

The Development of Children Placed Into Different Types of Russian Families Following an Institutional Intervention

Robert B. McCall
University of Pittsburgh

Rifkat J. Muhamedrahimov
Saint Petersburg State University

Christina J. Groark
University of Pittsburgh

Oleg I. Palmov
Saint Petersburg State University

Natalia V. Nikiforova
Baby Home 13, Saint Petersburg, Russia

Jennifer L. Salaway and Megan M. Julian
University of Pittsburgh

This study examined whether interventions in Russian Baby Homes promoting warm, sensitive, and responsive caregiver-child interactions and relationships would be associated with advantages in those children's behavior years after they transitioned to family care. Children ($N = 135$) who had resided for at least 3 months ($M = 13.8$ months) in 1 of 3 intervention institutions were subsequently placed in Russian families (relatives or non-relatives) for at least 1 year ($M = 33.5$ months). When children were 1.5 to 10.8 years of age, parents provided ratings of attachment, indiscriminate friendliness, executive functioning, social-emotional development, and behavior problems. Despite very substantial differences in the developmental status of children at departure from the 3 institutions, there were fewer than expected significant differences between children from the 3 institutions at follow-up or as a function of being placed with relatives or nonrelatives. Specifically, children reared in the most improved institution displayed less indiscriminate friendliness, were less aggressive/defiant, and had less externalizing behavior. Children from all 3 institutions who were placed into families at older ages tended to be rated more poorly on some measures. These results suggest that previously institutionalized children adjust well to family life, but improved institutional caregiving can have some persistent benefits over several years in children transitioned to families.

Keywords: catch-up growth, domestic family placements, intervention follow-up, post-institutionalized children, Russian children

The contribution of early experience to later development is a fundamental question for developmental sciences. The increasing number of children adopted into families from predomi-

nantly poor-quality institutions over the last two decades has provided developmental researchers with an opportunity to study the contemporary and longer-term development of children

This article was published Online First August 8, 2016.
Robert B. McCall, Office of Child Development, University of Pittsburgh; Rifkat J. Muhamedrahimov, Department of Psychology, Saint Petersburg State University; Christina J. Groark, Office of Child Development, University of Pittsburgh; Oleg I. Palmov, Department of Psychology, Saint Petersburg State University; Natalia V. Nikiforova, Baby Home 13, Saint Petersburg, Russia; Jennifer L. Salaway and Megan M. Julian, Office of Child Development, University of Pittsburgh.

Julian is now at the Center for Human Growth and Development, University of Michigan.

This research funded by Grants HD 050212 and 39017 to authors McCall and Groark from the *Eunice Shriver Kennedy* National Institute of Child Health and Human Development. The interpretations and opinions expressed are those of the authors, not the funder.

Correspondence concerning this article should be addressed to Robert B. McCall, Office of Child Development, University of Pittsburgh, 400 North Lexington Avenue, Pittsburgh, PA 15208. E-mail: mccall2@pitt.edu

who have experienced relatively inferior early rearing environments (McCall, Van IJzendoorn, Juffer, Groark, & Groza, 2011; Palacios & Brodzinsky, 2010).

Institutionalized and Post-Institutionalized Children

An estimated 2 to 8 million children reside in institutions around the world (Save the Children, 2009; USAID, 2009). Although the nature of the care these institutions provide infants and young children varies, certain characteristics are frequently reported (Rosas & McCall, 2011; Van IJzendoorn et al., 2011). Specifically, group sizes tend to be large (e.g., 9–16 or more), groups are homogeneous with respect to age and disability status, there are many children per caregiver (e.g., 8), children experience many different caregivers over their first two years of life (e.g., 50–100), children are routinely and periodically transitioned to new groups of peers and caregivers, and children rarely experience warm, sensitive, and responsive interactions or play with caregivers (Rosas & McCall, 2011; Van IJzendoorn et al., 2011).

Not surprisingly, the development of infants and young children while in residence is delayed or deficient. For example, physical growth (e.g., height, weight, head circumference) and general behavioral/mental development tend to average 1 to 1.5 standard deviations below U.S.A. noninstitutionalized children (Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007; Van IJzendoorn, Luijk, & Juffer, 2008; Van IJzendoorn et al., 2011). But it can be even lower, and nearly half may fall below the 10th percentile (Groark, McCall, Fish, & the Whole Child International Team, 2011; Groark, McCall, McCarthy, Eichner, & Gee, 2013; McCall, 2013).

Children who are transitioned to foster or adoptive families (mostly in North America and Western Europe) display immediate and substantial catch-up growth in most domains (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2008; Van IJzendoorn & Juffer, 2006; Van IJzendoorn et al., 2007). But higher rates of longer-term deficiencies and problems can occur in postinstitutionalized children with respect to physical growth, attachment and indiscriminately friendly behavior, executive functioning, and behavior problems (Gunnar, 2001; Juffer et

al., 2011; Julian, 2013; MacLean, 2003). Higher rates tend to occur in children placed into families after a longer residence in the institution, usually marked by age at adoption (Hawk & McCall, 2010; Julian, 2013; McCall, 2013; Merz & McCall, 2010; Van IJzendoorn et al., 2007, 2008). But age at adoption can interact with the severity of the institutional environment. Specifically, a higher rate of longer-term problems occurs after only 6 months residency in a severely globally deficient institution such as the 1990s Romanian institutions (Kreppner et al., 2007), but only after a longer residency (e.g., more than 18 months) in less severely deficient institutions such as the socially emotionally depriving Russian institutions (McCall, 2013; Merz & McCall, 2010; Merz, McCall, & Groza, 2013). Finally, although the research is less systematic, longer-term outcomes may vary with the type of family in which such children are placed. For example, children placed in adoptive families have the best developmental outcomes, followed by those placed in foster families; children reunified with biological families have the poorest outcomes (Julian & McCall, 2011). Therefore, rates of longer-term deficiencies and problems are a joint function of age at adoption, severity of institutional environment, and type of family placement. The current report investigates the longer-term development of institutionalized children as a function of these parameters. In particular, it is a follow-up study of the largest quasi-experimental intervention in institutions for infants and young children; it seeks to determine whether the intervention was associated with behavioral differences after children were transitioned to families in their birth country.

