Vulnerable children in Ukraine : impact of institutional care and HIV on the development of preschoolers

Dobrova-Krol, N.A.

Chapter 4

The Importance of Quality of Care: Effects of Perinatal HIV Infection and Early Institutional Rearing on Preschoolers' Attachment and Indiscriminate Friendliness

Dobrova-Krol, N.A., Bakermans-Kranenburg, M.J., Van IJzendoorn, M.H., & Juffer, F.
Manuscript submitted for publication

Abstract

The rearing environment of HIV-infected children is often compromised putting these children at additional risks. Positive caregiving may ameliorate the impact of adverse circumstances and promote attachment security. The goal of the present study was to examine the attachment relationships of HIV-infected children in biological families and institutions, and to assess the role of caregiving in the face of HIV-related adversities. We studied 64 Ukrainian uninfected and HIV-infected children reared in families and institutions (mean age 50.9 months). Physical and cognitive development of children as well as attachment-related domains and indiscriminate friendliness were assessed. Institutional care but not the presence of HIV was associated with less attachment security and higher levels of indiscriminate friendliness. HIV-infected family-reared children were less often secure and more often disorganized compared to uninfected family-reared children. HIV-infected and uninfected children in institutions showed the highest rates of insecure and disorganized attachments. On average, the level of indiscriminate friendliness among institution-reared children was more than twice as high as among family-reared children. Only 24% of institution-reared children had clearly developed attachment patterns, as opposed to 97% among family-reared children. Controlling for physical and cognitive development, type of care (institution or family), and HIV status, positive caregiving was associated with more attachment security. Indiscriminate friendliness was associated with lower attachment security among family-reared children, but with more positive caregiving among institution-reared children. Etiology and function of indiscriminate friendliness may differ for family-reared *versus* institution-reared children. Our findings point to the necessity of early interventions improving the quality of care for HIV-infected children.

Introduction

The rapid global spread of pediatric HIV infection has led to the emergence of a special need group of children whose development is hampered by this serious disease and environmental adversities. Whereas the advances in medical treatment have improved their survival rates and health condition, multiple psychosocial challenges accompanying HIV to a large extent remained unresolved, which tempers the medical successes and places children at risk for maladaptive functioning (Steele, Nelson, & Cole, 2007). Research demonstrated that early secure attachment promotes resilience in the face of adversities, however, attachment formation, in turn, is associated with context and quality of caregiving, as well as with child characteristics (Cassidy & Shaver, 2008). The goal of the present study was to examine the attachment relationships of HIV-infected children in different caregiving contexts: biological families and institutions; and to assess the role of caregiving in the face of HIV-related adversities.

The presence of HIV is a serious risk factor that can cause impairments of attachment formation. A study examining attachment quality as related to maternal and child HIV infection in Uganda, where transmission of HIV is not generally associated with family adversities, demonstrated that HIV-infected infants had less secure attachments (as assessed with the Attachment Q-sort) than uninfected infants (Peterson, Drotar, Olness, Guay, & Kiziri-Mayengo, 2001).

Often HIV-infected children either grow up in multiple-problem families or become abandoned or orphaned and end up in institutional care, especially in resource-limited countries. In both cases, rearing environment markedly deviates from the so called average expectable environment required for normal child development. Children in multiple-problem families are at risk for inadequate caregiving, and children in institutions often grow up in an atmosphere of structural neglect (Van IJzendoorn, 2008). In both cases, the formation of a coherent pattern of attachment may be violated resulting in attachment disorganization or attachment disorder that, in turn, may become a mediator between early adversities and subsequent psychopathology (Carlson, 1998). The prevalence of disorganized attachment in high-risk families ranges from 21% to 48%, as opposed to 15% in low-risk families (Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). As to currently institutionalized children, the rates of disorganization reported in different studies exceeded the normative data manifold: 41% in Chili (Herreros, 2009); 65% in Romania (Zeanah et al., 2005), 66% in Greece (Vorria et al., 2003), 74% in China (Steele, Steele, Jin, Archer, & Herreros, 2009), and 86% in Russia (The St. Petersburg-USA Orphanage Research Team, 2008).

