

# The effects of foster care intervention on socially deprived institutionalized children's attention and positive affect: results from the BEIP study

Melissa M. Ghera,<sup>1</sup> Peter J. Marshall,<sup>2</sup> Nathan A. Fox,<sup>3</sup> Charles H. Zeanah,<sup>4</sup>  
Charles A. Nelson,<sup>5</sup> Anna T. Smyke,<sup>4</sup> and Donald Guthrie<sup>6</sup>

<sup>1</sup>St. John Fisher College, Rochester, NY, USA; <sup>2</sup>Temple University, Philadelphia, PA, USA; <sup>3</sup>University of Maryland, College Park, MD, USA; <sup>4</sup>Tulane University, New Orleans, LA, USA; <sup>5</sup>Harvard University Medical School, Boston, MA, USA; <sup>6</sup>University of California, Los Angeles, CA, USA

**Background:** We examined the effects of a foster care intervention on attention and emotion expression in socially deprived children in Romanian institutions. **Methods:** Institutionalized children were randomized to enter foster care or to remain under institutional care. Subsequently, the institutionalized and foster care groups, along with a community-based comparison group, were evaluated on emotion tasks at 30 and 42 months of age. Behaviors reflecting positive and negative affect and attention were coded from videotapes. **Results:** Data indicated that at both age points, children who received the foster care intervention showed higher levels of attention and positive affect compared to children who remained institutionalized. Compared to the community sample, children in the foster care intervention showed higher levels of attention to the emotion-eliciting tasks at 42 months of age. **Conclusions:** The results of this randomized trial demonstrate the impact of a family-based intervention on the development of attention and positive affect. **Keywords:** Institutionalization, intervention, emotion expression, attention, positive affect. **Abbreviations:** BEIP: Bucharest Early Intervention Project; IG: institutionalized group; FCG: foster care group; NIG: never-institutionalized/community group; Lab-TAB: Laboratory Temperament Assessment Battery; BSID-II: Bayley Scales of Infant Development-II; DQ: developmental quotient; PA: positive affect; NA: negative affect.

Recent research on the effects of institutionalization as a model of early deprivation has focused on how cognitive and social deficits may be remediated by placement in family environments and how the timing of interventions impacts development (Clarke & Clarke, 2000; O'Connor, 2003; Rutter, 2006). Rutter and colleagues found that Romanian children adopted into the UK initially suffered from severe malnutrition, generally poor physical state, and cognitive impairment (Rutter & the ERA Study Team, 1998). While most of Rutter's sample made large intellectual gains after adoption, there was a high degree of heterogeneity of outcome and gains were larger for children who were adopted at earlier ages (see Rutter, 2006). Studies of post-institutionalized international adoptees have examined a variety of issues such as inattention (e.g., Kreppner, O'Connor, Rutter, & the ERA Study Team, 2001) as well as aspects of children's social behavior (for review see Tarullo & Gunnar, 2005). For example, Ames and colleagues (Fisher, Ames, Chisholm, & Savoie, 1997) reported that Romanian children adopted into Canada displayed internalizing problems and difficulty coping with social interactions, and hence decreased opportunities to learn appropriate social responses.

These children often scored highly on parent report of indiscriminate 'friendly' behavior (Chisholm, Carter, Ames, & Morison, 1995; Chisholm, 1998).

Few studies have examined the consequences of institutionalization and early intervention on the expression of emotion. The ability to express emotions and distinguish others' emotions is an early-occurring, integral component of social development. Infants display and can imitate emotional expressions during the first year of life, with these behaviors having far-reaching implications across different domains of development (Campos, Mumme, Kermorian, & Campos, 1994; Izard, 2002; Lazarus, 1991; Sroufe, 1984). Differences in the expression of emotion are central to the constructs of temperament (e.g., Fox, Henderson, Rubin, Calkins, & Schmidt, 2001) and attachment (Ainsworth, Bell, & Stayton, 1974; Bowlby, 1969). Expression of emotion also plays a critical role in the development of conscience and morality (Eisenberg & Fabes, 1998; Hoffman, 1978), and emotion identification is a cornerstone of social functioning and interaction (Herba & Phillips, 2004).

For institutionalized children, the scarcity of appropriate socio-emotional stimulation within institutions could lead to deficits in the recognition or expression of emotion and attention in social contexts. Especially in younger children, interpretation

Conflict of interest statement: No conflicts declared.

© 2008 The Authors

Journal compilation © 2008 Association for Child and Adolescent Mental Health.