The St. Petersburg Intervention

The preponderance of evidence converges on the proposition that the lack of sensitive and responsive caregiver-child interactions and the opportunity to develop attachments, especially in the first year or two of life, contribute substantially to institutionalized children's poor outcomes over and above any effects associated with prenatal and preinstitutional circumstances, nutrition, safety, sanitation, and medical care (McCall, 2011; Rutter et al., 2007).

Perhaps the best demonstration of this proposition is the quasi-experimental intervention

conducted in St. Petersburg, Russian Federation (St. Petersburg-U.S.A. Orphanage Research Team, 2005, 2008), which was designed to promote caregiver-child relationships and provide children with more stimulation. Three institutions for children birth to four years called Baby Homes (BHs) received one of three conditions. One was given a double intervention of Training plus Structural Changes (T + SC). Training promoted warm, sensitive, contingently responsive, caregiver-child interactions, plus caregivers received on-the-ward coaching and supervision. Structural Changes consisted of several employment and operational changes designed to support the training, including smaller groups, fewer and more consistent caregivers, termination of periodic transitions of children to new groups, integration of children within groups by age and disability status, and family hour consisting of an hour each morning and afternoon in which visitors to wards were prohibited and caregivers were to be with their children. A second BH received Training Only (TO), and a third BH continued to conduct business as usual (No Intervention = NoI), which was similar to that described above for many institutions.

T + SC caregivers improved the quality of the caregiving environment as measured on the HOME Inventory, and T + SC children improved substantially in physical growth and mental and social-emotional development relative to TO, and both T + SC and TO were more advanced than NoI children (St. Petersburg—U.S.A. Orphanage Research Team, 2008).

The Current Study

The current report is a follow-up study of children who had experienced one of these three intervention BHs for at least three months and who then transitioned to two broad types of families, Relatives and Non-Relatives. The typical neglectful institution minimizes sensitive and responsive caregiver-child interactions and relationships and likely produces chronic stress, which leads to higher rates of deficient development and behavioral problems (Gunnar, 2001; Johnson & Gunnar, 2011; McCall, 2011, 2013). Conversely, improved caregiver-child interactions and relationships might be expected to minimize such adverse outcomes (e.g., Gunnar & Quevedo, 2007a, 2008b).

General Hypotheses

Thus, it was first expected that children from the improved institution would display higher levels of development and lower scores on behavioral problem scales than children from the unimproved institution even after being placed into families in their country of birth. Second, children reared by nonfamily members were expected to have better developmental outcomes than those transitioned to relatives, and children placed at older ages should do more poorly than those transitioned at younger ages. More specifically:

Indiscriminate Friendliness

Generally, postinstitutionalized children display more disinhibited social behavior or indiscriminate friendliness than noninstitutionalized children (Bruce, Tarullo, & Gunnar, 2009; Chisholm, 1998; O'Connor, Rutter, and The English & Romanian Adoptees Study Team, 2000). Given that the T + SC intervention promoted warm, sensitive, contingently responsive caregiver-child interactions and T + SC children had more organized and less disorganized attachment relations while in residence (St. Petersburg-U.S.A. Orphanage Research Team, 2008), former T + SC children were expected to display less indiscriminate friendliness than former TO and NoI children.

Executive Functioning

Postinstitutionalized children also tend to have more problems with attention, executive functioning, and emotional regulation (Bos, Fox, Zeanah, & Nelson, 2009; Colvert et al., 2008; Merz & McCall, 2010; Rutter et al., 2007), especially if adopted at later ages (Merz & McCall, 2011). Thus, T + SC children were hypothesized to score better on measures of attention, impulsivity, and inhibitory control.

Social-Emotional Development and Behavior Problems

Generally, poor early attachment relationships (Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), environmental unpredictability (Simpson, Griskevicius, Kuo, Sung, & Collins, 2012), and chronic stress (National Scientific Council on the Developing Child,

2011, 2012) are associated with subsequent behavior problems. Specifically, PI children tend to have more behavior problems than non-PI children, including internalizing and externalizing problems (Hawk & McCall, 2010, 2011; Juffer & Van IJzendoorn, 2005), especially if adopted at later ages. So T + SC children were expected to display fewer behavior problems.

Family Type

The second general hypothesis predicted that children who transitioned to Non-Relatives would be reported to be developmentally better than children who transitioned to Relatives, as suggested by the literature (Julian & McCall, 2011). Non-Relatives included adoptive parents, who tend to be more committed to the child, be more affluent and educated, choose their child, and provide a more permanent family arrangement (Julian & McCall, 2011). In the current study, Non-Relatives also included a few foster parents, a relatively new option in Russia. Relatives included the biological parent(s) who may be younger (e.g., teenage mothers) and less affluent and educated, and other relatives, often a grandmother who may be more or less committed to rearing the child. Further, whatever circumstances led to the temporary relinquishment of the child to the BH may persist to some extent in Relatives. Although the Non-Relatives and Relatives groups were not homogeneous, on balance we expected children with Non-Relatives to have better developmental outcomes.

Method

Participants

Eligibility. Essentially all families of children who had spent at least three months in one of the three intervention BHs, who departed for domestic (Russian) families during the intervention study and up to six years later, and who resided in those families for at least one year were eligible to participate. The use of children who transitioned to families during the six years after the intervention study was completed was justified by a previous study of a larger group of children that showed the differences produced by the interventions on the caregivers and the children at departure from the BHs were main-

tained during this 6-year period (McCall et al., 2013).