Profound deviations of the rearing environment from the average expectable norm may lead to other deviant social behaviors such as indiscriminate friendliness that is also referred to as indiscriminate sociability, disinhibited social behavior,

or disinhibited attachment (e.g., Rutter, Kreppner, & Sonuga-Barke, 2009; Zeanah & Smyke, 2008). Indiscriminate friendliness is manifested in the failure to exhibit expectable reticence around unfamiliar adults, accompanied by seemingly friendly contacts with strangers and lack of checking back with a parent figure in anxiety-provoking situations. The etiology and function of indiscriminate friendliness are unclear, however, improved quality of caregiving seems to lead to a decrease of indiscriminate friendliness among institution-reared children (Smyke et al., 2002; The St. Petersburg-USA Orphanage Research Team, 2008).

Adequate quality of caregiving also appears to buffer illness-related adversities (Van IJzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992), as well as challenges of the rearing environment in disadvantaged families (e.g., Carlson, 1998) and in institutions (Herreros, 2009). Therefore, it is not the mere presence of a certain risk or protective factor but their accumulation and specific combinations that determine the developmental outcomes of children (e.g., Cyr, Euser, Bakermans-Kranenburg, & Van IJzendoorn, in press). In our study we made some first steps to examine the separate and combined impact of potential risk and protective factors on the formation of attachment of children with HIV infection.

Hypotheses

We predicted the following: (a) HIV infection and institution-rearing are associated with insecure attachment, more attachment disorganization, and more indiscriminate friendliness, and the combination of both HIV infection and institution-rearing is the least favorable; (b) compromised family care is more favorable for the development of attachment than institutional care, (c) positive caregiving is related to more attachment security and less attachment disorganization and indiscriminate friendliness.

Method

Participants

Participants were 64 children, mean age 50.9 months: 13 HIV-infected institution-reared; 16 uninfected institution-reared; 16 HIV-infected family-reared; and 19 uninfected family-reared (see Table 1). The selection criteria were: a) age between 3 and 6 years old; b) b) no genetic syndromes (e.g., Down syndrome); c) no evidence of fetal alcohol syndrome in the medical records. The groups did not differ with respect to age and gender. All HIV-infected children were born to seropositive mothers and acquired the infection perinatally.

Institution-reared children. Institution-reared children were recruited from four Children's Homes in Ukraine were they permanently resided since admission; the mean age at admission of the uninfected children was 1 month (*SD* = 1; range: 0 –

3), and they had lived in institutions for 47 months on average (*SD* = 9; range: 35 – 65). The mean age at admission of the HIV-infected children was also 1 month (*SD* = 2; range: 0 – 7). One child admitted at 7 months of age had previously lived in a hospital and was cared for by the hospital staff. HIV-infected children had lived in institutional care for 51 months on average (*SD* = 14; range: 35 – 74). For other details, see Dobrova-Krol, Van IJzendoorn, Bakermans-Kranenburg, Juffer, (in press).

Family-reared children. Family-reared children with no previous history of institutionalization were recruited in the same region. All uninfected children were reared in two-parent families with at least one employed parent. There were no criminal records among the parents, and in two families excessive use of alcohol by fathers was reported. Among HIV-infected family-reared children eight were living in two-parent families; four were reared by single mothers; and three by their single grandmothers because their parents were unable to parent due to drug abuse. In nine families one parent was abusing alcohol or drugs. In three families both parents were unemployed. In five families one parent had criminal records; data on criminal records of two fathers were missing. Families in both groups had low to middle income, but the monthly income of the HIV-impacted families was significantly lower, $t(23) = 2.54$, $p < .05$. Family income was not significantly related to any of the outcome variables ($.09 < p < .72$) (see Table 1).

Procedure

Informed consent was obtained from the local department of the Ministry of Health for institution-reared children, and from the primary caregivers for family-reared children. All children participated in a laboratory assessment procedure. Institution-reared children were accompanied by their favorite caregiver as determined through preliminary interviews with children and caregivers. If a favorite caregiver was difficult to identify, the person who spent most of the time with a child and knew him or her best was invited. Family-reared children were accompanied by their primary caregiver.

