

## Post-institutionalized Chinese and Eastern European children: Heterogeneity in the development of emotion understanding

Linda A. Camras and Susan B. Perlman  
DePaul University, Chicago, USA

Alison B. Wismer Fries and Seth D. Pollak  
University of Wisconsin at Madison, USA

Post-institutionalized Chinese and Eastern European children participated in two emotion understanding tasks. In one task, children selected facial expressions corresponding to four emotion labels (happy, sad, angry, scared). The second task required children to match facial expressions to stories describing situations for these emotions. While both post-institutionalized groups scored lower than the never-institutionalized children, those from China performed better than those from Eastern Europe. Post-institutionalized children's performance was predicted by their age at adoption.

Keywords: Chinese children; emotion; emotion understanding; Eastern European children; post-institutionalized children

Over the past 50 years, studies of post-institutionalized internationally adopted children have significantly advanced our understanding of the role of early experience in development. Both early and contemporary research has documented a variety of cognitive, social and emotional deficits associated with early institutional experience (Ames, 1997; Bowlby, 1951; Goldfarb, 1945; O'Connor et al., 2003; Rutter & ERA Research Team, 1998). Yet remarkable recovery has been observed in many children initially raised in very poor quality institutions who are subsequently adopted into middle-class homes (Groothues, Beckett, & O'Connor, 2001; Rutter, 2002; Rutter & ERA Research Team, 1998; Rutter et al., 2004). Both the extent of children's deficits and the course of their recovery have been found to vary with the duration and degree of deprivation experienced in the institutional environment (Castle et al., 1999; Maclean, 2003).

Such findings have led investigators to reconsider the original theoretical basis of research on post-institutionalized children (Rutter, 2002). Initially, such research was cast solely within the framework of attachment theory, with the observed negative outcomes being attributed to the child's experience of maternal deprivation during their earliest years. However, variability in the functioning of children who shared the experience of maternal deprivation has led most contemporary researchers to adopt a broader perspective. That is, specific outcomes for institutionalized and post-institutionalized children are predicted to be dependent upon the duration and quality of the relevant sensory, cognitive, and social stimulation received from the environment. Both Eastern European and Chinese orphanages have been described as providing substandard care for children (Human Rights Watch, 1996,

1998; Johnson, 2000). Of particular relevance to emotion understanding, most orphanages appear to have less than optimal staff:child ratios, thus providing limited opportunities for social interaction.

Within the domain of social and emotional development, post-institutionalized children have been reported to have difficulties in forming selected committed social relationships outside their family setting (Quinton, Rutter, & Liddle, 1984; Rutter, Quinton, & Hill, 1990). Rutter (2002) suggests that this difficulty is related to problems these children experience in reading social cues and appreciating social boundaries. Children's ability to understand social cues typically involves their capacity to perceive and understand other persons' emotions based on information from a variety of sources including emotional facial expressions. Yet few studies have focused on institutionalized or post-institutionalized children's emotion understanding.

As part of the Bucharest Early Intervention Project (Zeanah, Nelson, Fox, Smyke & Koga, in press), Parker (Parker, 2003) studied infants residing in Romanian orphanages utilizing a discrimination task involving prototypic emotional facial expressions. Institutionalized infants did not differ from non-institutionalized babies in either their novelty preferences or neurophysiological responses. However, such visual preference tasks may involve perceptual discrimination skills rather than emotion understanding. Sloutsky (1997) studied the ability of older Russian orphans to select facial expressions for emotion stories and found they performed more poorly than a group of non-institutionalized controls. In addition, children's performance was negatively related to the duration of their institutional experience.

---

Corresponding should be sent to Dr Linda A. Camras, Department of Psychology, DePaul University, 2219 N. Kenmore Ave., Chicago, IL 60614, USA; e-mail: lcamras@depaul.edu

The authors wish to thank the children and parents who generously gave their time to participate in this study. We also appreciate the help of Tom Cain, Kim Barfield, Gabrielle Sowle, Justin Martin, and Maria Brown, who assisted with the data collection, and Serah Fatani, who also assisted with the manuscript preparation. Linda Camras was

supported by grants from the National Institutes of Mental Health (MH59315) and from DePaul University. Seth Pollak was supported by grants from the National Institutes of Mental Health (MH16285, MH68858) and from the Jane Bradley Petit Foundation. Alison Wismer Fries was supported by a National Institutes of Health Training Program in Emotion Research (MH18931). A portion of these data were reported in Wismer Fries & Pollak (2004).

