

# Culture and Early Infancy Among Central African Foragers and Farmers

Barry S. Hewlett  
Washington State University

Michael E. Lamb  
National Institute of Child Health and Human Development

Donald Shannon  
Washington State University

Birgit Leyendecker and Axel Schölmerich  
Martin-Luther Universität of Halle

Everyday infant experiences among the Aka hunter-gatherers and the neighboring Ngandu farmers were observed and compared. Twenty Aka and 21 Ngandu 3- to 4-month-olds and 20 Aka and 20 Ngandu 9- to 10-month-olds were observed for 3 hr on each of 4 days so that all 12 daylight hr were covered. The Aka infants were more likely to be held, fed, and asleep or drowsy, whereas Ngandu infants were more likely to be alone and to fuss or cry, smile, vocalize, or play. The amount of crying, soothing, feeding, and sleeping declined over time in both groups. Distal social interaction increased over time among the Ngandu but not among the Aka. Despite striking cultural differences on many variables, however, functional context systematically affected the relative prominence of the infants' behavior in both cultural groups.

In this article, we examine infant care among two culturally distinct peoples in central Africa—Aka foragers and Ngandu farmers. Both cultures could be described as “traditional,” small scale, preindustrial, or non-Western because industrial production and wage labor are minimal and no socioeconomic class structure (beyond age and sex) exists. Infancy in small-scale traditional cultures is frequently contrasted with infancy in European American cultures, which are typically referred to as global scale, industrial, or Western (Dixon, Tronick, Keefe, & Brazelton, 1981; Konner, 1977; LeVine, 1994; Super & Harkness, 1981; Tronick, Morelli, & Winn, 1987). Although comparative studies of these types of cultures have contributed substantially to the understanding of infant development, they often give the impression that infant care practices vary little across traditional non-Western societies or that the variability between Western and small-scale traditional cultures is greater than the variability within either one of these groups. LeVine (1974, 1989, 1994), for instance, described two parenting strategies—

the agrarian (or pediatric) and the urban-industrial (or pedagogical)—following his work among the Gusii of East Africa. In his view, agrarian parents focus on the survival, health, and physical development of their infants because infant mortality levels are high, with half of the children not surviving to reproductive maturity. To monitor and respond to indicators of health and survival, agrarian parents hold or keep their infants in close proximity, quickly respond to fusses or cries, and feed their infants on demand. By contrast, urban-industrial parents focus on active engagement, social exchange, stimulation, and proto-conversation with their infants because these parents are concerned with the acquisition of cognitive skills essential to success in an environment in which infant mortality is low, children cost more and contribute less, and a competitive labor market builds on an academically graded occupational hierarchy.

Several researchers have confirmed that European Americans emphasize verbal and distal interaction, whereas mothers in traditional small-scale societies stress proximal interaction (Bakeman, Adamson, Konner, & Barr, 1990; Barr, 1990; Goldberg, 1977; Keller, Schölmerich, & Eibl-Eibesfeldt, 1988; Konner, 1976, 1977; Richman et al., 1988; Richman, Miller, & LeVine, 1992; Super & Harkness, 1981). Unfortunately, these comparative studies tended to sample from only one traditional non-Western group (e.g., Gusii in the Richman studies, Kipsigis in the Super and Harkness study, and !Kung in the Konner and Barr studies) compared with one or more European American groups, implicitly suggesting that traditional small-scale cultures have similar patterns of parenting. Some researchers have compared European Americans with more than one non-Western group (e.g., Bornstein et al., 1992; Roopnarine, Talukder, Jain, Joshi, & Srivastav, 1990), but the non-Western samples in these studies tend to be drawn from urban-industrial cultures (e.g., Japan and China). In this study, we focused on variability in infant care in small-scale or traditional non-Western cultures—cultures with minimal consumerism and social-economic stratification.

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Barry S. Hewlett and Donald Shannon, Department of Anthropology, Washington State University; Michael E. Lamb, Section on Social and Emotional Development, National Institute of Child Health and Human Development, Bethesda, Maryland; Birgit Leyendecker and Axel Schölmerich, Fakultät für Psychologie, Martin-Luther Universität of Halle, Halle, Germany. Axel Schölmerich is now at the Ruhr University of Bochum, Bochum, Germany.

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Correspondence concerning this article should be addressed to Michael E. Lamb, Section on Social and Emotional Development, National Institute of Child Health and Human Development, 9190 Rockville Pike, Bethesda, Maryland 20814. Electronic mail may be sent to lamb@ssd.nichd.nih.gov.

Researchers have also relied on brief observations (usually 1–2 hr of observation at each age), and this has precluded examination of the ways in which context might influence parent–infant interactions in different cultures. In addition, the differences between the Western and traditional small-scale cultures sampled have been so pronounced that the focus on these differences precluded analysis of within-group variability. High levels of parent–child proximity in traditional cultures are often attributed to high infant mortality and a resultant concern with survival, for example. In this article, our goal is to explore differences between two small-scale non-Western groups, on the assumption that a focus on both within- and between-culture variability promotes better understanding of the forces that shape infant development.