Measures

Child HIV-1 health status. The children's medical records were reviewed to obtain the cluster of differentiation 4 (CD4) T-lymphocyte counts most proximal to the time of assessment (range 1 to 3 months) that reflect the level of immune control over the infection, as well as duration and type of antiretroviral treatment. No

Table 1
Descriptive statistics for family-reared vs. institution-reared children

	Family-reared children						Institution-reared children					
	HIV -			HIV +			HIV -			HIV +		
	n^1	*M*	*(SD)*	n^1	*M*	*(SD)*	n^1	*M*	*(SD)*	n^1	*M*	*(SD)*
Age of mother (yrs)	17	32.12	(5.93)	14	32.47	(5.68)	11	30.18	(8.73)	8	30.38	(5.21)
Age of child (mos)	19	51.44	(9.77)	16	52.01	(14.78)	16	48.14	(9.72)	13	52.28	(12.99)
CD4 T-lymphocyte count				14	913	(459.91)				13	1148	(375.01)
Weight-for-age at birth	17	-0.33^{a}	(0.96)	15	-1.15^{ab}	(1.21)	15	-0.81^{ab}	(0.61)	13	-1.36^{b}	(0.56)
Height-for-age at assessment	19	0.20^{a}	(0.98)	16	-0.54^{a,b}	(1.06)	16	-1.58^{b,c}	(1.29)	13	-1.86^{c}	(1.30)
Cognitive performance	19	97.63^{a}	(19.40)	16	78.00^{b}	(16.87)	16	67.31^{b}	(18.97)	13	64.00^{b}	(14.32)
Attachment security	19	5.97^{a}	(1.74)	16	4.63^{a,b}	(1.31)	16	3.75^{b}	(1.94)	13	4.27^{b}	(1.87)
Attachment disorganization	19	2.79	(1.66)	16	4.14	(2.30)	16	4.44	(1.88)	13	4.00	(2.34)
Indiscriminate friendliness	19	0.63^{a}	(0.90)	16	1.13^{a}	(1.20)	16	2.44^{b}	(1.31)	13	1.69^{a,b}	(1.70)
Positive caregiving	19	1.39^{a}	(1.43)	16	-0.19^{b}	(1.34)	16	-0.96^{b}	(1.62)	13	-0.62^{b}	(1.41)

Note: Means in the same row that do not share the same superscripts differ at $p < .05$. [1]Number of cases with available data.

significant difference between the HIV-infected family- and institution-reared children on CD4 cell counts was found, $t(27) = -1.48$, $p = .15$ (see Table 1). Out of 20 children subjected to the treatment, 18 received the same anti-retroviral medications. No significant difference between family- and institution-reared children was found on duration of antiretroviral treatment, $t(15) = -0.57$, $p = .58$. There was no difference between the children receiving antiretroviral therapy and non-treated HIV-infected children on any outcome measure, $.15 < p < .94$.

Physical growth. Height, weight and head circumference were measured during the laboratory visit. Birth weight was retrieved from children's medical records. Current height, weight, and head circumference were highly correlated (rs > .50), as well as birth weight and current height ($r = .79$, $p < .01$). Because faltering of height serves as an adequate indicator of long term chronic adversities (e.g., Miller, 2005), it was used as the index for physical growth. Height-for-age was calculated with the software program Epi Info™, Version 3.3.2 using the 2000 CDC reference database.

Cognitive performance. The Snijders-Oomen Nonverbal Intelligence Test (SON-R) for children between 2.5 and 7 years of age was used (Tellegen, Winkel, Wijnberg-Williams, & Laros, 1998). The SON-R does not require the use of spoken or written language, and consists of six subtests focusing on visual-spatial abilities and abstract reasoning. Previous research showed good psychometric qualities and proved that the SON-R test is suited for use with children in different countries (e.g., in China**,** Zhang, Gong, Sun, & Tian, 1997). We selected two of the most reliable subtests of the SON-R to assess children's cognitive performance: *Patterns* and *Analogies*. The internal consistency of these subtests as estimated by Cronbach's alpha was .81. Total cognitive performance score was calculated with the SON-R computer program.

Positive caregiving. The Emotional Availability Scales (Biringen, Robinson, & Emde, 2000) were used to assess the quality of caregiving provided by the primary or favorite caregiver. Children were videotaped with their caregiver during three minutes of free play without toys. Caregivers' sensitivity and non-intrusiveness were coded by an experienced coder (FJ) who was unaware of the HIV and rearing status of the participants. A second coder rated 55% of the sample; intra-class correlation (single measure, absolute agreement) for sensitivity was 0.72, for non-intrusiveness it was 0.81. A score for positive caregiving was obtained by adding the standardized scores of caregivers' sensitivity and non-intrusiveness.