More recently, Wismer Fries and Pollak (2004) investigated emotion knowledge in 4-to-5-year old post-institutionalized Russian and Romanian children who had been adopted by American families. In one task, children were told stories portraying situations in which happiness, anger, fear, or sadness would typically occur and were asked to decide how the story protagonist would feel by choosing one of several emotional facial expressions. In the second task, children were given a verbal emotion label and were asked to choose the corresponding facial expression. Results showed that the post-institutionalized children were less able to match facial expressions to the verbal emotion labels than were control children. Post-institutionalized children also were less able than control children to map stories of happy, sad, and fear situations onto their corresponding facial expressions. Since the post-institutionalized children had scored above the mean on tests of receptive vocabulary, these findings could not be attributed to the children's failure to understand the stories or task instructions. Post-institutionalized children's performance was negatively related to the duration of their institutional experience and was positively related to duration of residence in their adopting home.

While most research on post-institutionalized children has focused on Eastern Europe, children adopted from China provide an additional opportunity to explore the effects of early institutionalization. Comparisons across children from different backgrounds may provide important clues about specific features of the early environment that underlie the development of emotion knowledge. In recent years, adoptions into the USA from the People's Republic of China (PRC) have increased rapidly in number, with China ranking first among countries of origin since 2000 (US State Department, 2002). These children are often not included in studies of institutionalization or are grouped together with children from Eastern Europe. Underlying these practices is the assumption that outcomes for Eastern European and Chinese children will be equivalent. Nonetheless, anecdotal descriptions by adopting parents suggest that Chinese children do not manifest the degree of impairment observed in Eastern European adoptees and may recover more quickly from their institutionalization experiences. With respect to empirical data, Nelson (2000) found that, upon their arrival in the USA, the majority of adopted Chinese infants in her study were delayed as measured by their performance on the Bayley Scales of Infant

Development. However, six months later, the majority of infants scored within the accelerated or normal range on the mental scale and substantially fewer infants were delayed in their motor development. More recently, examining an older group of Chinese adoptees, Norris (2003) found these children to be comparable to nonadopted children in their Bayley Scales performance. Thus, by three years of age, post-institutionalized Chinese children appear to have recovered in terms of cognitive and motor functioning as measured by this frequently used assessment instrument. Similar findings have been reported for Chinese children adopted in Canada (Cohen, Pugliese, Zadeh, Lojkasek, & Kiefer, 2005).

In the present investigation, we attempted to determine whether post-institutionalized Chinese children would demonstrate difficulties in emotion understanding and whether these would be comparable to those deficits shown by post-institutionalized Eastern European children. We also examined factors that might be related to their performance, e.g. adoption age and duration of residence in their adopting home. Thus, the present study represents an initial step toward the goal of more specifically parameterizing the experiential origins of emotion knowledge in post-institutionalized children from different cultural backgrounds.

## Method

### Participants

The participants were 23 post-institutionalized adopted Chinese children (all female), 18 post-institutionalized adopted Eastern European children (6 males, 12 females), and a comparison sample of 43 never-institutionalized nonadopted European-American children (9 males, 34 females). Because Chinese adoptees are virtually all female, no Chinese males could be included. The Eastern European participants and 21 of the comparison children (9 males, 12 females) had participated in Wismer Fries and Pollak's (2004) previously reported study. The 23 Chinese girls and 22 of the girls in the comparison sample were tested by an experimenter from the laboratory of the first author using the same procedures as Wismer Fries and Pollak.

Post-institutionalized Chinese and Eastern European children were recruited through adoption agencies and parent

**Table 1**

*Individual difference variables for post-institutionalized children: Means and standard deviations in months*

	Chinese			Eastern European		
	<i>M</i>	<i>SD</i>	<i>N</i> <sup>a</sup>	<i>M</i>	<i>SD</i>	<i>N</i> <sup>a</sup>
Adoption age <sup>+</sup>	14.0	4.9	23	19.1	11.6	18
Institutionalization*	8.0	5.6	21	16.6	10.2	18
Foster care	5.0	5.4	21	—	—	—
Residence in adopting home**	45.1	6.4	23	34.6	11.1	18
Height percentile at adoption <sup>b</sup>	29.4	33.1	9	18.6	26.2	14
Weight percentile at adoption <sup>b</sup>	28.9	24.4	14	8.6	11.4	16
Head circumference at adoption <sup>b</sup>	42.8	42.8	6	16.2	19.5	8
Age at testing**	59.2	5.9	23	53.7	4.4	18

<sup>a</sup> *N* = Number of children with information available.