Published by Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA

of situations relies almost exclusively on information garnered from facial expression (Izard & Harris, 1995). In studies of children reared in Russian institutions, Sloutsky (1997) found that such children identified the emotions of anger, love, fear, and joy less frequently compared to non-institutionalized children. Additionally, the longer children were in an institution, the fewer correct responses they gave (Sloutsky, 1997). Fries and colleagues (Fries & Pollak, 2004) found that post-institutionalized, internationally adopted children showed less accurate responses to the mapping of facial emotions onto emotional contexts, especially when contexts involved the emotions of happiness, fear, and sadness. The longer children had been in an institution, the poorer they performed, and increases in performance were related to the length of time a child had been in an adoptive home (Fries & Pollak, 2004), thereby illustrating the effect of institutionalization on the recognition of emotion. Electrophysiological research has also illustrated the effect of institutionalization on the perception of emotions. Parker, Nelson, and colleagues (Parker, Nelson, & the BEIP Core Group, 2005a, 2005b) demonstrated differences between institutionalized and never-institutionalized children on processing of emotion faces (using event-related potentials, or ERP), thus supporting findings regarding brain differences in institutionalized versus community children (see also Marshall, Fox, and the BEIP Core Group, 2004).

The current paper addresses children's emotion expression and attention in relation to a foster care intervention as part of the Bucharest Early Intervention Project (BEIP; Zeanah et al., 2003). The BEIP is a study of a foster care intervention for institutionalized children in Bucharest, Romania, and it differs from post-adoption studies of institutionalized children from that country in at least two important ways: First, the experimental design of the BEIP allows examination of the specific effects of the intervention that was applied, as children were randomly assigned to either remain in the institution or were placed into a foster care intervention. Such randomization allows for direct interpretation of changes in development due to children's experiences in the foster care setting. The BEIP is the first study of its kind to allow for such evaluation. Randomized controlled trials of enhancements to existing foster care in the US have demonstrated the efficacy of early intervention programs directed at improving foster children's regulatory capabilities, both behaviorally and physiologically (Dozier et al., 2006), as well as assisting caregivers of foster children in understanding and dealing with the needs of children in care (Dozier et al., 2006; Fisher, Burraston, & Pears, 2005) thereby allowing for more permanent placement situations (Fisher et al., 2005). The BEIP is the first study that examines foster care as an *alternative* to institutionalization. Given the prevalence of institutionalized care in

much of the world, this approach potentially allows a demonstration of the causal links between quality foster care and favorable outcomes (see Nelson et al., 2007). Second, a within-country intervention was used; placing children in foster families in Romania, rather than studying children from institutions who were subsequently raised in different cultures. The within-country context also allowed comparison between the performance of children in the intervention and same-age children from the local community who had never been institutionalized (Zeanah et al., 2003).

The current paper examines the effect of the BEIP foster care intervention on previously institutionalized children's emotional expression and attention to social stimuli during short laboratory episodes designed to elicit positive affect. As part of the BEIP, Smyke et al. (2007) examined emotion expression in these episodes at the baseline assessment (prior to randomization into the BEIP). Relative to a comparison sample of same-age community children, institutionalized children showed significantly less positive and more negative affect in the emotion episodes. The current paper reports on the effects of the intervention on emotion expression in these children at assessments at 30 and 42 months of age. For the children in foster care, assessments were an average of 7 and 19 months after placement respectively. Three main questions are addressed: (1) What is the effect of the foster care intervention on emotion expression and attention for previously institutionalized children? (2) Are effects of foster care on emotional functioning and attention related to timing of the intervention? (3) Do children in the foster care intervention begin to resemble never-institutionalized children with respect to emotional expression and attention?

## Methods

### Participants

Initially, 136 children living in institutions in Bucharest were randomly assigned to one of two groups: Children were either taken out of the institution and placed in foster care (FCG; foster care group,  $n = 68$ ) or were assigned to remain in their institution (IG; institutionalized group,  $n = 68$ ). While assignment to groups was random, accommodations were made to keep siblings together (Zeanah et al., 2003). Additionally, a comparison group of 72 typically developing community children (NIG; never-institutionalized group) living with their biological parents, matched to the IG on age and gender, were recruited. All children underwent an initial physical and pediatric screening (see Zeanah et al., 2003). From the original 208 participants, eleven participants (6 IG, 5 FCG) were excluded after study onset since these children failed to meet inclusion criteria (due to emergent neurological or genetic disorders). The present analyses concern the emotion elicitation tasks at the 30- and 42-month assessments (see Table 1 for sample sizes). Twenty-two children (2 IG, 6 FCG, 14

**Table 1** Mean ages of participants in each group at the 30- and 42-month assessments

Group	30 Months			42 Months		
	<i>N</i>	<i>M</i> ( <i>SD</i> )	Range	<i>N</i>	<i>M</i> ( <i>SD</i> )	Range
Overall	165	30.72 (.882)	29.43–33.80	154	42.49 (.551)	41.17–44.88
IG	58	30.78 (.947)	29.43–33.70	56	42.37 (.416)	41.17–43.57
FCG	55	30.49 (.706)	29.89–33.80	55	42.35 (.337)	41.60–43.47
NIG	52	30.88 (.943)	29.99–33.80	43	42.85 (.845)	42.02–44.88

NIG) were excluded from the analyses due to missing data on the emotion tasks.