Attachment. Attachment to the caregiver was observed in the Strange Situation Procedure (SSP; Ainsworth et al., 1978). The procedure involves a series of

episodes in which the infant is exposed to mildly stressful events: the entrance of a stranger and two separations from the caregiver, followed by a reunion.
Insecure-avoidant children keep a comfortable distance from the parent and show minimal responses. Insecure-resistant children are preoccupied with the relationship with the parent, and show immature and/or angry behavior. Secure children have calm and comfortable interaction with the parent and give an update to the parent when he or she returns (Stevenson-Hinde & Verschueren, 2002). Insecure/Controlling-Disorganized children either show contradictory or misdirected and other disorganized behaviors, or show that they have taken control of the interaction and of the relationship to reduce uncertainty when the caregiver cannot be counted upon. The SSP was coded by two experienced observers (MHvIJ and MJBK) according to the Cassidy and Marvin's system (Cassidy & Marvin with the MacArthur working group, 1992). The observers were blind for the HIV and rearing status of the participants. Agreement for the four attachment classifications was 81%, $k = .70$ ($n = 16$).

In addition, continuous ratings for security and disorganized/controlling behavior were assigned. The intercoder reliabilities for security and disorganization were .88 and .73, respectively ($n = 16$; single measure, absolute agreement). To document the degree of attachment formation we used a 5-point rating scale (Zeanah et al., 2005). Ratings of "5" indicated consistence with traditional A, B, C, and D classifications. Ratings of "4" indicated evidence of attachment behavioral organization and the presence of pervasive behavioral anomalies (beyond the scope of traditional disorganization coding). Ratings of "3," "2," and "1" were assigned for behavioral displays ranging from fragmented or incomplete sequences of attachment behavior differentially directed toward the caregiver, to isolated attachment signals and responses, or no evidence of attachment behavior. Intraclass correlation coefficient for interrater reliability was .84 ($n = 16$).

Indiscriminate friendliness. A semistructured interview with the caregiver to evaluate the child's behavior toward the parent and other adults in both novel and familiar situations was used (Chisholm, 1998). Caregivers were asked whether the child (1) wandered without distress; (2) was willing to go home with a stranger; (3) how friendly the child was with new adults; (4) was ever shy; (5) what the child typically did upon meeting new adults. For each question a score of 1 was given if a caregiver gave a response indicating indiscriminate friendliness. Research demonstrated substantial convergence of this measure with other measures of indiscriminate behavior, with intercorrelations ranging from $r = .64$ to $r = .83$ (Zeanah, Smyke, & Dumitrescu, 2002). In our sample the internal consistency as estimated by Cronbach's alpha was .66. Deleting the first item (the child wandered without distress) increased Cronbach's alpha to 0.74, therefore we computed the total score by adding scores on items 2 to 5.

Results

Preliminary Analyses

Univariate ANOVAs and chi-square tests showed no significant differences between the four groups on age of the biological mother, child gender, or child age. There were no associations of gender, current age, total duration of institutionalization, with any of the outcome variables, i.e., attachment security, disorganization of attachment, indiscriminate friendliness, and positive caregiving. Current height was positively related to positive caregiving (r = .43, p < .01); cognitive performance was positively related to attachment security (r = .29, p = .02) and positive caregiving (r = .38, p <.01), and negatively related to disorganization of attachment (r = -.33, p <.01) and indiscriminate friendliness (r = -.36, p < .01); therefore we used current height and cognitive performance as covariates in further analyses.

Rearing Environment, HIV-status, and Attachment

Table 1 presents descriptive information and contrasts among the four groups of HIV-infected and uninfected family- and institution-reared children for the continuous outcome variables. The distribution of attachment classifications in the four study groups is presented in Figure 1.

The distribution of attachment patterns was for uninfected family-reared children: 58% secure, 11% avoidant, 16% resistant, and 16% disorganized;