Recruitment. A social worker in each BH attempted to recruit eligible families. Some families were not contacted, for example, if the family was known to no longer live in the St. Petersburg area, not have a telephone, have serious problems after the child was placed, have a child with severe disabilities, and so forth. Social workers contacted 205 different families, approximately the same number for each BH. Of these, 73% (149) participated, 15% refused, and 12% could not be located or the child was unavailable; this distribution was not different for the three BHs, $\chi^2(4) = 5.27, p < .20$. Of the 149, the nature of the family type could not be verified for 14, so the total sample available for analysis was $N = 135$. These participation rates were considered fairly good, because families in the Russian Federation are not accustomed to requests by the government (i.e., BHs) to visit their homes, and adoption is considered secret and some parents may have been concerned their children might discover their adoption status during the home visit.

Family type. The 135 families represented five different types, which were combined into two categories because of few cases in certain types. *Relatives* ($N = 54$) included the child's biological parent(s) ($N = 41$) or other relatives, often a grandmother ($N = 13$). *Non-Relatives* ($N = 81$) included adoptive ($N = 43$) and foster ($N = 20$) parents plus "non-relative kin" ($N = 18$). The latter group consisted of nonrelative parents who desired to have a child placed with them sooner than policies allowed for nonrelatives but did allow for kin, so they were labeled "non-relative kin" to qualify for earlier placement. A previous study (McCall et al., 2014) of children departing from these BHs described the process by which children are placed into families and provided data indicating that the birth circumstances and developmental status at departure were not different for children transitioning to these different types of families. Therefore, preplacement status was not obviously confounded with Family Type as it potentially is in some other studies (Julian & McCall, 2011).

Sample characteristics. Table 1 presents demographics of the sample separately for each of the six BH (T + SC, TO, NoI) $\times$ Family Type (Relative, Non-Relative) groups as well as

Table 1
Sample Characteristics

Variable	NoI			TO			T + SC						Statistics
	Rel.	Non-rel.	Total	Rel.	Non-rel.	Total	Rel.	Non-rel.	Total	Rel.	Non-rel.	Total	
<i>N</i>	15	29	44	11	18	29	28	34	62	54	81	135	
Respondent													
Mother	67%	83%	77%	50%	78%	68%	64%	79%	73%	62%	80%	73%	BH: $\chi^2(6) = 5.32$
Father	13%	7%	9%	10%	6%	7%	11%	3%	6%	11%	5%	7%	Fam: $\chi^2(3) = 11.66^{**}$
Grandparent	20%	3%	9%	30%	17%	21%	25%	6%	15%	25%	7%	14%	
Other	0%	7%	5%	10%	0%	4%	0%	12%	6%	2%	7%	5%	
Marital status													
Married with spouse	33%	69%	59%	64%	88%	79%	52%	76%	65%	50%	75%	66%	BH: $\chi^2(4) = 5.27$
Not married, with partner	8%	14%	12%	9%	6%	7%	15%	9%	12%	12%	10%	11%	Fam: $\chi^2(2) = 11.52^{**}$
Not married, no partner	58%	17%	29%	27%	6%	14%	33%	15%	23%	38%	14%	23%	
Education													
<10 yrs.	27%	21%	23%	40%	39%	39%	50%	12%	29%	42%	21%	29%	BH: $\chi^2(4) = 6.11$
11–14 yrs.	47%	7%	20%	50%	11%	25%	18%	9%	13%	32%	9%	18%	Fam: $\chi^2(2) = 26.14^{***}$
15+ yrs.	27%	72%	57%	10%	50%	36%	32%	80%	58%	26%	70%	53%	
Annual income													
<20,000	43%	0%	14%	55%	11%	28%	32%	0%	15%	40%	3%	11%	BH: $\chi^2(4) = 6.57$
20,000–40,000	50%	41%	44%	46%	50%	48%	43%	33%	38%	45%	40%	45%	Fam: $\chi^2(2) = 39.74^{***}$
>40,000	7%	59%	42%	0%	39%	24%	25%	67%	48%	15%	58%	44%	
No. other children													
None	40%	62%	54%	64%	61%	62%	46%	59%	53%	48%	61%	56%	BH: $\chi^2(4) = 8.83$
1–2	53%	38%	43%	0%	33%	21%	43%	32%	37%	37%	35%	36%	Fam: $\chi^2(2) = 4.50$
3+	7%	0%	2%	36%	6%	17%	11%	9%	10%	15%	5%	9%	

Note. Percentages are for those with available data; percentages may not add to 100% because of rounding error. Rel. = Relatives; Non-Rel. = Non-relative families; NoI = No intervention; TO = Training only; T + SC = Training & structural changes; BH = Baby home; Fam = Family type. Income is in rubles.

** $p < .01$. *** $p < .001$.

for each of these two variables ignoring the other. Overall, most respondents (73%) were mothers of the target children, two thirds of respondents were married and living with their spouses, and 56% of the target children were the only child in the home. Generally, these families had above average education and income. Table 1 also presents the results of chi square tests of BH and of Family Type differences on these characteristics. There were no significant BHs differences. But as expected, the respondent in Non-Relative, compared with Relative, families was significantly more likely to be the mother, more likely to be married and living with their spouse, and have more education and higher family income. These data are for the maximum sample of 135 parents; because certain assessments were only appropriate for children of a limited age range and because of missing data, *Ns* for specific assessments varied and were less than this total (see below).

Demographic and other information. BH records were used to obtain the child's birth

date, date of admittance to the BH, and date of departure from the BH. Together with the date of assessment recorded by home visitors, the length of time (months) in the BH and time (months) in the family were determined.