At entry into the study, most children in the IG had spent the majority of their lives in the institution. After an initial baseline assessment, half the IG ( $n = 68$ ; 34 females) was randomly placed into foster care. Average age at placement was 23.1 months ( $SD = 6.8$ , range 6.8–33.0). Children who were not randomly assigned to foster care remained in the institution. Importantly, a policy of non-interference was implemented: Participation in the BEIP did not affect alternative placements which arose, with the caveat that no child placed into foster care would ever be placed back in the institution (Zeanah et al., 2003, 2006). Over the course of the study, 6 children in the FCG were reintegrated with their biological families or adopted within Romania and 25 IG children moved into family placements (domestic adoption, reintegration with biological family, or placement in government foster care). All placements were made at the direction of the Romanian National Authority for Child Protection.

The BEIP was approved by the Institutional Review Boards at the principal investigators' universities (University of Minnesota, Tulane University, University of Maryland) and by the National Authority of Child Protection and the Ministry of Health in Romania. For each participant, informed consent was obtained from the appropriate legal authority, either the biological parent or the Romanian Commission for Child Protection. For the institutionalized children who were to be placed in foster care, informed consent was also obtained from the birth parents, when they could be located. Ethical safeguards of the BEIP have been discussed in detail elsewhere (Millum & Emanuel, 2007; Wassenaar, 2006; Zeanah et al., 2003, 2006).

### Intervention

Foster parents were recruited from newspaper advertisements, screened for criminal records, education and employment, and interviewed about their interest in providing care. Training was developed by and for Romanians but was similar to training foster parents receive in the US (refer to Nelson et al., 2007; Zeanah & Smyke, 2005). The model of foster care involved having US clinicians provide ongoing training and support via video and telephone consultation to three project social workers in Bucharest, who in turn provided support and interventions to foster parents. Project social workers were trained by their US partners to enhance foster parents' understanding of children's needs for attention and affection, and address management of common behavioral problems using praise and limit-setting. The question under evaluation was whether an affordable, replicable model of foster care, respectful of

Romanian values and caregiving practices, could be developed and implemented and be shown to be more effective than institutional care. Caregivers (FCG or IG) did not follow any manual outlining appropriate social interaction. Quality of caregiving was assessed with videotaped observations. Raters blind to group assignment and the study's purpose coded the observations. Data revealed that the caregiving environments for the FCG were significantly better than those of the IG (Smyke, Zeanah, Fox, Nelson, & Guthrie, 2008).

### Measures

Two slightly modified episodes (*Puppets* and *Peek-A-Boo*) from the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith & Rothbart, 1999), designed to elicit positive affect, were utilized. Children were escorted to a laboratory that had been constructed specifically for the purposes of the study by a caregiver from the institution, their foster parent, or their biological parent, for the IG, FCG, or NIG respectively. For both episodes, the mother (NIG), foster parent (FCG) or favored caregiver (IG) remained in the room with the child and was instructed to sit behind the child and remain neutral. During the puppet episode, a female examiner introduced a pair of puppets to the child and acted out a conversation. Coding was conducted on 30-second epochs within the 2-minute episode to identify expression of discrete emotions as well as intensity of facial and bodily expressions. Interrater reliability was achieved on each coded behavior ( $\kappa$ 's = .60–.96).

Following procedures for coding of behaviors and composite formation (Lab-TAB manual; Goldsmith & Rothbart, 1999) and based on previous work (e.g., Kochanska, Coy, Tjebkes, & Husarek, 1998) and properties of the scale scores, positive affect (PA), negative affect (NA), and attention composites were created and transformed within each episode (see also Smyke et al., 2007). Given significant inter-episode correlations ( $r$ 's range .351–.689), values were averaged into an overall score.

The Bayley Scales of Infant Development (BSID-II; Bayley, 1993) were also administered at baseline, and follow-up (30 and 42 months). Developmental quotient (DQ) was entered as a covariate in the analyses reported here (analysis of the DQ data can be found in Nelson et al., 2007).

### Data analysis

Analyses in this paper are presented from an 'intent to treat' perspective, with the original group assignments being used for all analyses. Therefore the

'institutionalized' label for the IG actually represents the natural course of institutionalization at the time of study, which may or may not have involved remaining in an institution. There was one child who did not enter the foster care intervention until after the 30-month assessment and therefore was not included in analyses at 30 months, but is included in the FCG at the 42-month assessment.

Given relations in the entire sample between DQ, PA, and NA at 30 and 42 months ( $r$ 's = .176–.226,  $p < .05$ ), DQ was statistically controlled in analyses examining the efficacy of intervention.<sup>1</sup> To ensure that covariation of DQ was not masking an effect, follow-up analyses were conducted without the covariate. Follow-up analyses examined differences in trajectories of change from baseline to post-intervention assessments. Here, change scores were computed and group differences evaluated via  $t$ -tests.