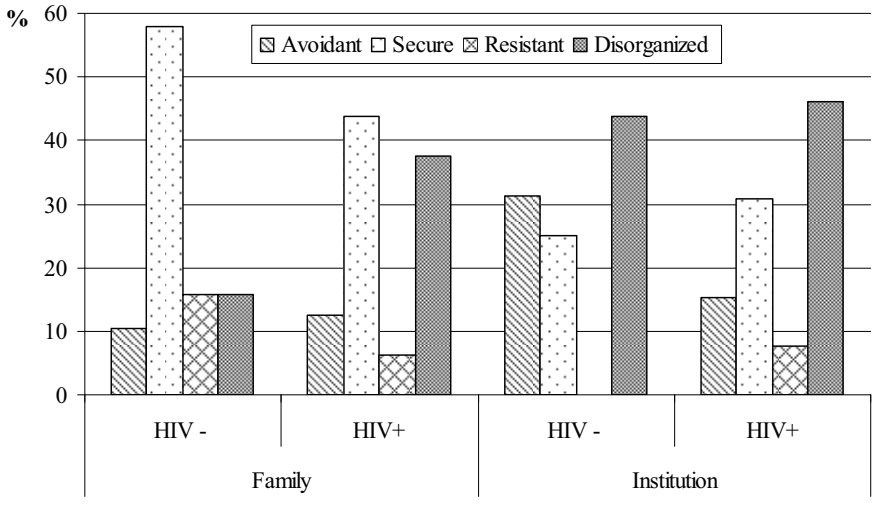

Figure 1. Distribution of attachment patterns

Table 2
Intercorrelations for the outcome variables across and within family- vs. institution-reared groups

	Total (N = 64)					Institution-reared group (n = 29)					Family-reared group (n = 35)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Height-for-age at assessment	--					--					--				
2. Cognitive performance	.44**	--				.25	--				.19	--			
3. Security	.14	.29*	--			-.06	-.21	--			-.10	.38*	--		
4. Disorganization	-.18	-.33*	-.48**	--		-.35	-.08	-.35	--		.18	-.40*	-.53**	--	
5. Indiscriminate friendliness	-.13	-.36**	-.32*	.16	--	.28	-.13	-.07	.04	--	-.02	-.21	-.36*	.14	--
6. Positive caregiving	.43**	.38**	.43**	-.32*	.01	.40*	-.13	.31	-.36	.45*	.12	.42*	.33*	-.19	.02

Note: *p < .05. **p < .01

for HIV-infected family-reared children: 44% secure, 13% avoidant, 6% resistant, and 38% disorganized; for uninfected institution-reared children: 25% secure, 31% avoidant, none resistant, 25% disorganized, and 19% unclassifiable; for HIV-infected institution-reared children: 31% secure, 15% avoidant, 8% resistant, 46% disorganized, and 8% unclassifiable. Children with unclassifiable attachments were included in the disorganized group (as in e.g., Zeanah et al., 2005).

On the 5-point ratings of attachment formation (Zeanah et al., 2005), 34 family-reared children received a rating of 5, one child was rated a 4. Of 29 institution-reared children 12 were rated lower than 4, and only 7 children received a 5. All children classified as secure received a score of 5.

Multivariate Regressions Predicting Attachment Security, Attachment Disorganization, and Indiscriminate Friendliness

In Table 2, bivariate correlations between the covariates and outcome variables in the whole sample and as a function of the rearing environment are presented.

To assess the unique contribution of the rearing environment, HIV infection, positive caregiving, and their interactions, we conducted a series of hierarchical regression analyses predicting attachment security, attachment disorganization, and indiscriminate friendliness. We entered children's height and cognitive performance in the first step, followed by rearing environment and HIV status in the second step; the interaction between rearing environment and HIV status in the third step; and positive caregiving in the last step. The regressions explained a significant 29% of the variance in attachment security, 37% of the variance in indiscriminate friendliness and were not significant in the prediction of attachment disorganization (see Table 3).

In the prediction of attachment security, type of care was a significant predictor, with institutional care being associated with lower levels of attachment security ($p = .04$). There was no association between HIV status and attachment security. The interaction between rearing environment and HIV status made a significant contribution, $R^2_{change} = .06$, $F(1, 58) = 4.46$, $p = .04$, with family rearing in the absence of HIV infection being associated with higher levels of attachment security. Positive caregiving accounted for an additional significant 6% of the variance in the level of attachment security, $F_{change}(1, 57) = 4.42$, $p = .04$, with more positive caregiving being associated with more attachment security.