The comparison between Aka and Ngandu is interesting because these neighboring societies make a living in the same tropical forest, have similar mortality and fertility levels (infant mortality is 15–20%, juvenile [ $<15$  years] mortality is 40–50%, total fertility rate is about six live births per woman); have frequent social, economic, and religious interactions; and are exposed to one another's practices on a regular basis, yet have distinct modes of production, male–female relations, and patterns of child care (see Hewlett, 1991b, for a detailed description of the cultures). The Aka are foragers (also known as hunter–gatherers), move their camps several times a year, have minimal political hierarchy, and have relatively high gender and intergenerational egalitarianism, whereas the Ngandu are sedentary “slash-and-burn” farmers with stronger chiefs and marked gender and intergenerational inequality. As a result, Aka–Ngandu comparisons may provide insights into several issues, including the role of natural selection (i.e., differential reproduction) in shaping infant care.

Noting that in comparison with Western cultures, non-Western foragers and farmers hold their infants extensively, breastfeed frequently, and respond promptly to fusses and cries, developmentalists have described these practices as part of a hazard-prevention strategy that serves to buffer vulnerable infants from health risks in contexts of high infant mortality (Blurton Jones, 1993; Kaplan & Dove, 1987; LeVine, 1994; Tronick, Morelli, & Ivey, 1992). By studying the Aka and Ngandu, we can evaluate this hypothesis because they both experience high infant mortality rates, have lived in association with each other for generations, and observe one another frequently. As a result, holding, responsiveness to fussing or crying, and the frequency of breastfeeding should be similarly high in the two cultures if they enhance infant survival. Moreover, parents in both cultures have had the opportunity both to evaluate the costs and benefits of different infant practices and to modify their own.

Studying these two cultures further allows researchers to explore the impact of different socioeconomic lifestyles on infant care. With the exception of Konner's (1977) research on the !Kung hunter–gatherers and Tronick et al.'s (1987, 1992) research on the Efe hunter–gatherer–traders, most of the traditional non-Western societies studied have comprised agriculturists. Like LeVine (1974, 1989, 1994), the Whittings (Whiting & Edwards, 1988; Whiting & Whiting, 1975) have suggested that parenting practices are determined by the modes of production, which they called *maintenance systems*, because the subsistence demands, especially the workloads of women, lead to different

patterns of child care. The Aka–Ngandu comparison may thus elucidate the differential effects of foraging and agricultural lifestyles on infant care.

Several cross-cultural theorists (such as Keller, 1997; Kornadt & Trommsdorff, 1990; Tronick et al., 1987) have hypothesized that differences between Western and traditional small-scale cultures with respect to infant–adult proximity are linked to distinct cultural goals: Western parents engage in frequent verbal and face-to-face interaction to promote independence and autonomy, whereas parents in small-scale and other non-Western cultures use close body contact and affective tuning to promote more social sensitivity and group-oriented tendencies. Structural aspects of a culture may also be significant in this regard. In cultures such as India, Japan, and China that are highly patriarchal, women can exert political and economic power and control primarily through their children (Keller, 1997). For example, Wolf (1972) has hypothesized that Chinese mothers hold, indulge, and limit access to their infants to develop more dependent and loyal children who will give support and status as the mothers grow older. As a result, both patriarchy and a strong cultural emphasis on social unity or conformity should be associated with more infant–adult proximity.

Both of the cultures we studied share more and are in many ways more egalitarian than European American cultures, but Aka sharing and egalitarianism are substantially greater than among the Ngandu. Ngandu households that accumulate more than others and do not share with neighboring families are prime targets of sorcery. This promotes some sharing between households, but there is marked inequality within Ngandu households, with men and elderly individuals receiving more than others. The Aka, by contrast, share with many people in many households on a daily basis, and there is greater gender and age egalitarianism. To foster egalitarianism, Aka also avoid drawing attention to themselves and eschew evaluative rankings, while also respecting individuality and autonomy. By contrast, the Ngandu promote social unity and conformity.

The Ngandu live alongside roads in sedentary communities of about 100 to 400 people. The Ngandu in this study lived in Bagandu where two or three vehicles pass each day. Bagandu has a Catholic church, local market, health clinic, and several small shops, run mostly by Tchadians. Ngandu men build the 40-ft by 20-ft (12.19 m  $\times$  6.10 m), one- to three-roomed mud-and-thatch houses. Polygyny is common among the Ngandu (35% of the men have more than one wife), and each wife has her own room or house. Houses are about 40 ft (12.19 m) from each other, but there are no walls or fences between houses and other villagers frequently walk by. By contrast, the Aka live in camps of 25 to 35 blood or marriage relatives and move camp several times a year for various reasons (e.g., better hunting, death in camp). The dome-shaped Aka houses are made by women and have just enough room for a narrow 4-ft-long (1.22 m) log bed and a fire. Camps consist of four to six houses that are very close to each other (1–2 ft, .30 m–1.22 m) so all camp members live in an area (around 200 ft<sup>2</sup>, 18.58 m<sup>2</sup>) about the size of a large living and dining room in the United States. Cooperative net hunting involves men, women, and children, who connect their nets to form a circle. The men go to the center of the circle and try to chase game into the net, while

the women stay close to the net, tackling the animals once they are trapped.