Table 2 presents the means (*SDs*) for these age and timing parameters for the six BH (T + SC, TO, NoI) $\times$ Family Type (Relatives, Non-Relatives) groups, marginal groups, and total sample ($N = 135$). The table also gives the results of two between-factor (3 BH $\times$ 2 Family Type) ANOVA tests, which indicated that there were no significant differences between BHs and Family Types. Overall, children averaged 10.7 months at BH intake ($SD = 11.9$), spent 13.8 months ($SD = 11.0$) in residence, transferred to families at 24.7 months ($SD = 15.2$), spent 43.3 months ($SD = 21.5$ months) in those families, and were assessed at 67.9 months of age ($SD = 24.2$). More than half the children arrived at the BH before 6 months of age, 83% spent more than 6 months in residence, 62% were transferred to families after 18 months of

Table 2
Means (SDs) for Age and Time Parameters of Sample ($N = 135$)

Characteristic	NoI		TO		T + SC		Rel.	Non-rel.	Statistics
	Rel.	Non-rel.	Rel.	Non-rel.	Rel.	Non-rel.			
Age at BH intake (months)	11.7 (10.9) 11.4 (12.0)	11.2 (12.7) 13.0 (10.2)	12.9 (10.5) 11.5 (10.6)	10.7 (10.8) 14.3 (11.2)	11.1 (13.2) 9.8 (12.6)	8.7 (12.2) 10.7 (11.9)	11.6 (11.9) 10.7 (11.9)	10.3 (12.0) 10.7 (11.9)	BH: $F < 1$ Fam: $F < 1$ BH $\times$ Fam: $F < 1$
Time in BH (days)	10.4 (5.0) 12.1 (8.8)	13.0 (10.2) 12.1 (8.8)	11.6 (13.5) 13.3 (11.9)	14.3 (11.2) 13.3 (11.9)	16.3 (12.8) 15.2 (11.8)	14.4 (11.1) 15.2 (11.8)	13.7 (11.5) 13.8 (11.0)	13.9 (10.7) 13.8 (11.0)	BH: $F = 1.37$, $p = .26$ Fam: $F < 1.00$ BH $\times$ Fam: $F < 1.00$
Age at family placement (months)	22.1 (11.4) 23.5 (13.6)	24.2 (14.7) 23.5 (13.6)	24.6 (14.7) 24.9 (13.5)	25.1 (13.2) 24.9 (13.5)	27.4 (15.5) 25.4 (17.1)	23.7 (18.4) 25.4 (17.1)	25.4 (14.2) 24.7 (15.2)	24.2 (15.9) 24.7 (15.2)	BH: $F < 1.00$ Fam: $F < 1.00$ BH $\times$ Fam: $F < 1.00$
Time in family (months)	42.7 (25.5) 44.9 (23.3)	46.0 (22.4) 44.9 (23.3)	49.3 (20.0) 50.5 (16.4)	51.3 (14.4) 50.5 (16.4)	45.4 (23.7) 38.8 (21.4)	33.4 (17.9) 38.8 (21.4)	45.5 (23.2) 43.3 (21.5)	41.9 (20.2) 43.3 (21.5)	BH: $F = 2.63$, $p = .76$ Fam: $F < 1.00$ BH $\times$ Fam: $F = 2.01$, $p = .139$
Age at assessment (months)	64.7 (29.3) 68.3 (24.8)	70.2 (22.5) 68.3 (24.8)	70.8 (24.3) 75.3 (20.8)	76.2 (19.1) 75.3 (20.8)	72.9 (24.8) 64.2 (24.7)	57.1 (22.6) 64.2 (24.7)	70.8 (25.8) 67.9 (24.2)	66.0 (23.0) 67.9 (24.2)	BH: $F = 1.72$, $p = .183$ Fam: $F < 1.00$ BH $\times$ Fam: $F = 2.91$, $p = .058$

Note. Rel. = Relatives; Non-Rel. = Non-relative families; NoI = No intervention; TO = Training only; T + SC = Training & structural changes; BH = Baby home; Fam = Family type.

age, and 78% had lived more than 2 years in their families.

These data indicate a great deal of variability in the ages of children at assessment. This was handled in three ways. First, any single assessment was conducted on a much narrower age range, one that was appropriate for that assessment. Second, most outcome measures were standardized by age. Third, time in the BH and time in the family, which together were very highly correlated with age at assessment, were entered first in all analyses and their associations with each outcome measure could be observed.

Assessments

Indiscriminate friendliness. The assessment of indiscriminate friendliness consisted of a short questionnaire for parents of children ($N = 40$, 20 males) who were 18–47 months at assessment ($M = 34.5$). *Chisholm's Indiscriminately Friendly (IF) Behavior Questionnaire* (Chisholm, 1998) consisted of five items pertaining to how friendly the child is with strange adults, how shy or wary the child is with new adults, the child's general behavior around strange adults, whether the child is willing to go home with them, and whether the child frequently wanders off by him- or herself. Responses were scored simply as reflecting IF (1) or not (0). The original items were reworded to help parents make clearer choices of responses. These changes were reviewed by Chisholm (personal communication, 2007). The final items were translated into Russian by bilingual psychologist authors RJM or OIP and checked by the other.

Raw scores were used in analyses, and the alpha coefficient in the current study was .76. The scale has discriminated between later (>8 months) 1990s Romanian PIs and both early adoptees and non-PIs, and these differences persisted up to 3 years after adoption into Canada (Chisholm, 1998; Chisholm, Carter, Ames, & Morison, 1995). Chisholm's brief attachment questionnaire was also administered, but it failed to achieve acceptable internal consistency (.35).

Executive functioning. Three subscales—Impulsivity, Inhibitory Control, and Attentional Focusing—were selected from the *Children's Behavior Questionnaire, Russian Version*

(Rothbart, Ahadi, Hershey, & Fisher, 2001) to represent executive functioning. Parents of children ($N = 63$, 36 males, for Attentional Focus; $N = 60$ for Impulsivity and Inhibitory Control) who were 31 to 76 months of age ($M = 52.8$) indicated on a 7-point scale for each of the 35 items the extent to which the statement was *extremely untrue* (1) to *extremely true* (7) of their child.

To adjust for possible age differences, scores were converted to z scores based on the means and SD s from the standardization sample of noninstitutionalized U.S.A. children. Alpha coefficients were .61, .82, and .73 for each subscale respectively, which were similar to those found for the original U.S.A. sample.