<sup>b</sup> Chinese norms from Chang et al. (1965); Eastern European norms from NCHS (2000).

Group differences: <sup>+</sup>  $p < .10$ ; <sup>\*\*</sup>  $p < .01$ .

organizations utilizing the same age criterion for inclusion (i.e., 4 to 5.5 years). Nonetheless, the Chinese children were approximately 5 months older than the Eastern European children,  $F(1, 39) = 10.86, p = .002$ , although neither post-institutionalized group differed significantly from the combined comparison group (see Table 1).

The Chinese and Eastern European children differed in several other features of their early experience. The mean adoption age was somewhat lower for the Chinese children, although the difference did not reach a conventional level of significance,  $F(1, 39) = 3.59, p < .07$ . The post-institutionalized Eastern European children had resided longer in orphanages than the Chinese children,  $F(1, 37) = 10.8, p = .002$ . Fifteen Chinese children experienced foster care, although the precise duration of fostering was unknown for two of these children (average duration for 13 children = 8.4 months, S.D. = 4.8 months). At the time of their adoption, Chinese children weighed more for their age than the Eastern European children although both groups were well below the 50th percentile,  $F(1, 28) = 8.93, p = .006$ . The percentile scores for height and head circumference did not significantly differ between groups. Chinese children had resided longer in their adoptive homes than Eastern European children,  $F(1, 39) = 14.65, p < .001$ .

Families of comparison children were recruited via notices in preschools and print media targeting middle-class parents and through informal networking with participating parents. Nonetheless, parents of Eastern European children had fewer years of education than parents in the other two groups,  $\chi^2 = 14.9$  for mothers,  $p < .001$ ,  $\chi^2 = 7.4, p < .03$  for fathers.

## Tasks

The *Emotion Situation Task* involved a set of 32 short stories describing situations evoking the emotions of happiness, anger, sadness or fear (see Wismer Fries & Pollak, 2004, for details). Stories were accompanied by simple color illustrations that did not include the characters' facial expressions. In contrast to some previous studies, the stories also did not include the verbal emotion label. The 32-story set was divided into two blocks of 16 stories, each having two child-protagonist stories and two adult-protagonist stories for each of the four emotions. Children were asked to select a facial expression for the story protagonist from a set of four photographs (one target emotion and three randomly selected distracters) showing an adult or child model posing prototypic expressions of either happiness, anger, sadness, fear, disgust, or surprise (Ekman and Friesen, 1975). Eight adult models (four males and four females) and eight child models (four males and four females) were used (so that a different person was presented for each of the 16 stories). The adult photographs were taken from a set published by Ekman (1976) and the child photographs were taken by the first author and have been used in several previous studies (e.g., Camras, Grow, & Ribordy, 1983). Children received an accuracy score for each emotion equivalent to the number of trials in which they chose the correct facial expression for the story character (range = 0–8) and a total accuracy score (range = 0–32).

The *Expression Identification Task* involved the verbal presentation of an emotion label (i.e., "happy", "mad", "scared", or "sad") accompanied by four photographs (one target emotion and three randomly selected distracters). Children were asked

to select the expression showing the labeled emotion. The photographs were drawn from the same set used in the Emotion Situation Task. Eight trials were presented for each target emotion. Thus accuracy scores for expression identification ranged from 0–8 for each emotion and 0–32 for the task as a whole.

Both tasks were presented in fully automated form on a laptop computer and View Sonic VE150 touch screen monitor. The instructions and stories were recited by either a male or female narrator recorded on the computer. Children responded by touching one of the four facial expression photos simultaneously presented on the screen as response options.