Whereas Aka men and women contribute equally to subsistence, Ngandu women are the primary providers. Ngandu men clear and burn plantations, whereas women plant, weed, harvest, and prepare all subsistence food items (manioc, corn, peanuts, plantains, etc.). Unlike the Aka, the Ngandu are actively engaged in a local cash economy, and many women are small-scale merchants, selling plantains, peanuts, nuts, mushrooms, and alcohol. Men are completely responsible for coffee production, hunting with trap lines or guns, and searching for gold or diamonds in the local streams. Ngandu women are responsible for home maintenance, laundry, and collecting water and firewood. Ngandu subsistence involves "delayed returns" (Woodburn, 1982, p. 435), in that the Ngandu have to delay the rewards of investment until harvest time. By contrast, the Aka subsistence system involves "immediate returns" (Woodburn, 1982, p. 435) in that the Aka consume everything within a day or two after capture or collection. The Aka may thus share more frequently in part because relatively little has been invested. The workload of Ngandu mothers also appears to be greater than that of the Aka, especially given the extensive sharing and cooperation among the Aka. Meanwhile, Aka infants are socialized in a denser social context than are Ngandu infants. Like the !Kung, Aka infants are carried in slings on the left-hand side of the adults' bodies (Konner, 1976, 1977). This leaves the head, arms, and legs free and allows the infant to nurse on demand. By contrast, Ngandu infants are tied rather snugly on the adults' backs. When the adults are sitting, both Aka and Ngandu care providers place infants on their laps or between their legs facing outwards. When infants are laid down, they are always placed on their backs. Aka infants sleep with their parents and siblings, whereas Ngandu infants often sleep with their mothers (or in separate cots, when husbands come to visit).

The Ngandu have more caregiving devices than Aka; some parents make small chairs, beds or mats for the infants to lie on. Ngandu infants also have more clothes, are often dressed more warmly than adults even in the middle of a hot day, and are washed once or twice a day. By comparison, Aka infants seldom have more than a protective forest cord around their waists and are infrequently given a complete bath. Both Aka and Ngandu caregivers carefully keep insects and debris off their infants.

## Method

### Participants

Twenty Aka and 21 Ngandu 3- to 4-month-olds and 20 Aka and 20 Ngandu 9- to 10-month-olds were observed for 3 hr on each of 4 different days so that all 12 daylight hours were covered (roughly, 6 a.m. to 6 p.m.). Thirteen of the Aka 3-month-olds, 12 of the Ngandu 3-month-olds, 9 of the Aka 9-month-olds, and 12 of the Ngandu 9-month-olds were boys. Six (3 Aka, 3 Ngandu) of the Aka and Ngandu 3 to 4 month-olds and 14 (6 Aka) of the 9- to 10-month-olds were firstborns, and 20% of the Aka and Ngandu fathers in both age cohorts had more than one wife. None of the Aka had received a formal education nor were they engaged in the cash economy, and all Aka parents engaged in subsistence activities during the observations. Most of the Ngandu men and several of the Ngandu women had received some elementary educa-

tion. Men and women engaged in subsistence and market activities, but none were employed outside the households.

### Procedure

Families were asked to follow their everyday activities and to ignore the observer, although, as always, it is difficult to know precisely how much the caregivers changed their daily activities to accommodate the observations. Ngandu mothers, in particular, seldom left their homes to participate in public activities (e.g., going to the market or standing in line for hours at the health clinic), in part, we believe, because the observer's presence elicited such curiosity. Aka generally do not accommodate others very much, and they pursued a great variety of activities outside their houses or camps. Observations took place in both rainy and dry seasons, but the majority of the 3- to 4-month-old observations took place in the dry season, whereas the majority of the observations of the 9- to 10-month-olds took place in the rainy season. Both Aka and Ngandu are more likely to stay home during the rainy season.

Using a 20-s observe-10-s record time sampling procedure for 45 min, observers noted on a checklist the occurrence of 11 adult and 9 infant behaviors, 5 dyadic behaviors, as well as the location, position, and identity of the adult near, holding, or caring for the infant. Observers then took a 15-min break before starting the next 45 min of observation. The beginning and end of each time sampling unit were signaled through an earphone from a small tape recorder.

The codes, which were also used and defined by Belsky, Gilstrap, and Rovine (1984) and by Fracasso, Lamb, Schölmerich, and Leyendecker (1997), are listed in Table 1. Observers were trained until they were reliable using videotaped interactions, but interobserver reliability was checked during the data gathering by having two different coders independently observe infants at the same time. Interobserver reliability coefficients were computed by correlating the two observers' scores on each variable. Mean reliability of codes was .82 (range = .65-.96), and the interobserver reliability of each code is provided in Table 1. Most (75%) of the observations were conducted by one observer. Interobserver reliability was checked twice—before observations began with each age group. Warm-up observations were used to acclimate Ngandu but not Aka parents and children. Because the observers were living with the Aka, Aka houses are open, and the camp is a public sphere (in contrast to the United States, where houses are considered private spheres), there was no apparent need to acclimate Aka parents and children to the observers. The Aka adults and children appeared unaffected by the observers' activities.