Social-emotional and behavior problems and competence. Parents of children ($N = 52$, 26 males) who were 18–59 months of age completed selected subscales of the *Infant Toddler Social Emotional Assessment* (ITSEA; Carter, Briggs-Gowan, Jones, & Little, 2003). Parents indicated whether statements were *rarely/not true* (0), *sometimes true* (1), or *often/very true* (2) of their children (or no opportunity to judge = 0). The Aggression/Defiant (12 items) subscale from the Externalizing domain and the Negative Emotionality (13 items) subscale from the Internalizing domain were given, because similar behaviors were assessed in older children (see below). All of the subscales in the Competence domain were administered to complement the problem behavior assessments. However, some subscales did not achieve acceptable internal consistency so only the general Competence score will be reported. Alpha was .84, which was similar to that found for the standardization sample; test-retest reliabilities for that sample were .82–.90 (Carter et al., 2003).

Age standardized scores were used, but the ages of the children who had ITSEA scores extended beyond the oldest age of children in the standardization sample. For children up to 48 months the means and SD s for the U.S.A. noninstitutionalized standardization sample (Carter & Briggs-Gowan, 2002) were used to calculate z scores. Little systematic age change in means or SD s occurred in that sample between 36 and 41 and 42–48 months. So after consultation with Alice Carter (personal communication, 2000), the means and SD s for 42–48 month children in the standardization

sample were used to calculate z scores for the current children who were 49–59 months of age.

The *Child Behavior Checklist (CBCL) 6–18 Years* (Achenbach & Rescorla, 2000) that assesses common behavior problems was administered to parents of children ($N = 72$, 30 males) who were 61–129 months of age ($M = 86.9$). They reported that statements were *not true* (0), *sometimes true* (1), or *very/often true* (2) of their children. The CBCL produces two broadband scores, Internalizing Problems (subscales of Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints) and Externalizing Problems (subscales of Aggressiveness, Rule Breaking). The CBCL is widely used with postinstitutionalized children (Hawk & McCall, 2010), has adequate reliability and validity, and discriminates between clinically referred and non-referred children (Achenbach & Rescorla, 2000).

Alpha coefficients for the current study were .79 and .84 for Internalizing and Externalizing Problems, respectively, but alphas ranged between .52 and .82 (most below .70) for other subscales, so the broadband results will be emphasized here. To adjust for possible age differences, scores were translated to T scores based on the assessment manual for U.S.A. noninstitutionalized children, and norms for children age 6 years were used for younger children.

Assessment Procedure

BH social workers provided assessors with contact information for families agreeing to participate, and assessors scheduled a home visit. Assessors visited families in pairs, one focusing on the child and the other on the parent. After getting acquainted, the adult-focused assessor explained the procedure, answered questions, and obtained written consent while the child-focused assessor engaged the child. The parent was then given the questionnaires and filled them out in writing or orally if necessary pertaining to the target child while the other assessor continued to engage the child. At the end of the visit, the parent was paid the equivalent of \$30 USD in rubles, and the child was given an age appropriate toy (value approximately \$10 USD).

Data Analysis Strategy

Because this is a field study of naturally occurring events, there were more factors potentially related to outcomes than could reasonably be analyzed simultaneously with the number of available subjects. Further, many of these factors are not independent of one another. Consequently, the data were analyzed with a set of sequential regression analyses on progressively larger models involving only those main effect factors and selected interactions that were the focus of this study. This approach used the maximum *Ns* for each comparison.

Predictors

Analyses focused on several predictors.

Duration of exposure. Because children entered and left the BHs, entered families, and were assessed at different ages (see Table 2), predictors that reflected the extent to which children were exposed to the BH treatment and to family life were entered first. This was done to assess in subsequent models whether adding other predictors was associated with outcomes to a significantly greater extent.

Time in BH. Although Time in BH (months) was not different for children who transitioned to different types of families in a previous study (McCall et al., 2014), it was related to the extent of BH intervention effects on children's development at departure (St. Petersburg-U.S.A. Orphanage Research Team, 2008) and it is generally related to longer-term outcomes for postinstitutionalized children (Julian, 2013).

Time in family. The number of months the child spent in the family before the assessment varied among children, and progressive adjustments to family life could be associated with outcomes. Except for the time that some children spent with a family before institutionalization, Time in BH coupled with Time in Family were highly correlated with age at assessment. Therefore, age at assessment was not analyzed directly but inferred from the combined contribution of Time in BH plus Time in Family.

Main predictors. Two factors, the intervention condition of the BH (T + SC, TO, NoI) and the type of family (Relatives, Non-Relatives) were the main focus of this study.

BH. The primary research question was whether children who experienced the improved BH (T + SC) displayed any benefits after transitioning into families, especially in comparison with children who experienced the no-treatment control BH (NoI). Further, while in residence, the TO children did not improve as much as the T + SC children, so it was of interest whether simply training caregivers would have some persistent benefits compared to NoI. Thus, the main BH effect was represented by two contrasts: T + SC versus NoI and TO versus NoI, which together approximates a comparison between the two treatment BHs combined versus the no-treatment comparison.

Family type (non-relatives vs. relatives). Based on the literature (Julian & McCall, 2011) and their parental financial and educational advantage (see Table 1), children who transitioned to Non-Relatives were expected to have better outcomes than those who transitioned to Relatives.

Interactions. Certain interactions, but not all, were potentially related to outcomes.

BH $\times$ Time in BH. The developmental differences between children from the three intervention BHs increased the longer the children were exposed to the interventions (St. Petersburg-U.S.A. Orphanage Research Team, 2008). Thus, it was possible that T + SC children would do better in families the longer they had been in T + SC and/or NoI children would do worse the longer they were in NoI. This interaction was represented by two contrasts: T + SC versus NoI $\times$ Time in BH and TO versus NoI $\times$ Time in BH.

Family type $\times$ Time in family. Similarly, any differences between Family Types might be exaggerated the longer children resided in those families. This interaction was represented by the contrast Relatives versus Non-Relatives $\times$ Time in Family.

Family type $\times$ BH. The combination of the advantages of T + SC and being placed with Non-Relatives could be associated with especially better outcomes; conversely, the combination of the less advantageous NoI and being transitioned to Relatives could be associated with disproportionately poorer outcomes. This interaction was represented by two contrasts: Non-Relatives versus Relatives $\times$ T + SC versus NoI and Non-Relatives versus Relatives $\times$ TO versus NoI.