Analyses focused on the intervention and proceeded as follows: (1) *Effects of the foster care intervention between IG and FCG* were evaluated via repeated-measures analyses of covariance (RM ANCOVA) controlling for DQ at 30 and 42 months. Since the NIG was nonequivalent to the other groups it was not included in this set of analyses in order to fully examine the consequences of the randomized experimental design. To further illustrate the efficacy of the intervention, analyses of the differences between the IG and FCG in the change in expression of emotion and attention pre-to-post intervention were also conducted using  $t$ -tests. To do so, change scores were computed between the baseline and post-intervention timepoints (e.g., 30-month PA minus baseline PA), and differences in mean change values evaluated without controlling for DQ. (2) We then examined *timing of intervention effects* on emotional expression; specifically age of entry into foster care as a possible factor in changes in attention and PA within the FCG. (3) RM ANCOVA analyses compared the FCG to the NIG for each composite from 30 to 42 months. As was done between the FCG and IG, after the creation of change scores,  $t$ -tests were used to examine differences in the change in each composite.

## Results

### *Effect of the foster care intervention on children's emotion expression*

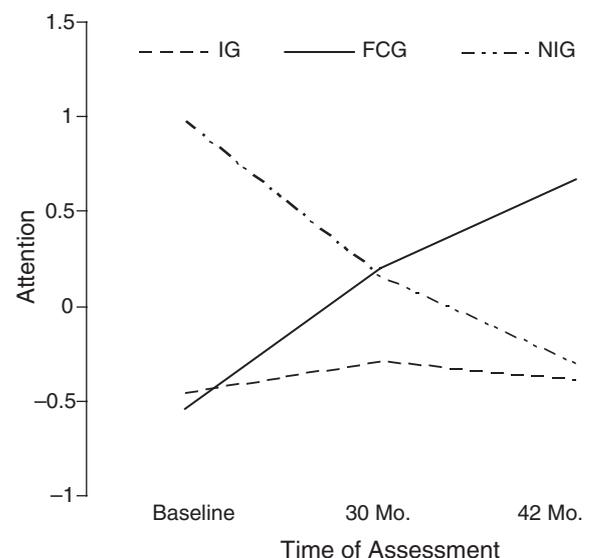
Preliminary analyses showed that the IG and FCG were not significantly different at baseline (prior to randomization) on any of the 3 outcome variables: positive affect (PA), negative affect (NA), and attention.

**Attention.** There was no significant main effect of age at assessment, nor was the interaction of group  $\times$  age of assessment significant. There was a significant main effect of group ( $F(1,101) = 4.53$ ,

$p < .05$ ,  $\text{Eta}^2 = .043$ ). The FCG demonstrated higher levels of attention at both age points compared to the IG; however, analyses within each age point revealed that the difference was not significant at 30 months ( $t(108) = .982$ ,  $p > .05$ ), but was significant at 42 months ( $t(108) = 2.50$ ,  $p = .01$ ). Examination of group differences in change from the baseline assessment to both 30 and 42 months revealed non-significant differences between baseline and 30 months, but significant differences to 42 months ( $t(98) = 1.99$ ,  $p < .05$ ). Figures 1–3 illustrate unadjusted mean values for each composite at each assessment (baseline, 30 months, and 42 months).

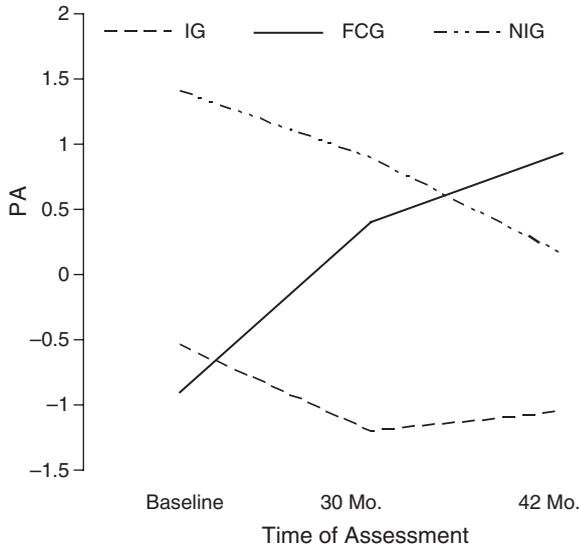
**Positive affect.** There was a significant main effect of group ( $F(1,99) = 18.92$ ,  $p < .001$ ,  $\text{Eta}^2 = .160$ ), but no main effect of age at assessment nor interaction of age  $\times$  group. Analysis within each timepoint revealed that the FCG demonstrated significantly higher levels of PA at 30 ( $t(106) = 3.39$ ,  $p < .001$ ) and 42 months ( $t(108) = 3.28$ ,  $p < .001$ ) compared to the IG. Examination of differences in change from the baseline assessment to post-intervention assessments demonstrated a significant increase from baseline for the FCG as compared to the IG for both the 30-month ( $t(98) = 3.80$ ,  $p < .001$ ) and 42-month assessments ( $t(98) = 3.87$ ,  $p < .001$ ).

**Negative affect.** There were no significant main effects of either group or age at assessment, nor was the interaction significant. Examination of group differences in change from the baseline assessment to the 30- and 42-month assessments revealed no differences between groups in change in NA to 30 or 42 months.