## Procedure

Children were tested in a quiet room in their homes. Two sessions were conducted on separate days with half of the trials for each task (i.e., 16 trials per task) presented during each session. The Emotion Situation Task was administered first, followed by the Expression Identification Task. For the Emotion Situation Task, half of the participants were presented with the first block of stories during the first session and the second block of stories during the second session. Story-block presentation order was randomly assigned and stories within each block were presented in random order for each participant. For the Expression Identification Task, each of the four target emotions was presented four times during each session. In addition, presentation order for the target emotions was randomized for each participant. Each of the 16 models was presented twice during each session, once for an Emotion Situation trial and once for an Expression Identification trial. The matching of models to stories and models to target emotion labels was fixed and identical for all participants.

## Results

Task performance was significantly related to age at testing for both the Expression Identification Task,  $r(82) = .26, p < .02$  and for the Emotion Situation task;  $r(82) = .30, p = .006$ . Because Chinese children were older than Eastern European children, age was included as a covariate in the subsequent multivariate analyses of variance. Because no significant effects for gender were found, gender was not examined.

### *Children's ability to identify facial expressions of emotion*

*Accuracy.* A multivariate analysis of covariance was performed with participant group as the independent variable, age at testing as the covariate, and accuracy scores for the happy, sad, angry and fear faces as the four dependent variables. The omnibus analysis yielded a significant effect for group,  $F(8, 154) = 3.87, p < .001$ , and a near-significant effect for testing age,  $F(4, 77) = 2.39, p = .058$ . Follow-up univariate tests indicated significant group differences for happy, sad, and fear faces,  $F(2, 80) = 8.53, MSE = .88, p < .001$ ,  $F(2, 80) = 6.11, MSE = 2.21, p = .003$ ,  $F(2, 80) = 6.36, MSE = 4.08, p < .001$  respectively. Post hoc Tukey tests ( $p < .05$ ) showed that comparison children outperformed post-institutionalized Eastern European children for all three emotions but outperformed the Chinese children only for fear. The Chinese

**Table 2***Emotion recognition tasks: Mean accuracy scores*

	<i>Comparison</i>		<i>Chinese</i>		<i>Eastern European</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Expression Identification Task</b>						
Happiness	7.79 <sup>a</sup>	0.51	7.87 <sup>a</sup>	0.34	6.78 <sup>b</sup>	1.83
Sadness	7.42 <sup>a</sup>	0.96	7.09 <sup>a</sup>	1.20	5.67 <sup>b</sup>	2.64
Anger	5.70	1.45	5.48	1.20	5.28	2.24
Fear	5.14 <sup>a</sup>	1.85	3.61 <sup>b</sup>	1.90	3.39 <sup>b</sup>	2.69
<b>Emotion Situation Task</b>						
Happiness	6.53 <sup>a</sup>	1.89	5.48 <sup>ab</sup>	1.76	4.22 <sup>b</sup>	2.75
Sadness	6.19 <sup>a</sup>	1.56	5.74 <sup>a</sup>	1.54	3.61 <sup>b</sup>	2.45
Anger	3.63	1.88	3.48	1.59	3.11	1.84
Fear	4.07	1.84	2.87	1.98	2.83	1.75

*Note.* Highest possible score = 8.

Values sharing superscripts within a row do not differ significantly (Turkey test,  $p > .05$ ).

Test age included as covariate for all analyses.

Expression identification score included as covariate for emotion situation analysis.

children outperformed the Eastern European children for both happy and sad faces (see Table 2).<sup>1</sup>

*Individual differences.* Controlling for testing age, post-institutionalized children's performance was negatively associated with adoption age and duration of institutional care and positively associated with duration of residence in their adopting homes and mother's education level,  $r(38) = -.45$ ,  $p = .003$ ,  $r(38) = -.47$ ,  $p = .003$ ,  $r(38) = .45$ ,  $p = .001$ ,  $r(35) = .38$ ,  $p < .03$ , respectively. The first three individual difference variables were also interdependent in our study (see Table 3). To evaluate their contribution to post-institutionalized children's performance relative to other factors, a regression analysis was conducted with participant group, testing age, mother's education level and adoption age (representing the three interdependent individual difference variables) entered as predictors. Only adoption age and testing age significantly predicted post-institutionalized children's accuracy in expression identification  $r(4, 33) = .57$ ,  $p < .02$ .  $\beta = -.25$ ,  $p < .02$  for adoption age,  $\beta = .35$ ,  $p < .05$  for testing age. Within the Chinese group, neither presence nor duration of fostering was related to accuracy in identifying the facial expressions.