In addition to assessing the number of intervals in which certain behaviors were observed, we also defined five mutually exclusive and exhaustive contexts (feeding, caretaking, object play, social interaction, and no interaction) to describe the overall activity of the dyad as suggested and previously demonstrated by Leyendecker, Lamb, Schölmerich, and Miranda Fricke (1997). As in Leyendecker et al.'s study, the feeding and caretaking contexts were identified as such by the coders, and even when other activities such as social play and object play occurred in one of these two contexts, the functional context was still labeled as *feeding* or *caretaking*, respectively, because feeding or care-providing were the adults' primary goals at the time. Dyadic *object play* was coded when both infant and adult were involved in object play outside of feeding and caretaking, and *social interaction* was coded when the dyads were engaged in visual-verbal interactions, physical and nonphysical affect, and soothing outside of the other contexts. Whereas feeding, caretaking, object play, and social interaction describe dyadic states, all monadic states were coded as *no interaction* (e.g., infant looks at mother while mother does not look at the infant and vice versa; infant plays with object while mother is at leisure, etc.) as were all other units not included in the other four contexts.



Table 1  
Codes Used for the Observation  
of Care Provider–Infant Interaction

Behavior	Interobserver reliability
<b>Dyadic behavior</b>	
Face-to-face	.75
Mutual visual	.67
C holds	.96
C proximal (within arm length)	.82
C grooms, dresses, cleans, etc.	.91
C feeds or nurses	.96
<b>Care provider behavior</b>	
C attention is focused on infant (watches)	.78
C checks on infant (brief glances)	.84
C stimulates or arouses infant	.83
C physical affect towards infant	.79
C nonphysical affect towards infant	.72
C physically soothes infant	.87
C nonphysically soothes infant	.82
C vocalizes to infant	.76
M leisure (no subsistence activity)	.73
M works	.70
C talks to others	.83
<b>Infant behavior</b>	
I fussing	.78
I crying	.95
I sleeps	.87
I drownses	.65
I looks at C	.83
I smiles	.73
I vocalizes	.81
I plays alone (distracts self with objects, including own body)	.81
I plays with objects	.86
I responds to care provider stimulation	.77
<b>Other behavior</b>	
Location (lap, bed, arms, sling)	.92
Room (in house, outside house, forest, plantation)	.89

Note. C = care provider; M = mother; I = infant.

## Results

Because preliminary multi- and univariate analyses revealed no reliable effects of gender, the data concerning boys and girls were combined for the purposes of further analysis. A series of 2 (ethnic group: Aka or Ngandu)  $\times$  2 (age: 3–4 months or 9–10 months) multivariate analyses of variance (MANOVAs) were first used to assess the effects of ethnic group and age on the three groups of dependent variables—care provider behaviors, infant behaviors, and dyadic behaviors—and are displayed in Table 2. These analyses yielded significant effects for ethnic group on the care provider,  $F(10, 68) = 3.56, p < .001$ ; infant,  $F(11, 67) = 7.34, p < .0001$ ; and dyadic behaviors,  $F(6, 72) = 26.38, p < .0001$ , and significant effects for age on all three groups of dependent variables as well,  $F(10, 68) = 6.76, p < .0001$ ;  $F(11, 67) = 18.28, p < .0001$ ;  $F(6, 72) = 4.57, p < .001$ , respectively. Univariate analyses were used to explore these effects further, and the results of these analyses are provided in Table 2, along with the relevant means. Inspection of

the table shows that, as expected, older infants slept and drownsed less, fussed or cried less, and consequently received less physical or nonphysical soothing than did the younger infants. The frequency of feeding, face-to-face interaction, and caregiving also declined over time, but the amount of adult leisure increased, presumably because observations of the young infants took place in the dry season when the workload for Ngandu women is especially high, whereas observations of older infants took place in the rainy season when maternal workloads are lower. The unavoidable confounds between age and season are unlikely to have accounted for any other effects reported here.

The Aka infants were substantially more likely than Ngandu infants to sleep, drowse, to be held or fed, or to be within proximity of their care providers, whereas Ngandu infants were more likely than Aka infants to be alone, fuss, cry, smile, vocalize to care providers, play alone, or play with objects. Ngandu infants were stimulated and aroused more by their care providers than Aka infants were. There were no differences between ethnic groups in the frequency of care provider soothing, affect, watching or checking the infant, and face-to-face or mutual visual interactions.

Significant multivariate interactions between age and ethnic group were also evident for care provider,  $F(10, 68) = 2.62, p < .009$ ; infant,  $F(11, 67) = 3.73, p < .0001$ ; and dyadic,  $F(6, 72) = 2.44, p < .034$ , behaviors. Subsequent analyses using Tukey honestly significant difference tests revealed no group differences in adult vocalizations to infants at 3 months, although the Ngandu engaged in more mutual visual interactions at 9 ( $p < .02$ ) but not at 3 months, and en-face interactions increased over time among the Aka ( $p < .003$ ) but not among the Ngandu. The frequency of looking at care providers decreased over time among the Aka ( $p < .007$ ) but did not change among the Ngandu. There were no group differences in the frequencies of object play and playing alone at 3 months, but the Ngandu engaged in significantly more play than the Aka ( $p < .0001$  and  $p < .003$ , respectively) at 9 months. The frequency of watching and checking by the adults did not change over time among the Aka but increased among the Ngandu ( $p < .05$ ).