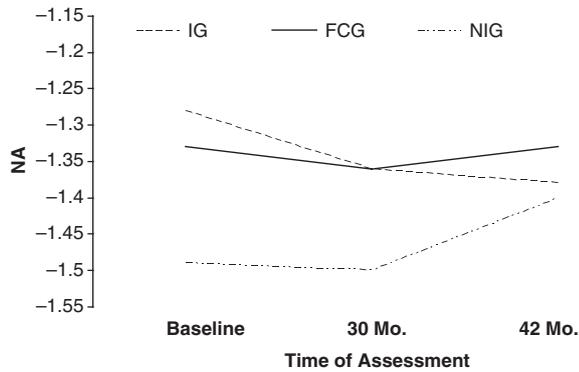


**Figure 1** Means for attention in IG, FCG, & NIG at baseline, 30, and 42 months

<sup>1</sup>DQ was not found to moderate the relation between group (NIG/FCG) and any of the outcome variables (PA, NA, Attention) at either 30 or 42 months.



**Figure 2** Means for positive affect (PA) in IG, FCG, & NIG at baseline, 30, and 42 months



**Figure 3** Means for negative affect (NA) in IG, FCG, & NIG at baseline, 30, & 42 months

*Timing of intervention effects on emotion expression*

We examined age of entry into foster care as a possible factor influencing the increase in attention and PA within the FCG, using the data from the 42-month assessment. By 42 months, most children in the FCG had experienced at least one year of

intervention. Partial correlations controlling for DQ at 30 and 42 months revealed non-significant relations between age at entry into foster care and the three composites from the Lab-TAB tasks at 42 months. To further examine the effect of age of entry into foster care, we created dichotomous variables based on a split of age at entry into foster care (for a similar approach, see Nelson et al., 2007) to compare the groups at 42 months of age. We compared attention and affect scores by dichotomized age of entry to foster care separately for placement cutoffs of 20, 22, 24, 26 and 28 months of age. A series of ANCOVAs, controlling for DQ, revealed non-significant differences between groups of earlier- or later-placed children based on these age cutoffs (adjusted means are shown in Table 2).

The above analyses did not suggest an effect of timing of entry into the intervention on the increase in positive emotion expression and attention within the FCG. To further evaluate the effect of intervention timing on emotional expression, further analyses attempted to remove the inherent confound between age at foster care placement and the duration of intervention. The FCG was divided into two groups that had experienced similar mean durations of intervention, but who had entered foster care at different ages (see Nelson et al., 2007 for a similar approach). One group consisted of FCG children who had been placed before 18 months of age ( $n = 13$ , mean placement age = 12.46) while the other consisted of FCG children placed after 18 months ( $n = 46$ , mean placement age = 26.14). To approximately equate for duration of intervention, these two groups (early- vs. later-placed) were compared using outcomes at the 30- and 42-month assessments respectively. Using these timepoints, mean lengths of time in foster care for the two groups were 502 and 420 days (approximately 17 and 14 months) respectively. Thirty-month PA for the earlier entry group (placed before 18-months of age) was compared with 42-month PA for the later entry group (placed after 18 months of age). Means for PA (adjusted for DQ) were  $-.87$  for the early entry group and  $.76$  for the later entry group: these were not significantly different.

**Table 2** Adjusted means (and standard errors) for composites at each cutoff age (before cutoff age/after cutoff age) within FCG only

Composite variable At 42 mo.	Cutoff age				
	20 mo. < >	22 mo. < >	24 mo. < >	26 mo. < >	28 mo. < >
N per group	15 40	19 36	26 29	29 26	36 19
Attention	.361 .780 (.344) (.208)	.203 .910 (.300) (.216)	.544 .775 (.271) (.255)	.661 .671 (.261) (.278)	.637 .720 (.225) (.317)
Positive affect	.792 .986 (.642) (.388)	.509 1.16 (.569) (.409)	.935 .932 (.502) (.473)	1.04 .813 (.482) (.513)	1.05 .715 (.416) (.585)
Negative affect	-1.30 -1.35 (.138) (.083)	-1.33 -1.33 (.088) (.106)	-1.23 -1.42 (.088) (.100)	-1.21 -1.47 (.101) (.108)	-1.25 -1.48 (.088) (.124)

Note: All values are adjusted for DQ at 42 months of age. Standard errors in parentheses.

### Comparisons of the FCG with NIG following intervention

Results revealed no significant main effects of group or age of assessment. However, significant interactions were found for both attention ( $F(1,84) = 7.00$ ,  $p < .01$ ,  $\text{Eta}^2 = .077$ ) and PA ( $F(1,83) = 5.64$ ,  $p < .05$ ,  $\text{Eta}^2 = .064$ ). This illustrates that, even while controlling for DQ, post-intervention, FCG children displayed higher levels of attention and PA while the NIG displayed levels of attention and PA at 42 months that were lower than they had at 30 months. Also, at 42 months, the FCG displayed levels of attention that were significantly higher than the NIG ( $t(95) = 2.50$ ,  $p < .05$ ). A similar trend was demonstrated for PA ( $t(94) = 1.79$ ,  $p = .07$ ).

