)	57.60 (15.23)	54.82 (13.77)	54.96 (13.92)	63.24 (14.44)
Learning Support Service Use	28%	39%	56%	33%	45%	66%

Note. PSD, adopted from psychosocially depriving institutions; GD, adopted from globally depriving institutions; BRIEF, Behavior Rating Inventory of Executive Function; GEC, Global Executive Composite; Bolded means were significantly higher than the BRIEF standardization sample mean of 50 (*SD*=10) using one-sample *t* tests (PSD group: <9: $t(158)=.05$, *ns*; 9–17: $t(217)=.91$, *ns*; 18: $t(93)=4.84$, $p<.001$, $d=.72$; GD group: <9: $t(33)=2.04$, $p<.05$, $d=.47$; 9–17: $t(27)=1.89$, $p<.10$; 18: $t(32)=5.27$, $p<.001$, $d=1.10$).