The regression predicting indiscriminate friendliness showed that type of care was a significant predictor with institutional care being associated with more indiscriminate friendliness. There was no association between HIV status and indiscriminate friendliness. The significant interaction of rearing environment and HIV status indicated that for uninfected children the difference in level of indiscriminate friendliness between family-reared and institutionalized children was more pronounced (with institutionalized children showing more

Table 3
Regression analyses predicting attachment security, attachment disorganization, and indiscriminate friendliness from rearing environment, HIV status, and positive caregiving, controlling for current height and IQ

	Attachment security				*Disorganization of attachment*				*Indiscriminate friendliness*			
	ß	*p*	R^2	F_{change}	*ß*	*p*	R^2	F_{change}	*ß*	*p*	R^2	F_{change}
Step 1			.08	2.79			.11	3.79*			.13	4.44*
Height	-.23	.12			.03	.86			.16	.25		
Cognitive performance	.04	.80			-.23	.14			-.20	.15		
Step 2			.17	3.07†			.11	.07			.25	4.73*
Rearing environment	-.33	.04			.00	.98			.55	<.01		
HIV status	-.12	.34			.04	.78			.05	.68		
Step 3			.23	4.46*			.14	1.79			.29	3.13§
Rearing environment x HIV status	.18	.15			-.12	.38			-.30	.01		
Step 4			.29	4.42*			.17	1.83			.37	7.42**
Positive caregiving	.29	.04			-.20	.18			.35	.01		

Note: N = 64. ß, t, and p statistics are based on the final model.
§ $p < .10$ † $p = .05$. * $p < .05$. ** $p < .01$.

indiscriminate friendliness) than for HIV-infected children (see also Table 1). Positive caregiving made a significant contribution to the prediction of indiscriminate friendliness accounting for an additional 8%, $R^2_{change} = .08$, $F_{change}(1, 57) = 7.42$, $p < .01$, and was associated with more indiscriminate friendliness. Although an additional interaction between positive caregiving and type of care just failed to be significant, type of care seemed to be a moderator: the correlation between positive caregiving and indiscriminate friendliness for institution-reared children was .45, $p = .01$, for family-reared children it was .02, $p = .91$ (Table 2). The difference between the two correlation coefficients was $Z_{diff} = 1.76$, $p = .078$.

Discussion

We found that institutional care but not the presence of HIV infection was associated with less attachment security and higher levels of indiscriminate friendliness. Although HIV-infected family-reared children were less often secure and more often disorganized compared to uninfected family-reared children, HIV-infected and uninfected children in institutions showed the highest rates of insecure and disorganized attachments and poorly developed attachment patterns. Even after controlling for physical and cognitive development, type of care, and HIV status, positive caregiving was associated with more attachment security. Indiscriminate friendliness was associated with lower attachment security among family-reared children, but with more positive caregiving among institution-reared children.

The absence of an association between HIV infection and attachment contrasts with the findings of Peterson and colleagues (2001) on lower attachment security among HIV-infected children in Uganda. However, unlike the Ugandan children who had almost twice as many AIDS-related symptoms as the uninfected comparisons, most children in our study were asymptomatic, therefore, HIV infection may not have interfered with attachment formation, or, as the meta-analysis by Van IJzendoorn and colleagues (1992) points out, caregivers had a greater impact than children's health condition in shaping the child-caregiver attachment relationship.

Indeed, the elevated rate of disorganization (38%) among HIV-infected family-reared children falls within the range of the meta-analytic prevalence of disorganization in high risk families (Van IJzendoorn et al., 1999). The fact that HIV-infected children in disadvantaged families had better outcomes than both healthy and HIV-infected children in institutions suggests that the structural neglect of childcare institutions may be more damaging for attachment formation than the presence of HIV in multiple-risk family environments.

More than 40% of institution-reared children did not exhibit clear attachment patterns that could be rated with 4 or 5 on the attachment formation scale, which

is in line with other studies reporting on the lack or absence of clearly discernable attachment patterns in institution-reared children (e.g., Zeanah et al., 2005). Nevertheless, we also found a number of children who formed secure attachments despite compromised rearing environments, among HIV-infected family-reared children (44%), as well as among HIV-infected (31%) and uninfected (25%) institution-reared children. According to the 5-point attachment formation rating scale (Zeanah et al., 2005), all children in our sample who were rated as secure also had a clear attachment pattern.

So what helps children to form a secure attachment in adverse rearing environments? The child-to-caregiver ratio in our institutions (3-7:1) was similar to the institution in Greece (4-6:1) (Vorria et al., 2003) and more favorable than in Romanian institutions, (10-12:1) (Smyke et al., 2002). The percentage of securely attached children in our study was comparable to the results of the Greek study (28% vs. 24%, respectively), and 10% higher than in the Romanian sample. Apparently, a more favorable child-to-caregiver ratio may have an ameliorating effect on the attachment formation in institutional care.