Examination of group differences in change from the baseline assessment to 30 and 42 months, without DQ controlled, supported intervention effects as well. Analyses demonstrated differences between the FCG and NIG in rate and direction of change to 30 and 42 months for attention ( $t(97) = 3.23$ ,  $p < .01$  and  $t(89) = 5.25$ ,  $p < .001$ , 30 and 42 months respectively) and PA ( $t(97) = 2.86$ ,  $p < .01$ ,  $t(88) = 5.42$ ,  $p < .001$ , 30 and 42 months respectively). To both timepoints, the FCG demonstrated increased attention and PA while the community group decreased. No such differences were found for NA.

### Discussion

The current study illustrates the efficacy of a family-based foster care intervention in producing change in the expression of emotion and attention for previously institutionalized children. After a relatively short period of intervention, children who had been removed from institutions displayed heightened positive affect and attention to two positively-valenced laboratory episodes. The FCG demonstrated significantly more joy than the IG at both 30 and 42 months. In fact, not only did FCG children display higher mean values at each timepoint, but the change for these children from the baseline assessment was significantly more marked than that of the IG.

The rapid nature of the change in positive affect expression is encouraging and demonstrates the responsiveness of emotion behavior systems to intervention, even following significant early social deprivation. At 30 and 42 months of age, children who remained in institutions displayed lower levels and less change in expression of positive affect and attention compared to institutionalized children placed into foster care. Smyke et al. (2007) previously reported that at entry into the BEIP study, institutionalized children showed significantly lower levels of positive affect and attention compared to community children. Smyke and colleagues noted

that the low level of positive affect amongst the institutionalized children may be the result of the low levels of contingent social interaction and positive affect interchanges that characterize institutional life. In addition, the low levels of attention displayed by IG children at both 30 and 42 months may reflect problems with inattention that have been found in children with a history of institutional rearing (Hodges & Tizard, 1989; Kreppner et al., 2001).

The FCG also demonstrated significantly higher levels of positive affect and attention at 42 months compared to the community sample (the NIG). This may be due to the nature of the tasks administered and the 'catch up' process in the FCG. Specifically, the two laboratory tasks are part of a commonly-used battery designed to elicit emotions in infants and very young children. By 42 months of age, these particular tasks (the puppets and peek-a-boo tasks) may no longer elicit reliable expressions of positive emotion in typically developing children. However, for children deprived of contingent positive social interaction, when provided with these conditions following foster care placement, these tasks may continue to elicit positive affect because they are still appropriate for the 'emotional level' of the child.

Current analyses did not reveal any effect of age of entry into the intervention on the expression of positive affect within the FCG. As early as 30 months of age (after a mean of 7 months of intervention), FCG children were already showing heightened PA expressions compared to IG children. These initial dramatic changes appeared to level out between 30 and 42 months of age with longer durations of exposure to the intervention. This supports the premise that brief exposure to a nurturing family environment is sufficient to elicit changes in positive affect. It may be that the neural circuits supporting PA, though deprived of typical expected social interaction early in life, are readily adaptive to appropriate social interaction and potential recovery of normative expression of these affects. There are, however, few data on the nature of a sensitive period for the development of normative positive emotion expressions. This effect may reflect an experience-expectant process (Greenough, Black, & Wallace, 1987; Nelson & Bosquet, 2000). The brain may 'expect' to experience contingent, positive social interactions, and the development of the circuitry for social engagement remains 'on hold', at least for the period of time from birth through early childhood.

Smyke et al. (2007) reported that at the baseline assessment in the BEIP, institutionalized children displayed heightened negative affect compared to typically developing children during the same tasks (designed to elicit positive affect) used in the follow-up. While the incidence of negative affect decreased in both the institutionalized and foster care groups through 42 months, mean levels were not different

between the two groups, suggesting a lack of an effect of the intervention on negative affect. On the other hand, the incidence of negative affect increased amongst the community group (the NIG) such that by 42 months there were no differences among the three groups of children. For the institutionalized and previously institutionalized groups, the expression of negative affect may indicate emotion dysregulation that is a by-product of poor quality care (Smyke et al., 2007) and which may persist after children are removed from institutional care. Increased negative affect amongst the NIG at 42 months may simply reflect boredom with the tasks that are designed for younger children. This is supported by the comparatively low levels of negative affect in the NIG at earlier (baseline, 30-month) assessments. On the other hand, negative affect here was coded during procedures designed specifically to elicit positive affect and may not generalize to other situations.