Although there were striking Aka–Ngandu differences on a number of variables, it is instructive to examine these differences across functional contexts. For illustrative purposes, we focus here only on the observations of the 3- to 4-month-olds; the same points could be made using the data for the 9- to 10-month-olds. Figures 1 to 4 graphically display variations across context on four variables in which there were significant differences between ethnic groups (fuss, cry, smile, and infant vocalization). In general, the figures indicate that, although ethnic differences were consistent across contexts (i.e., Ngandu infants fussed and cried more than Aka infants in all contexts), context systematically affected the relative prominence of the infants' behavior (i.e., both Aka and Ngandu fussed and cried more in social interaction). One implication is that both similarities and differences between Aka and Ngandu groups can be magnified or minimized unless steps are taken to ensure that observations take place in comparable contexts.

## Discussion

Overall, the statistical analyses reported here revealed that Aka infant–adult interactions are more proximal, whereas

Table 2  
*Age Cohort and Ethnic Group Differences in the Behavior of Adults and Infants*

Variable	3–4 months				9–10 months				Effect	
	Aka		Ngandu		Aka		Ngandu		Ethnic	Age
	<i>M</i> <sup>a</sup>	<i>SD</i>	<i>M</i> <sup>a</sup>	<i>SD</i>	<i>M</i> <sup>a</sup>	<i>SD</i>	<i>M</i> <sup>a</sup>	<i>SD</i>		
Dyadic behavior										
Face-to-face	2.57	3.32	2.17	2.37	0.14	0.13	0.99	1.13	0.19	14.85***
Mutual visual	2.35	3.62	1.10	0.82	0.05	0.07	2.72	4.36	1.26	0.29
<i>C</i> holds <i>I</i>	95.91	6.57	54.21	19.99	86.71	10.98	54.46	16.17	132.55**	1.93
<i>C</i> proximal (within arm's length)	97.29	4.03	65.31	16.19	86.57	15.63	63.42	17.06	75.34***	3.94
<i>C</i> grooms, dresses, cleans, etc.	5.03	1.74	6.50	3.32	2.74	1.29	6.10	3.86	15.35***	4.75*
<i>C</i> nurses or feeds	15.23	5.53	12.63	5.02	13.30	4.50	10.13	4.20	7.19**	4.34*
Care provider behavior										
<i>C</i> watches or checks on <i>I</i>	30.14	8.87	23.50	12.62	22.35	6.95	31.72	10.59	0.37	0.01
<i>C</i> stimulates or arouses <i>I</i>	0.63	0.75	1.73	1.52	0.06	0.09	2.57	3.85	14.97***	0.07
<i>C</i> physical affect toward <i>I</i>	4.18	2.18	3.08	2.86	1.38	1.01	1.72	1.26	0.76	22.14***
<i>C</i> nonphysical affect toward <i>I</i>	0.90	1.67	2.14	3.03	1.31	1.37	1.29	1.51	1.88	0.23
<i>C</i> physically soothes <i>I</i>	3.39	2.30	4.22	4.11	0.75	0.60	1.56	1.02	2.25	23.60***
<i>C</i> nonphysically soothes <i>I</i>	2.28	1.93	4.04	4.33	0.86	0.82	1.22	1.03	3.67	14.59***
<i>C</i> vocalizes to <i>I</i>	3.91	3.45	2.84	2.22	2.31	1.59	5.23	5.21	1.52	0.27
Mother leisure: no subsistence activity	67.45	23.63	50.34	22.68	70.71	15.04	65.75	11.58	6.84**	4.89*
Mother works	28.29	20.46	39.13	20.40	28.34	15.15	29.81	11.88	2.53	1.44
<i>C</i> talks to others	40.19	12.66	30.95	13.57	43.13	10.37	41.23	15.16	3.68	5.18*
Infant behaviors										
<i>I</i> fusses or cries	4.67	3.26	12.38	7.03	2.42	1.39	6.81	5.67	81.07**	12.96***
<i>I</i> alone, asleep	0.47	0.94	10.56	9.72	1.09	1.67	9.81	8.63	40.82***	0.00
<i>I</i> alone, awake	0.06	0.19	4.81	7.12	0.43	0.82	6.09	8.42	17.79***	0.45
<i>I</i> sleeps	41.34	14.99	31.40	10.30	19.77	9.13	18.41	9.80	5.11**	47.81***
<i>I</i> drowns	19.30	14.48	11.38	10.30	11.72	7.83	6.90	5.36	8.09**	7.24**
<i>I</i> looks at <i>C</i>	4.16	4.23	2.62	2.03	0.95	1.12	3.64	6.38	0.73	2.65
<i>I</i> smiles	0.51	0.56	1.25	1.57	0.26	0.25	3.56	4.11	9.55**	1.16
<i>I</i> vocalizes	2.37	3.14	9.32	7.85	3.53	3.23	11.88	11.13	22.98***	1.36
<i>I</i> plays alone (distracts self with objects, fingers, etc.)	1.11	1.67	2.79	3.14	1.95	1.39	14.86	22.74	8.2**	6.42**
<i>I</i> plays with objects	1.69	2.93	2.15	2.83	12.41	7.45	28.62	17.11	15.58***	77.65***
<i>I</i> responds to <i>C</i> stimulation	0.16	0.28	0.81	1.05	0.08	0.17	1.78	2.71	13.14***	1.92

Note. C = care provider; I = infant. Watch or check, fuss or cry, infant alone (nobody present in room) and infant alone and awake are combined behaviors from Table 1.