Model Specifications and Analyses

The analyses consisted of a sequence of multiple regressions that progressively compared one model with another as specified in Table 3. The Xs in the model number columns indicate which predictors are included in that model, and the bold Xs indicate which predictors were added to that model when compared with the previous model. The statistical results for each model indicate (a) the significance of the model itself (i.e., whether this model of predictors as a set accounts for a significant amount of variance in the outcome measure), (b) the significance of adding the Bold $\times$ Predictors to the set of predictors compared with only the predictors included in the previous model, and (c) the significance of each individual predictor contrast variable within the model. For significant results, we give the amount of variance accounted for in the dependent variable by the model and the amount associated with adding the model over the previous model, and the standardized beta and the amount of unique variance associated with a specific contrast over and above the other predictors in the model (i.e., each predictor's unique contribution to outcome variance in that model).

Note that the significance of each individual predictor can change from one model to the

next, because its significance is net of the other predictors in the model and those predictors change from one model to the next. Only statistically significant results are emphasized below; however, because of the small sample sizes, a few borderline significant results are described if they pertain to predicted differences.

Results

Family Type

There were few main effects or interactions for Family Type, so details of results for most of these models will not be presented. Means and SDs for the other predictors across Family Type for each outcome variable are presented in Table 4.

Indiscriminate Friendliness (IF)

Chisholm's Indiscriminately Friendly Behavior Questionnaire. Although the addition of the two contrasts for BHs together did not add significant variance for Model 2, the individual predictor of T + SC versus NoI was significant in Model 2, $t(35) = -2.17$, $p = .037$, standardized beta = $\beta = -3.73$, accounting for 11.0% of the unique variance. This sug-

Table 3
Composition and Sequence of Testing Regression Models

Variables to be entered	Model number					
	1	2	3	4	5	6
Duration of exposure						
Time in baby home	X	X	X	X	X	X
Time in family	X	X	X	X	X	X
Baby home						
T + SC vs. NoI		X	X	X	X	X
TO vs. NoI		X	X	X	X	X
Baby Home $\times$ Time in baby home						
T + SC vs. NoI $\times$ Time in Baby Home			X	X	X	X
TO vs. NoI $\times$ Time in Baby Home			X	X	X	X
Family type						
Non-relatives vs. Relatives				X	X	X
Family Type $\times$ Time in Family						
Non-relatives vs. Relatives $\times$ Time in family					X	X
Family Type $\times$ Baby Home						
Non-Relatives vs. Relatives $\times$ T + SC vs. NoI						X
Non-Relatives vs. Relatives $\times$ TO vs. NoI						X

Note. Bold Xs indicate the effect tested when this model is compared with the previous model. Rel. = Relatives; Non-rel. = Non-relative families; NoI = No intervention; TO = Training only; T + SC = Training & structural changes.

Table 4
Mean (SD) Scores on Outcome Measures for Children in the Three Intervention Groups

Variable	NoI	TO	T + SC	Total	Results
Chisholm Indiscriminate Friendliness To Adults (<i>N</i> = 40; 18–47 mos; <i>M</i> = 34.2)	1.43 (.37)	1.37 (.27)	1.00 (.58)	1.20 (.51)	T + SC < NoI (<i>p</i> < .037)
Executive function (CBQ) (31–76 mos.; <i>M</i> = 52.8)					
Inhibitory control (<i>N</i> = 60)	-.45 (1.50)	-.51 (1.42)	-.34 (1.14)	-.41 (1.30)	All <i>ns</i>
Impulsivity (<i>N</i> = 60)	.31 (1.17)	-.09 (.97)	.63 (.95)	.39 (1.05)	T + SC more impulsive than NoI (<i>p</i> < .036), more so with more time in T + SC (<i>p</i> < .052)
Attentional FOCUS (<i>N</i> = 63)	-.40 (1.59)	.19 (1.34)	-.04 (1.33)	-.11 (1.41)	All <i>ns</i>
ITSEA Scale (<i>N</i> = 52; 18–59 mos.; <i>M</i> = 43.2)					
Aggressive/Defiant	.54 (1.25)	-.66 (.48)	.08 (.97)	.14 (1.07)	More time in family, less aggressive/defiant (<i>p</i> < .004); T + SC had less Agg/Def than NoI the more time in BH (<i>p</i> < .083)
Negative emotionality	.31 (1.20)	.03 (.86)	.31 (1.15)	.28 (1.12)	All <i>ns</i>
Competence	-.90 (1.08)	-.18 (.66)	-.35 (1.07)	-.50 (1.05)	All <i>ns</i>
CBCL scale (<i>N</i> = 72; 61–129 mos.; <i>M</i> = 86.9)					
Internalizing	50.46 (8.39)	50.16 (10.61)	50.89 (9.78)	50.55 (9.44)	All <i>ns</i>
Externalizing	56.64 (6.87)	58.37 (7.86)	58.14 (8.62)	57.68 (7.78)	More time in BH related to more externalizing (<i>p</i> < .040) in NoI but less externalizing in T + SC (<i>p</i> < .065) and TO (<i>p</i> < .014)

Note. NoI = No intervention; TO = Training only; T + SC = Training & structural changes; BH = Baby home; Fam = Family type; CBQ = Child Behavior Questionnaire; ITSEA = Infant Toddler Social Emotional Assessment; CBL = Child Behavior Checklist.

gests, as hypothesized, that children from T + SC reportedly displayed less Indiscriminate Friendliness than those from NoI.

In contrast to most other outcome measures, Model 5, which added Time in Family $\times$ Family Type, accounted for a significant amount of additional variance (19%), $F(1, 31) = 4.94$, $p = .034$; both Family Type, $t(31) = -2.48$, $p = .019$, $\beta = .587$, and Time in Family $\times$ Family Type, $t(31) = -2.22$, $p = .034$, $\beta = -1.299$, were significant; and the combined Family Type effect and dosage accounted for 23% of the variance in this score. These results indicate that children residing with Relatives have less Indiscriminate Friendliness than children residing with Non-Relatives, and this is more true the longer they lived with the family.