In summary, the current study demonstrates the effects of a foster care intervention on emotional expression and attention for previously institutionalized children. Institutionalized, socially deprived children, when placed into family environments, showed rapid increases in both expressed positive affect and attention in social episodes that were designed to be enjoyable for infants and young children. While neither age at placement nor duration of institutionalization appeared to affect the pattern of the results in this study, these factors do appear to matter for other domains of development. Specifically, Nelson et al. (2007) found that age at placement was related to general cognitive development at 42 months of age within the FCG in the BEIP study. Children taken out of the institution prior to 24 months of age displayed higher DQ scores compared to those taken out after 24 months. On the other hand, behavioral and emotional problems seem to follow the same pattern as the affect expression data reported (Zeanah et al., 2008). Specifically, age at placement or duration of institutionalization did not affect the incidence of such problems. Further work with this sample is likely to further clarify these issues.

## Acknowledgements

The work reported in this manuscript was supported by funds from the John D. and Catherine T. MacArthur Foundation. We thank Gwen Gordon, Hermi Woodward, and Dana Johnson for their assistance and input. We also acknowledge Sebastian Koga for overseeing the project in Romania, the caregivers and children who participated in this project, the BEIP staff for their tireless work; and our many colleagues in Romania who facilitated this work, particularly B. Simion, A. Stanescu, M. Iordachescu, and C. Tabacaru. We also wish to acknowledge the

many invaluable contributions of our Romanian partner institutions: The SERA Romania Foundation, the Institute of Maternal and Child Health, and the Bucharest Departments of Child Protection.

## Correspondence to

Melissa M. Ghera, Department of Psychology, St. John Fisher College, 3690 East Avenue, Rochester, NY 14618, USA; Tel: (585) 385-8011; Fax: (585) 385-7311; Email: mghera@sjfc.edu

## References

- Ainsworth, M.D., Bell, S.M., & Stayton, D.F. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M.P. Richards (Ed.), *Integration of a child into a social world* (pp. 99–136). New York: Cambridge University Press.
- Bayley, N. (1993). *Bayley Scales of Infant Development*. San Antonio, TX: Harcourt.
- Bowlby, J. (1969). *Attachment and loss: Volume 1*. New York: Basic Books.
- Campos, J.J., Mumme, D.L., Kermonian, R., & Campos, R.G. (1994). A functionalist perspective on the nature of emotion. *Monographs for the Society for Research in Human Development*, 59, 284–303.
- Chisholm, K. (1998). A three year follow-up of attachment and indiscriminate friendliness in children adopted from Romanian orphanages. *Child Development*, 69, 1092–1106.
- Chisholm, K., Carter, M., Ames, E.W., & Morison, S.J. (1995). Attachment security and indiscriminately friendly behavior in children adopted from Romanian orphanages. *Development and Psychopathology*, 7, 283–294.
- Clarke, A.M., & Clarke, A.D.B. (2000). *Early experience and the life path*. London: Jessica Kingsley.
- Dozier, M., Peloso, E., Lindhiem, O., Gordon, M.K., Manni, M., Sepulveda, S., et al. (2006). Developing evidence-based interventions for foster children: An example of a randomized clinical trial with infants and toddlers. *Child Maltreatment*, 10, 61–71.
- Eisenberg, N., & Fabes, R.A. (1998). Prosocial development. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (5th edn, pp. 701–778). New York: Wiley.
- Fisher, L., Ames, E.W., Chisholm, K., & Savoie, L. (1997). Problems reported by parents of Romanian orphans adopted to British Columbia. *International Journal of Behavioral Development*, 20, 67–82.
- Fisher, P.A., Burraston, B., & Pears, K. (2005). The early intervention foster care program: Permanent placement outcomes from a randomized trial. *Child Maltreatment*, 10, 61–71.
- Fries, A.B., & Pollak, S.D. (2004). Emotion understanding in postinstitutionalized Eastern European children. *Development and Psychopathology*, 16, 355–369.
- Fox, N.A., Henderson, H.A., Rubin, K.H., Calkins, S.D., & Schmidt, L.A. (2001). Continuity and discontinuity