Only significant *F* values are reported in the two right-hand columns; in each case (*dfs* = 1, 77).

<sup>a</sup> Represents the mean percentage of the total number of intervals (1,080) during which the behavior was observed.

\* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

Ngandu adult–infant interactions are more distal and that these differences become especially pronounced in late infancy. Aka care providers—usually mothers, fathers, or other adults—hold their infants, keep them close, feed them more frequently (2.2 vs. 4.0 times per hour) and longer, and soothe them just as long as Ngandu care providers do, even though Aka infants fuss or cry half as much as Ngandu infants. Aka respond to each fuss or cry, often by soothing, whereas Ngandu care providers are more likely to let the infant fuss or cry (Hewlett, Lamb, Leyendecker, & Schölmerich, 1998). The differences are especially

remarkable in light of the fact that Aka holding is energetically more costly to Aka mothers than to Ngandu mothers because, as pygmies, the Aka are considerably shorter and lighter than Ngandu women, whereas the Aka and Ngandu infants are of comparable weight. On the other hand, Ngandu stimulate their infants more by using distal behaviors; they are more likely to arouse and to vocalize to infants who are, in turn, more likely to respond by smiling and by vocalizing. The differentiation between these two non-Western populations is greater than the differences between and among those Western groups that have

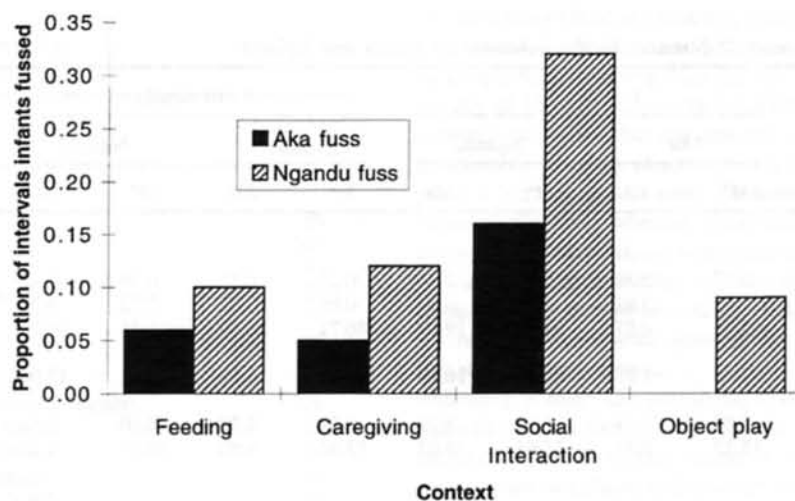


Figure 1. Aka and Ngandu infant fussing in various contexts.

been studied at similar ages with comparable methods (e.g., Fracasso et al., 1997; Leyendecker et al., 1997).

The fact that the Aka infants are held almost all the time may explain why these infants sleep or drowse more than Ngandu infants do and may also increase the potential for nonverbal communication, like that documented by McKenna, Mosko, Dungy, and McAninch (1990). When infants are held, the body movements, heartbeats, sounds, and smells of infants and adults provide the basis for a subtle "dance" that is obviously not captured when gross observational methods are used, so we cannot conclude that Aka adults and infants interact rarely. Meanwhile, because Ngandu infants are held about half as frequently as Aka infants, their interactions tend to depend on more distal forms of communication: Ngandu infants thus fuss, cry, smile, and vocalize to maintain or attract their parents' attention, and Ngandu adults vocalize and stimulate their infants in return.

Although this may explain why distal interaction is more common in Ngandu than in Aka infant-adult dyads, it does not explain why the Aka hold their infants so much or why the Ngandu tend not to do so. Are these differences explained by considerations of infant survival (more hazards in Aka environment), mode of production (lower workload by Aka women), or cultural ideologies (social unity, communalism), as suggested by cross-cultural theorists (Bornstein et al., 1992; Keller, 1997; LeVine, 1994; Tronick et al., 1987; Whiting & Whiting, 1975)?

Infant mortality is similarly high among both Aka and Ngandu, as it is in other contemporary forager and farmer environments (Bailey & Peacock, 1989; Bentley, Goldberg, & Jasienska, 1993; Cohen, 1989; Hewlett, 1991a), so this cannot explain the substantial cultural differences in the frequencies of proximal behaviors, although it might be argued that worries about survival are greater among Aka parents than among