Executive functioning. Means, SDs, and statistical results for the three subscales of the

Children's Behavioral Questionnaire are given in Table 4, in which higher scores for Inhibitory Control and Attentional Focus are better whereas higher scores for Impulsivity are poorer.

Inhibitory control, attentional focus. No regression model contributed significant additional variance, no model was individually significant, and no individual exposure, BH, or Family Type predictor was significant in any model for the outcomes of Inhibitory Control and Attentional Focus.

Impulsivity. The regression analyses produced a variety of effects for Impulsivity. First, Model 2, in which BH main effects were added to the duration of exposure predictors of Model 1, contributed a significant amount (10.2%) of additional variance in Impulsivity, $F(2, 55) = 3.23$, $p = .047$. Further, in Model 4, after a

variety of other predictors had been entered, Time in BH was significant, $t(52) = -2.40$, $p = .020$, $\beta = -.946$, as were the T + SC versus NoI contrast, $t(52) = 2.15$, $p = .036$, $\beta = .338$, plus the interaction of Time in BH $\times$ T + SC versus NoI, $t(52) = 1.99$, $p = .052$, $\beta = .726$. These two contrasts added 6% unique variance.

These results show that the three BHs differed, especially that children in T + SC were *more* impulsive (.63) than in TO (-.09) and NoI (.31). Further, *more* time in a BH was associated with *less* Impulsivity, especially for NoI relative to T + SC.

Social-Emotional Development and Behavior Problems

The Infant Toddler Social Emotional Assessment (ITSEA). The group means and SDs for the ITSEA subscales are given in Table 4, where higher scores represent worse behavior for Aggressive/Defiant and Negative Emotionality but higher scores for Competence are better.

Aggression/Defiant. Models 1 through 3 were individually significant, Model 1: $F(2, 49) = 4.46$, $p = .017$, 12%, but no model added significant variance to any previous model. Time in Family was a significant exposure predictor in every model, Model 1: $t(49) = -2.99$, $p = .004$, $\beta = -.420$, 15.4%, indicating that the significance of all models was primarily associated with the fact that more time in the family was associated with less aggression/defiance. In addition, Time in BH approached significance in Models 3–5 ($p = .08$ –.09) and was significant in Model 6, $t(41) = -2.18$, $p = .035$, $\beta = -1.053$, 7.9%, and Time in BH $\times$ T + SC vs. NoI also approached significance, $t(41) = 1.78$, $p = .083$, $\beta = .817$, 5.2%. This set of results, not all of which were significant, suggests that children in T + SC were less aggressive/defiant than children in NoI the more time they both spent in their BHs.

Negative emotionality. No models were individually significant and none contributed additional significant variance.

Competence. There were no exposure, BH, or Family Type effects for this broadband scale.

CBCL t Scores

Means and SDs for t scores are given in Table 4, where higher scores indicate more problems.

Internalizing. No regression model provided significant additional variance or was significant by itself, and no individual predictor was significant. The same null results were obtained for the subscales of *Withdrawn/Depressed* and *Somatic Complaints*; but for *Anxious/Depressed*, Time in BH was significant in most models ($p < .02$, 9% of variance), and Model 3, which added Time in BH $\times$ BHs, contributed significant additional variance (9%), $F(2, 64) = 3.23$, $p = .046$. These results suggested that although no general internalizing results were observed, more time in the BHs was related to greater levels of Anxious/Depressed scores, especially for children in NoI.

Externalizing. Model 3, which added the Time in BH predictors, contributed additional significant variance, $F(2, 65) = 3.37$, $p = .040$, 2.1%, and the individual dosage predictors were significant or borderline: Time in BH, $t(65) = 2.10$, $p = .014$, $\beta = .472$, 6.1%; Time in BH $\times$ T + SC versus NoI: $t(65) = -1.88$, $p = .065$, $\beta = -.346$, 4.8%; Time in BH $\times$ TO versus NoI: $t(65) = -2.53$, $p = .014$, $\beta = -.429$, 8.8%; collectively accounting for 19.7% of the variance. The combination of these effects indicated that although children across BHs displayed more Externalizing problems with more time in BHs, more Time in BH was related to more Externalizing for NoI children but less Externalizing for T + SC and TO children. An examination of the subscales of this broadband measure indicated that this same set of effects occurred for *Aggressiveness*, but nothing was significant for *Rule Breaking*.

Discussion

Intervention Effects

This study sought to determine whether children who were exposed to a socially emotionally improved early institutional environment and were then transferred to domestic families would be reported by their parents to be developmentally more advanced and display less problem behaviors than children who came from more traditional nonintervention institutions. Although children who experienced the Training and Structural Changes (T + SC) intervention were reported to have some of the hypothesized advantages, there were fewer dif-

ferences between T + SC and the No Intervention (NoI) children than expected.

Nevertheless, some differences between intervention groups did occur. Consistent with expectations, parents reported T + SC children displayed less indiscriminate friendliness than NoI children. Indiscriminate friendliness in postinstitutionalized children is ordinarily rather pervasive, relatively long lasting, and often unrelated to attachment to the parent (Bakermans-Kranenburg et al., 2011). The origins of indiscriminately friendly behavior in these samples are not well understood (Bakermans-Kranenburg et al., 2011; Soares, Belsky, Mesquita, Osorio, & Sampaio, 2013), but it is related to the quality of caregiving (Love, Minnis, & O'Connor, 2015) and some (Chisholm, 1998; McCall, 2011) have suggested that it is learned in the institution, rewarded by families and friends, and related to a lack of inhibitory control which also characterizes postinstitutionalized children (Bruce et al., 2009). If so, the T + SC intervention, which emphasized caregiver attention and sensitive, responsive interactions, may have lessened the need for children to be indiscriminately friendly and instead rewarded more appropriate child-caregiver interactions.