### *Children's ability to match facial expressions with emotion situations*

*Relationship between Facial Expression Task and Emotion Situation Task.* Performance on the two emotion knowledge tasks was highly correlated,  $r(82) = .63$ ,  $p < .01$ . Therefore, to evaluate children's ability to understand emotion situations, we controlled for their ability to recognize facial expressions by including their total expression identification score as a

covariate in the multivariate analysis as well as the child's age at testing.

*Accuracy.* A multivariate analysis of covariance was performed with participant group as the independent variable, age at testing and expression identification score as covariates, and accuracy scores for happy, sad, angry and fear stories as the four dependent variables. The omnibus analysis yielded significant effects for group,  $F(8, 152) = 2.28$ ,  $p = .025$ , testing age,  $F(4, 76) = 4.15$ ,  $p = .004$ , and expression identification,  $F(4, 76) = 7.59$ ,  $p < .001$ . Follow-up univariate tests indicated significant group differences for the sad stories,  $F(2, 79) = 5.55$ ,  $MSE = 2.51$ ,  $p = .006$ , and a near-significant effect for the happy stories,  $F(2, 79) = 2.95$ ,  $MSE = 3.34$ ,  $p = .058$ . Post hoc Tukey tests ( $p < .05$ ) showed that comparison children outperformed post-institutionalized Eastern European children for both happy and sad stories but did not outperform Chinese children for any emotion. Chinese children outperformed Eastern European children for the sad stories (see Table 2 for means). No significant differences were found for fear or anger.<sup>2</sup>

*Individual differences.* Controlling for age at testing, a near-significant positive association was found between post-institutionalized children's performance and duration of residence in their adopting homes,  $r(38) = .28$ ,  $p < .10$ , while near-significant negative associations were found between performance and both adoption age and duration of institutional care,  $r(38) = -.28$  and  $-.27$  respectively,  $p < .10$ . To evaluate their contribution to post-institutionalized children's performance relative to other factors, a regression analysis was conducted with participant group, testing age, expression identification accuracy score, and adoption age (representing

<sup>1</sup> As a check on our results, we conducted ANOVAs on total accuracy scores for both tasks using data from a subset of roughly same-age children in each group (52 to 60 months of age at time of testing). Consistent with the conclusions we draw from the reported analyses, control children significantly outperformed the Eastern European children while the Chinese children scored between the two other groups.

<sup>2</sup> The pattern of significant results varies slightly from that reported by Wismer Fries and Pollak (2004). In their study, the difference between control children and Eastern European children for fear stories also reached significance and a significant main effect was found in the expression identification task. Minor differences in analytic strategy and the control group's composition are responsible for these differences.

**Table 3***Correlations among individual differences variables for post-institutionalized children*

	1	2	3	4	5	6	7	8	9
Age of adoption <sup>a</sup>	–	.80**	–.81**	–.20	–.12	–.13	–.07	–.12	.09
Institutionalization <sup>b</sup>		–	–.66**	–.56**	–.30	–.36	–.27	–.83**	.08
Residence in adopting home <sup>a</sup>			–	.25	.29	.13	.21	.47	.51**
Mother's education <sup>c</sup>				–	.61**	.47*	.46*	.39	.07
Father's education <sup>d</sup>					–	–.04	.08	.21	.16
Percentile height at adoption <sup>e</sup>						–	.74**	.30	.02
Percentile weight at adoption <sup>f</sup>							–	.60*	.28
Percentile head circumference at adoption <sup>g</sup>								–	.30
Testing age <sup>h</sup>									–

Note. \* $p < 0.05$ , two-tailed; \*\* $p < 0.01$ , two-tailed.

<sup>a</sup>  $N = 41$ ; <sup>b</sup>  $N = 39$ ; <sup>c</sup>  $N = 38$ ; <sup>d</sup>  $N = 29$ ; <sup>e</sup>  $N = 23$ ; <sup>f</sup>  $N = 30$ ; <sup>g</sup>  $N = 14$ ; <sup>h</sup>  $N = 41$ .

the three inter-related individual difference variables) entered as predictors. Only the expression identification accuracy scores significantly predicted post-institutionalized children's performance in the emotion situation task,  $r(4, 36) = .70$ ,  $p < .001$ ,  $\beta = .63$ ,  $p = .001$ . Within the Chinese group, neither presence nor duration of fostering was related to performance in the emotion situation task.