- of behavioral inhibition and exuberance: Psychophysiological and behavioral influences across the first four years of life. *Child Development*, 72, 1–21.
- Goldsmith, H.H., & Rothbart, M.K. (1999). *The Laboratory Temperament Assessment Battery* (Locomotor version 3.1). Madison, WI: University of Wisconsin-Madison.
- Greenough, W.T., Black, J.E., & Wallace, C.S. (1987). Experience and brain development. *Child Development*, 58, 539–559.
- Herba, C., & Phillips, M. (2004). Annotation: Development of facial expression recognition from childhood to adolescence: Behavioral and neurological perspectives. *Journal of Child Psychology and Psychiatry*, 45, 1185–1198.
- Hodges, J., & Tizard, B. (1989). IQ and behavioural adjustment of ex-institutionalized adolescents. *Journal of Child Psychology and Psychiatry*, 30, 53–75.
- Hoffman, M.L. (1978). Empathy, its development, and prosocial implications. In C.B. Keasey (Ed.), *Nebraska symposium on motivation* (vol. 25, pp. 169–218). Lincoln: University of Nebraska Press.
- Izard, C.E. (2002). Translating emotion theory and research into preventative interventions. *Psychological Bulletin*, 5, 796–824.
- Izard, C.E., & Harris, P. (1995). Emotional development and developmental psychopathology. In D. Cicchetti & D.J. Cohen (Eds.), *Developmental psychopathology, Vol. 1: Theory and method* (pp. 467–503). New York: John Wiley & Sons.
- Kochanska, G., Coy, K.C., Tjebkes, T.L., & Husarek, S.J. (1998). Individual differences in emotionality in infancy. *Child Development*, 69, 375–390.
- Kreppner, J.M., O'Connor, T.G., Rutter, , & the English and Romanian Adoptees Study Team. (2001). Can inattention/overactivity be an institutional deprivation syndrome? *Journal of Abnormal Child Psychology*, 29, 513–528.
- Lazarus, R.S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Marshall, P.J., Fox, N.A. & the BEIP Core Group. (2004). A comparison of the electroencephalogram between institutionalized and community children in Romania. *Journal of Cognitive Neuroscience*, 16, 1327–1338.
- Millum, J., & Emanuel, E.J. (2007). The ethics of international research with abandoned children. *Science*, 318, 1874–1875.
- Nelson, C.A., & Bosquet, M. (2000). Neurobiology of fetal and infant development: Implications for infant mental health. In C.H. Zeanah (Ed.), *Handbook of Infant Mental Health* (2nd edn, pp. 37–59). New York: Guilford Press.
- Nelson, C.A., Zeanah, C.H., Fox, N.A., Marshall, P.J., Smyke, A.T., & Guthrie, D. (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. *Science*, 318, 1937–1940.
- O'Connor, T.G. (2003). Early experiences and psychological development: Conceptual questions, empirical illustrations, and implications for intervention. *Development and Psychopathology*, 15, 671–690.
- Parker, S.W., Nelson, C.A., & the BEIP Core Group. (2005a). The impact of early institutional rearing on the ability to discriminate facial expressions of emotion: An event-related potential study. *Child Development*, 76, 54–72.
- Parker, S.W., Nelson, C.A., & the BEIP Core Group. (2005b). An event-related potential study of the impact of institutional rearing on face recognition. *Development and Psychopathology*, 17, 621–639.
- Rutter, M. (2006). The psychological effects of early institutional rearing. In P.J. Marshall & N.A. Fox (Eds.), *The development of social engagement: Neurobiological perspectives* (pp. 355–391). New York: Oxford University Press.
- Rutter, M., and the English and Romanian Adoptees Study Team. (1998). Developmental catch-up, and deficit, following adoption after severe global early privation. *Journal of Child Psychology and Psychiatry*, 39, 465–476.
- Sloutsky, V.M. (1997). Institutional care and developmental outcomes of 6- and 7-year-old children. *International Journal of Behavioral Development*, 20, 131–151.
- Sroufe, L.A. (1984). The organization of emotional development. In K. Sherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 109–128). London: Erlbaum.
- Smyke, A.T., Koga, S.F., Johnson, D.E., Fox, N.A., Marshall, P.J., Nelson, C.A., et al. (2007). The caregiving context in institution reared and family reared infants and toddlers in Romania. *Journal of Child Psychology and Psychiatry*, 48, 210–218.
- Smyke, A.T., Zeanah, C.H., Fox, N.A., Nelson, C.A., & Guthrie, D. (2008). *Placement in foster care enhances quality of attachment among young institutionalized children*. Manuscript under review.
- Tarullo, A.R., & Gunnar, M.R. (2005). Institutional rearing and deficits in social relatedness: Possible mechanisms and processes. *Cognitive Creier Comportament*, 9, 329–342.
- Wassenaar, D.R. (2006). Commentary: Ethical considerations in international research collaborations: The Bucharest Early Intervention Project. *Infant Mental Health Journal*, 27, 577–580.
- Zeanah, C.H., Egger, H.L., Smyke, A.T., Nelson, C.A., Fox, N.A., Marshall, P.J., et al. (2008). *Altering early experience reduces psychiatric disorders among institutionalized Romanian preschool children*. Manuscript under review.
- Zeanah, C.H., Koga, S.F., Simion, B., Stanescu, A., Tabacaru, C., Fox, N.A., et al. (2006). Ethical considerations in international research collaboration: The Bucharest Early Intervention Project. *Infant Mental Health Journal*, 27, 559–576.
- Zeanah, C.H., Nelson, C.A., Fox, N.A., Smyke, A.T., Marshall, P.J., Parker, S.W., et al. (2003). Designing research to study the effects of institutionalization on brain and behavioral development: The Bucharest Early Intervention Project. *Development and Psychopathology*, 15, 885–907.
- Zeanah, C.H., & Smyke, A.T. (2005). Building attachment relationships following maltreatment and severe deprivation. In L. Berlin, Y. Ziv, L. Amaya-Jackson & M. Greenberg (Eds.), *Enhancing early attachments: Theory, research, intervention, and policy* (pp. 195–216). New York: Guilford Press.