In addition, attachment security was associated with more positive caregiving, even after controlling for child-related characteristics, type of care, and HIV status. This is in line with research on attachment in institutional settings (e.g., Zeanah et al., 2005), and in multiple-problem and normally developing families (Cyr et al., in press; De Wolf & Van IJzendoorn, 1997). However, the lack of an association between positive caregiving and attachment disorganization may mean that the level of positive caregiving was not sufficient to compensate for the pathogenic experiences of children, and according to the meta-analytic evidence insensitivity is not sufficient to evoke disorganized attachment (Van IJzendoorn et al., 1999).

Finally, we found that institution-reared children had a higher level of indiscriminate friendliness that was related to more positive caregiving. Our results seem to be in line with Chisholm's (1998) finding of a positive association between indiscriminate friendliness and being a favorite in an institution. Indiscriminate friendliness might be interpreted as adaptive behavior aiming to elicit caregiving from any available person in an institution. However, we found no positive association between indiscriminate friendliness and physical and cognitive development or attachment security indicating better adaptation.

Possibly, indiscriminate friendliness in institution-reared children is not adaptive, but results from the lack of expected input in the form of contingent interactions with a stable caregiver needed to facilitate the development of a preference for familiar caregivers. This presumably experience-expectant process is shown in the transformation from a relatively indiscriminate response towards strangers, characteristic for the first months of life, to stranger anxiety occurring around 7 to 8 months (Bowlby, 1997). Provence and Lipton (1962), who observed the development of institution-reared infants report that "in the second six months

one saw no evidence of increasing personal attachment to a particular person" (p. 78), and that the infants "responded with equal enjoyment to everyone who came around" (p. 80).

The lack of the expected experience during a sensitive period may lead to permanent deficits or, as Rutter and colleagues (2007, 2009) suggest biological programming effects. In fact, Wolkind (1974) reported that indiscriminate behaviors were confined to children admitted to an institution before two years of age. Similarly, Rutter and colleagues (2007) found that marked disinhibited attachment was more common among children adopted between 6 and 42 months as opposed to those adopted earlier. Persistence of these behaviors even after adoption as well as their associations with vagal regulation (Oosterman & Schuengel, 2007), and inhibitory control abilities (Bruce, Tarullo, & Gunnar, 2009), also point to possible biological programming during a sensitive period. In our case, the association between indiscriminate friendliness and positive caregiving may simply reflect a natural reaction of caregivers to contact-inducing behaviors. However, due to the shallow nature of such contacts children may not profit from them.

The significant negative association between indiscriminate friendliness and attachment security among family-reared children and its absence among institution-reared children points to possible equifinality of indiscriminate friendliness. In fact, in case of children without institutional background the etiology, course, correlates, and meaning of indiscriminate friendliness may be different (Bruce et al., 2009; Rutter et al., 2007; Zeanah et al., 2004). Among family-reared children indiscriminate friendliness is related to maltreatment and maternal psychiatric problems or substance abuse (Boris et al., 2004; Lyons-Ruth, Bureau, Riley, & Atlas-Corbett, 2009; Zeanah et al., 2004). Thus, it seems to result from a distortion or disruption of early attachment relationships rather than a lack thereof.

Our study has several limitations. The modest sample size calls for replication of our findings. However, the power of the study was sufficient (> .80) to find significant differences of moderate effect sizes. Furthermore, we were not able to employ observational measures of indiscriminate friendliness, and it was difficult to disentangle the impact of HIV from other family adversities. Conclusions regarding the effects of HIV should remain preliminary until a direct comparison with a group of uninfected children reared by HIV-infected primary caregivers is made.

Because pediatric HIV infection is a growing challenge worldwide the findings of our study have important practical implications for policymakers, practitioners and caregivers. Our study suggests that even compromised family care appears to be more favorable for the formation of attachment relationships of HIV-infected children than good quality institutions. Therefore, efforts should be made to prevent

child abandonment and to support HIV-impacted families in their parenting role. If a child nevertheless ends up in institutional care the rearing environment should be optimized by reducing the number of children per caregiver and improving the quality of caregiving. The timing of such interventions is of importance. As the phenomenon of indiscriminate friendliness illustrates, structural neglect or traumatic experiences during the first year of life may have long-term or even permanent effects on children. Therefore, preventive measures and interventions should be introduced at the earliest stages of life.