## Discussion

This study found that post-institutionalized Chinese children performed better on two emotion understanding tasks than post-institutionalized Eastern European children. Out of eight comparisons (four emotion faces and four emotion situations), five significant differences were found between the non-institutionalized children and the Eastern European participants but only one significant difference was found between the control children and the Chinese participants. Chinese children significantly outperformed the Eastern European children in three comparisons. These findings demonstrate that the development of emotion knowledge may vary across different post-institutionalized groups, encouraging attempts to identify the more specific parameters of early experience producing such differences.

What factors may be responsible for the better performance of the Chinese children relative to the Eastern European children in our study? The Chinese children were adopted at younger ages and consequently had fewer years of institutional experience and had resided longer in their adopting homes. These factors have been found in previous studies to influence post-institutionalized Eastern European children's cognitive and social development (e.g., Ames, 1997; O'Connor et al., 2000; Zeanah, 2000). Within our data set, adoption age, duration of institutional experience and duration of residence in the adopting home were interdependent and correlated significantly with accuracy on the expression identification task. Participant group made no significant contribution to the prediction of children's performance when adoption age was also included in the regression analysis (to represent the three interdependent variables). These results suggest that Chinese children's better performance was related to the duration of their pre- and post-adoption experiences rather than other systematic differences between the two post-institutionalized groups (e.g., in the quality of care received prior to adoption

or to constitutional differences between the Chinese and Eastern European children). While quality of care and constitutional factors may importantly influence the development of children's emotion processing skills, this study found no evidence that they differed systematically for Chinese vs. Eastern European adoptees, at least to a degree that influenced children's performance beyond the contribution of adoption age.

One unexpected finding in this study was that experience in foster care was not related to greater emotion understanding. Foster care has been shown to benefit Chinese infants in their performance on the mental and motor scales of the Bayley test when they are assessed upon arrival in the USA (Nelson, 2000). If emotion understanding develops most optimally during interactions with a consistent responsive caregiver, then fostered children would be expected to do better than children raised solely within the institution. Failure to find this difference may suggest that the development of emotion knowledge requires extensive interaction with a consistent caretaker for longer periods of time than experienced by those Chinese infants provided with foster care. Alternatively, it is possible that foster mothers in China provide their charges with enhanced cognitive and motor stimulation but are not more emotionally responsive than institution personnel.

The results of this study are also interesting to consider in light of cultural differences in emotional expression. Emotional restraint has been traditionally valued within Chinese culture (Tu, 1998) and early anthropological accounts described Chinese adults as less expressive than Westerners (Klineberg, 1938). Although several studies have found Chinese infants and children to be less facially expressive than European American babies (Camras et al., 1998; Camras et al., in press; Freedman, 1974; Kisilevsky et al., 1998), systematic empirical investigations of contemporary Chinese adults are few. Chinese mothers have been described as neither valuing nor encouraging the expression of affect as much as do European American mothers (Chen, 2000; Kagan, Kearsley, & Zelazo, 1978; Kuchner, 1989; Wu, 1996). However, Kisilevsky (Kisilevsky et al., 1998) found that Chinese mothers in Beijing smiled as much as Canadian mothers during face-to-face interactions with their infants. These findings suggest that the value placed on emotional restraint within Chinese culture may not currently extend to infant caretaking contexts. Perhaps for this reason, the post-institutionalized Chinese children in our study did not appear to be penalized by their cultural background.

Similar to other recent investigations of post-institutionalized internationally-adopted children, our study included limitations that will be challenging to address in future research. First, our samples were volunteer participants and thus may not be representative of the populations from which they were drawn. However, within our study, both the Chinese and Eastern European children were recruited in a similar manner from similar sources. Therefore, performance differences between our groups are unlikely to have resulted from group differences in the representativeness of the samples. In addition, as noted above, we also had no direct measure of the quantity or quality of social and nonsocial stimulation provided within the institution. Typically, adopting parents and even adoption agency personnel have restricted access to orphanages and are provided with very limited and possibly inaccurate information. Still, we included several measures that often serve as proxy variables representing institutional quality (i.e., our anthropomorphic indices). These were unrelated to performance on our emotion knowledge tasks. Future studies that incorporate more direct measures of children's relevant social and emotional experiences within the institution should undoubtedly be pursued. Nonetheless, our regression analyses indicated that adoption age was a greater influence on children's performance than other systematic differences that may have existed between the Chinese and Eastern European groups.