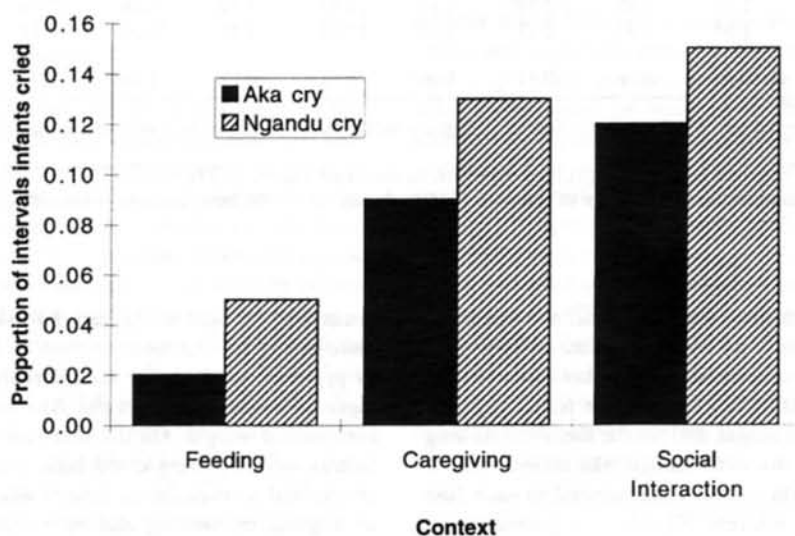


Figure 2. Aka and Ngandu infant crying in various contexts (there was no crying during object play).

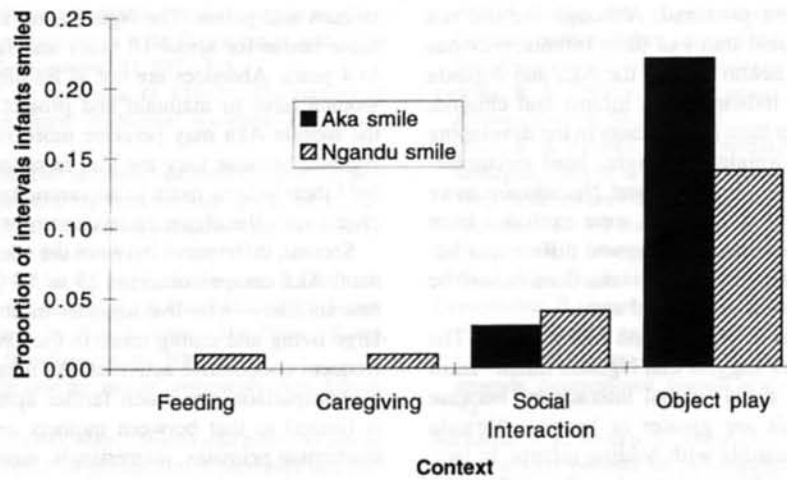


Figure 3. Aka and Ngandu infant smiling in various contexts.

Ngandu parents, perhaps because the Aka environment is more dangerous (i.e., exposure to more hazards such as snakes, predators, or falling trees). Kaplan and Dove (1987) have suggested that Aché foragers in Paraguay hold their infants all the time because the forest is potentially hazardous, and Blurton Jones (1993) has developed a simulation model influenced, in part, by his observation that Hadza and !Kung foragers always hold their infants; the model predicts greater reproductive fitness from constant holding even when hazards are rare. The differential infant mortality hypothesis is also not supported by Barry S. Hewlett's observations during 25 years of fieldwork (1973–1997) that there are as many poisonous snakes, spiders, and scorpions in the Ngandu villages and fields as in the forest and that Ngandu fields attract large and dangerous game animals,

including elephants. Nor is it clear how holding an infant as opposed to laying it down nearby would affect survival differentially or why survival-focused Aka mothers would have primary responsibility for tackling trapped animals, a task that requires them to put their infants down and run after game animals. And if holding, frequency of breastfeeding, and responsiveness to crying dramatically affect survival, why would the Ngandu not alter their behavior to match that of the neighbors they observe so frequently?

Nutritional factors or infant morbidity might also explain why Aka are more proximal; Wachs, Sigman, Bishry, and Moussa (1992) have shown that caregiver behaviors are influenced by infant nutritional status. The hypothesis would be that Aka infants, in general, have lower nutritional status than Ngandu in-

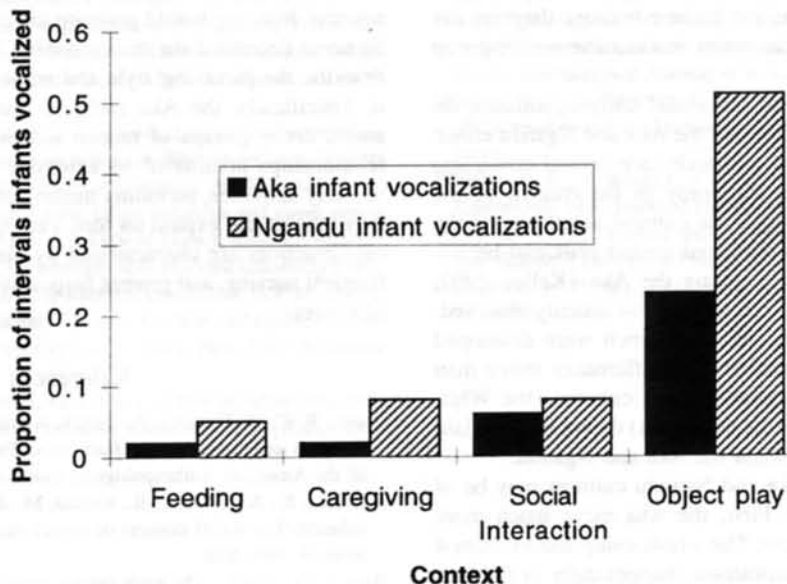


Figure 4. Aka and Ngandu infant vocalizations in various contexts.



fants and are therefore more proximal. Although we did not directly measure the nutritional status of these infants, previous studies of infant and child health among the Aka and Ngandu (Cordes & Hewlett, 1990) indicated that infants and children in both groups were healthier than most infants in the developing world (measures included weight for height, head circumference, and hemoglobin levels). Both Aka and Ngandu are more proximal with ill infants, but sick infants were excluded from the study. Overall, it appears that the observed differences between Aka and Ngandu caregiver–infant interactions cannot be explained by differential health or survival rates.