In apparent contrast to expectations, T + SC children were rated as being *more* Impulsive on the CBQ than NoI children. The Impulsivity scale reflects an eagerness to engage in activities, and it reverse scores apprehension to get involved or try something new. The T + SC intervention stressed child-directed interactions and encouraged caregivers to respond to, and thus reward, children's initiatives. In contrast, NoI children are taught conformity, and their behavioral overtures tend not to elicit responses from caregivers. Therefore, T + SC children likely take more initiative, engage in more activities, and are more independent and "creative," behaviors that produce somewhat higher scores on "impulsivity" but nevertheless within the normal range of U.S.A. children, especially compared with NoI children who were not encouraged in these ways.

Although there were no main effects for intervention BHs on the ITSEA, T + SC children were less Aggressive/Defiant than NoI children the longer they were in the BH. This may reflect a greater opportunity for T + SC children to learn appropriate behaviors with peers and adults at somewhat older ages.

Family Type

A second major purpose was to examine whether children placed with Non-Relatives would adjust and develop better than those placed with Relatives. This would be consistent with the literature (Julian & McCall, 2011), and might be expected on the basis of substantial financial and educational differences between these family types. Again, there were relatively few differences. This may be because the literature shows the most difference in children's development to be between adoptive versus biological parents (Julian & McCall, 2011), whereas in the present study Non-Relatives also included foster parents and other nonrelatives and Relatives included grandparents. The heterogeneity within these groups may have reduced any differences between them. Also, financial resources and parental education may have less associations with children's development in Russia than in a meritocracy, such as the U.S.A.

Time in BH and Time in Family

The literature summarized above indicates that problems of various types are often more frequent in PI children who were exposed a longer time to an unimproved institution, and several results in the current study are consistent with this theme. More Time in BH, regardless of which intervention condition, was associated with higher Internalizing scores (especially Anxious/Depression) on the CBCL. Apparently, even children who had longer residencies in the T + SC intervention displayed more Internalizing difficulties than those with shorter exposures. More Time in BH was related to more Externalizing Problems for NoI but less for T + SC and TO. Again, this may reflect the opportunity for T + SC and TO children to learn more appropriate behaviors with peers and adults than NoI children, especially at somewhat older ages.

More Time in Family was related to less ITSEA Aggression/Defiance, which may reflect the family's socializing influence.

Limitations

This study has several limitations. First, although this is one of the few studies of postinstitutionalized children transferred to domestic families (e.g., Tibu, Humphreys, Fox, Nelson,

& Zeanah, 2014), the sample sizes are not large, which limited power, especially within each type of assessment, and many statistical tests were conducted risking capitalization on chance on Type I errors. It should be noted that the failure to find many significant effects does not necessarily mean such effects do not exist, although the relative lack of BH differences is broadly similar to preliminary results from a larger follow-up study of children from these same institutions adopted into U.S.A. families.

Second, children were exposed to the institution for as little as three months (but $M = 13.8$ months). The interventions produced differences in residential children's development after only four months (St. Petersburg-U.S.A. Orphanage Research Team, 2008), but intervention effects were larger with longer exposures. Time in the BH was related to some outcomes, but the short residencies in the institutions for some children might not have been sufficient to produce lasting effects for other outcomes.

Third, this study relied on parental report measures rather than actual observations of the children. Although some milestone studies of postinstitutionalized children used structured behavioral assessments, many studies, especially those focusing on behavioral problems, have used parental report (Hawk & McCall, 2010; Julian, 2013). Further, parent reports have a certain ecological validity and are based on substantially more and varied experience with the child than could be obtained with independent observations.

Fourth, social workers did not contact parents of children they knew to be having serious difficulty, and parents of children with developmental challenges may not have agreed to participate, which could have minimized the presence of developmental problems in this sample, especially in NoI. However, similar kinds of reporting bias does not exist among U.S.A. adoptive parents (Hawk et al., 2013).

Fifth, the mean age at assessment was 5.7 years and the oldest child was 10.8 years old, whereas research suggests that rates of deficient development and problem behaviors for PI children can be higher in adolescence (Hawk & McCall, 2010, 2011; Juffer & Van IJzendoorn, 2005; Julian, 2013; Merz & McCall, 2010; Sonuga-Barke, Schlotz, & Kreppner, 2010). Thus, it is possible that T + SC may be asso-

ciated with better outcomes than NoI when these children reach adolescence.

Sixth, PI children are widely reported to display substantial catch-up growth and positive adjustment following placement into families (Bakermans-Kranenburg et al., 2008; Van IJzendoorn & Juffer, 2006; Van IJzendoorn et al., 2007), and it is possible that the family environments helped NoI children "catch up" to T + SC and TO children. However, technically this cannot be firmly concluded from this study. Although T + SC and TO children departed from the BHs with higher general developmental scores (i.e., Battelle Developmental Inventory) than NoI children, the other outcome measures were not assessed at departure from the BHs to establish a baseline from which to measure catch-up directly because many of the children were too young at departure for some of the follow-up assessments.

Conclusions

This study reports the only follow-up assessments of institutionalized children exposed to a very comprehensive quasi-experimental intervention who were then placed into families in their own community. As such, it is an assessment of the longer-term consequences, at least through early childhood, of differences in the early institutional experience of infants and toddlers. Although children exposed to a better early environment had less indiscriminate friendliness, less aggressive/defiance, and less externalizing behaviors, especially the longer they were in the intervention, they were not rated better on a variety of other dimensions.

These results suggest that improving the quality of caregiver-child interactions within an institution can have some persistent benefits over several years in children transitioned to families. Although these effects were less frequent and profound than expected, this should not be taken as evidence that institutionalization is relatively harmless to children's development and can be overcome to some extent by transitioning PI children to families. A substantial literature exists to the contrary. Further, Fraley, Roisman, and Haltigan (2013) caution against interpreting minimum longer-term outcomes as evidence that the intervention did not work, because interventions nearly always have di-

minishing effects over time and some benefits might only occur at older ages.

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Received January 7, 2015

Revision received May 2, 2016

Accepted June 5, 2016 ■