In conclusion, the present study showed that two different groups of post-institutionalized children, those from China and Eastern Europe, differed from each other on tasks that tap emotion understanding. Although both groups scored lower than the nonadopted children, fewer differences were found for the Chinese adoptees. Future studies should investigate the possibility of further "catch-up" in Chinese and Eastern European adoptees' emotion knowledge as well as other factors related to their differential levels of performance. In addition, future research should investigate more explicitly the relationship between children's performance on emotion understanding tasks and their functioning in the context of real-life social interactions and emotional relationships. Such studies will contribute to the development of a more fully-articulated theory of the influence of early experience on socioemotional development and ultimately lead to focused interventions to help promote optimal social development for these children.

## References

- Ames, E. (1997). *The development of Romanian orphanage children adopted to Canada* (Final report to the National Welfare Grants Program: Human Resources Development Canada). Brunaby, British Columbia: Simon Fraser University.
- Bowlby, J. (1951). *Maternal care and mental health*. Geneva: World Health Organization.
- Camras, L.A., Chen, Y., Bakeman, R., Norris, K., Cain, T., & Meng, Z. (in press). Culture, ethnicity, and children's facial expressions: A study of European American, Mainland Chinese, Chinese American, and adopted Chinese girls. *Emotion*.
- Camras, L.A., Oster, H., Campos, J., Campos, R., Ujiie, T., Miyake, K., et al. (1998). Production of emotional facial expressions in American, Japanese and Chinese infants. *Developmental Psychology*, *34*, 616–628.
- Castle, J., Groothues, C., Bredenkamp, D., Beckett, C., O'Connor, T., Rutter, M., et al. (1999). Effects of qualities of early institutional care on cognitive attainment. *American Journal of Orthopsychiatry*, *69*, 424–437.
- Chang, K., Lee, M., Low, W., Shui, S., & Chow, M. (1965). Standards of height and weight of southern Chinese children. *Far East Medical Journal*, *1*, 101–109.
- Chen, X. (2000). Social and emotional development in Chinese children and adolescents: A contextual cross-cultural perspective. In F. Columbus (Ed.), *Advances in psychology research* (Vol. 1). Huntington, NY: Nova Science Publishers.
- Cohen, N., Pugliese, M., Zadeh, Z., Lojkasek, M., & Kiefer, H. (2005). Children adopted from China: Outcomes one and two years later. Poster presented at the meeting of the Society for Research in Child Development, Atlanta, Georgia, April.
- Ekman, P. (1976). *Pictures of facial affect*. Palo Alto, CA: Consulting Psychologist's Press.
- Ekman, P., & Friesen, W.V. (1975). *Unmasking the face*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- Freedman, D.G. (1974). *Human infancy: An evolutionary perspective*. New York: Halsted Press.
- Goldfarb, W. (1945). Effects of psychological deprivation in infancy and subsequent stimulation. *The American Journal of Psychiatry*, *102*, 18–33.
- Groothues, C., Beckett, C., & O'Connor, T. (2001). Successful outcomes: A follow-up study of children adopted from Romania into the UK. *Adoption Quarterly*, *5*(1), 5–22.
- Human Rights Watch. (1996). *Death by default: A policy of fatal neglect in China's orphanages*. New York: Human Rights Watch.
- Human Rights Watch. (1998). *Abandoned to the state: Cruelty and neglect in Russian orphanages*. New York: Human Rights Watch.
- Johnson, D.E. (2000). Medical and developmental sequelae of early childhood institutionalization in Eastern European adoptees. In C. Nelson (Ed.), *Minnesota Symposia on Child Psychology: Vol. 31: The effects of early adversity on neurobehavioral development* (pp. 113–162). Mahwah, NJ: Erlbaum Associates.
- Kagan, J., Kearsley, R., & Zelazo, P. (1978). *Infancy: Its place in human development*. Cambridge, MA: Harvard University Press.