What about the workloads of Ngandu and Aka mothers? The Whitings' (1975) hypotheses suggest that Ngandu infant–adult dyads might involve more distal–verbal interactions because Ngandu women's workloads are greater or because Ngandu subsistence tasks are incompatible with holding infants. In fact, Ngandu women usually put infants down when they fall asleep rather than switching activities, and none of their subsistence tasks are incompatible with infant care. Meanwhile, Aka parents have plenty of opportunities (in camp and on the hunt) to put their infants down but do not do so. Further, one deficiency of the maternal work hypothesis is the implication that infants are a burden, constraining their mothers' activities; many parents may feel this way in European American cultures, but such complaints are rare among the Aka and Ngandu. In addition, the Ngandu and Aka women we studied devoted equivalent amounts of time to subsistence and household work, although the Aka mothers had slightly more leisure time than the Ngandu mothers, especially when the infants were younger. These differences are likely to be artifacts of seasonal variations, however; the observations of the 3-month-olds were conducted in the dry season when Ngandu women are unusually busy preparing the fields before the rains, whereas the observations of the 9-month-olds were conducted in the rainy season when both Ngandu and Aka women have more leisure time. Aka mothers also "work" much more than Ngandu women when child care is included because they hold their infants so often. On the other hand, Aka mothers' other work may be less intense because they are not primary providers and they can count on extensive within-group sharing.

Cultural ideologies, such as the social unity hypothesis, do not explain the differences between the Aka and Ngandu either. Social unity, conformity, and patriarchy are central constructs in Ngandu culture, whereas autonomy in the context of the community and egalitarianism is the cultural script among the Aka. These cultural patterns predicted greater proximal behaviors among the Ngandu than among the Aka (Keller, 1997; Tronick et al., 1987), whereas the reverse was actually observed.

In sum, extant hypotheses, most of which were developed to explain Western versus non-Western differences rather than variation among Western or non-Western cultures (the Whitings', 1975, hypotheses being the exception) do not help explain the observed differences between the Aka and Ngandu.

Several features of the Aka and Ngandu cultures may be of explanatory value, however. First, the Aka move much more frequently than do the Ngandu: The whole camp moves from 4 to 18 times a year, camp composition changes daily as families arrive or leave temporarily to visit relatives and friends, and families travel several kilometers every day through open forest

to hunt and gather. The Ngandu, on the other hand, stay in the same house for about 10 years and farm the same fields for 2 to 4 years. Absences are not as frequent or as long because the women have to maintain and protect their fields. As a result, the mobile Aka may perceive more risk than do the sedentary Ngandu because they are less familiar with their "home" and hold their infants more to accommodate potential hazards associated with the changing environment.

Second, differences between the social contexts may be pertinent. Aka camps comprise 25 to 35 people—many related to one another—who live together in an area about the size of a large living and dining room in the United States and engage in frequent cooperative activities like hunting. Ngandu households, by comparison, are much farther apart, and daily cooperation is limited to that between mothers and their children. Among nonhuman primates, interestingly, mothers in group-living pairs nurse and spend more time in contact with their infants than do mothers in isolated pairs (Konner, 1977). Isolated mothers distance themselves from, avoid, and punish their infants more. Similarly, Aka parents may be more willing to hold and nurse infants if their denser social contexts provide substantial alternative stimulation for both mothers and infants. Of course, by European American standards, the Ngandu are not socially isolated but by comparison with the Aka, their social contacts with other adults are fewer and shorter in duration.

Third, cooperative hunting and food sharing practices may ensure that the Aka are less concerned about having adequate supplies of food, and this may make them more willing (or able) to invest in energetically costly infant care.

Fourth, the Aka focus on immediate returns rather than on delayed gratification, and this may make them more willing to accommodate their infants' demands for gratification.

Whatever the reason for the observed differences between the Aka and the Ngandu, the data presented in this article suggest that there may be a forager pattern of infant care. When describing farming (agrarian) and urban–industrial parental goals and infant care patterns, LeVine (1989, p. 6) suggested a decade ago that foraging would generate unique parenting patterns, but he never described the distinguishing features. These data help describe the parenting style and some of the forces that shape it. Specifically, the Aka niche is marked by integration into small, dense groups of related individuals who have intimate relationships dominated by extensive sharing and cooperation in many activities, including hunting and gathering in the forest they inhabit and exploit on foot. Perhaps as a result, their infant care practices are characterized by almost continuous holding, frequent nursing, and prompt responsiveness, especially to signs of distress.

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