- Kisilevsky, B., Hains, S., Lee, K., Xu, F., Fu, G., Zhao, Z., et al. (1998). The still-face effect in Chinese and Canadian 3- to 6-month-old infants. *Developmental Psychology*, *34*, 629–639.
- Klineberg, O. (1938). Emotional expression in Chinese literature. *Journal of Abnormal and Social Psychology*, *33*, 517–520.
- Kuchner, J. (1989). Chinese-American and European-American mothers and infants: Cultural influences in the first three months of life. Paper presented at the Meeting of the Society for Research in Child Development, Kansas City, April.
- MacLean, K. (2003). The impact of institutionalization on child development. *Development and Psychopathology*, *15*, 853–884.
- National Center for Health Statistics (NCHS) (2000) *2000 CDC growth charts: United States*. <http://www.cdc.gov/growthcharts>. (accessed January 2006).
- Nelson, R. (2000). The developmental status and expressive behavior of ex-institutionalized female Chinese infants: The early months. Unpublished dissertation, DePaul University, Chicago.
- Norris, K. (2003). The effects of institutionalization and parenting on children's development. Unpublished dissertation, DePaul University, Chicago.
- O'Connor, T., Marvin, R., Rutter, M., Orick, J., Britner, P., & ERA Research Team. (2003). Child-parent attachment following early institutional deprivation. *Development and Psychopathology*, *15*, 19–38.
- O'Connor, T., Rutter, M., Beckett, C., Keaveney, L., Kreppner, J., & ERA Research Team. (2000). The effects of global severe privation on cognitive competence: Extension and longitudinal follow-up. *Child Development*, *71*(2), 376–390.
- Parker, S. (2003). Discrimination of facial expressions in institutionalized and community children in Romania. Paper presented at the Poster session at the meeting of the Society for Research in Child Development, Tampa, FL.
- Quinton, D., Rutter, M., & Liddle, C. (1984). Institutional rearing, parenting difficulties and marital support. *Psychological Medicine*, *14*, 107–124.
- Rutter, M. (1995). Maternal deprivation. In M. Bornstein (Ed.), *Handbook of parenting: Vol. 4: Social conditions and applied parenting* (1st edn, pp. 3–31). Mahwah, NJ: Erlbaum Associates.
- Rutter, M. (2002). Maternal deprivation. In M.H. Bornstein (Ed.), *Handbook of parenting: Vol. 4: Social conditions and applied parenting* (2nd edn, pp. 181–202). Mahwah, NJ: Erlbaum Associates.
- Rutter, M., O'Connor, T., & ERA Research Team. (2004). Are there biological programming effects for psychological development?: Findings from a study of Romanian adoptees. *Developmental Psychology*, *40*(1), 81–94.
- Rutter, M., Quinton, D., & Hill, J. (1990). Adult outcome of institution-reared children: Males and females compared. In L. Robins & M. Rutter (Eds.), *Straight and devious pathways from childhood to adulthood* (pp. 135–157). New York: Cambridge University Press.
- Rutter, M., & ERA Research Team. (1998). Developmental catch-up, and

- deficit, following adoption after severe global early privation. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 39, 465–476.
- Sloutsky, V.M. (1997). Institutional care and developmental outcomes of 6- and 7-year old children: A contextualist perspective. *International Journal of Behavioral Development*, 20, 131–151.
- Tu, W.M. (1998). Confucius and Confucianism. In W. Slote & G. DeVos (Eds.), *Confucianism and the family* (pp. 3–36). Albany, NY: State University of New York Press.
- US State Department. (2002). Immigrant visas issued to orphans coming to the U.S. [http://www.travel.state.gov/family/adoption/stats/stats\\_451.html](http://www.travel.state.gov/family/adoption/stats/stats_451.html) (accessed January 2006).
- Wisner Fries, A.B., & Pollak, S.D. (2004). Emotion understanding in post-institutionalized Eastern European children. *Development and Psychopathology*, 16, 355–369.
- Wu, D. (1996). Chinese childhood socialization. In M. Bond (Ed.), *The handbook of Chinese psychology* (pp. 143–154). New York: Oxford University Press.
- Zeanah, C.H. (2000). Disturbances of attachment in young children adopted from institutions. *Journal of Developmental and Behavioral Pediatrics*, 21, 230–236.