WEANING AND THE NATURE OF EARLY CHILDHOOD INTERACTIONS AMONG BOFI FORAGERS IN CENTRAL AFRICA

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Western scholarly literature suggests that (1) weaning is initiated by mothers; (2) weaning takes place within a few days once mothers decide to stop nursing; (3) mothers employ specific techniques to terminate nursing; (4) semi-solid foods (gruels and mashed foods) are essential when weaning; (5) weaning is traumatic for children (it leads to temper tantrums, aggression, etc.); (6) developmental stages in relationships with mothers and others can be demarcated by weaning; and (7) weaning is a process that involves mothers and children exclusively, with weaned children moving from close relationships with their mothers to strengthened relationships with other children. In many respects, these presumptions are consistent with contemporary Euroamerican practices: nursing stops early (usually before six months) relative to other cultures and takes place over a few days or weeks with the help of bottles and baby foods. Because bottles are available, weaning seldom appears traumatic, but it is seen as an important step in the establishment of independence between mothers and infants. By contrast, weaning from the bottle is often perceived as traumatic. Despite considerable academic and popular interest, weaning has seldom been studied systematically, especially in small-scale cultures. Qualitative and quantitative data from a study of Bofi foragers in Central Africa are used here to evaluate the cross-cultural applicability of the assumptions summarized above.

Received February 7, 2000; accepted April 26, 2000.

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Copyright 2001 by Walter de Gruyter, Inc., New York Human Nature, Vol. 12, No. 1, pp. 27–46.

1045-6767/01/\$1.00+.10

KEY WORDS: Central Africa; Foragers; Weaning; Parent-child relations; Social and emotional development.

CONCEPTUAL HISTORY

Many of the extant images of weaning are rooted in psychoanalytic theory, perhaps because Freud (1938), Erikson (1950), and Lacan (1977) all saw weaning as an important phase in the socio-emotional development of children. Freud came to believe that the first few years of a child's life were crucial for personality and emotional development. He hypothesized that infants gained pleasure through sucking, chewing, eating, and biting during the initial "oral" stage of psychosexual development and that children whose oral experiences were not satisfying (such as infants who were denied access to their mothers' nipples) experienced psychological "pain." Consequently, weaning was deemed traumatic.

Psychoanalytic theory influenced the culture and personality (C&P) school of anthropologists, who proposed between the 1930s and 1950s that early culturally based childhood experiences, such as nursing behaviors and weaning, had an important impact on adult personality. Ethnographers such as Mead (1935), Benedict (1934), and Kardiner (1947) often described weaning as both brief and traumatic.

In the 1950s, the Whitings and their colleagues began one of the most extensive studies of human development in cultural context. The Whitings were critical of the descriptive studies conducted by C&P anthropologists and established a methods handbook (1966) to standardize and quantify the collection of data on child development. Unfortunately, they focused on three- to five-year-old children so behavioral data on weaning were not collected systematically, but all the researchers in this group collected descriptive data on infancy and weaning, in part because they were influenced by both the psychoanalytic and attachment theories (Bowlby 1958). The standardized measures developed for cross-cultural studies of infancy and early childhood during this era included "age of weaning" and "severity of weaning" (Whiting and Child 1953), implying that weaning took place at a specific time.

Freud's (1938) emphasis on oral satisfaction also affected the development of attachment theory. Bowlby (1958, 1969) suggested that evolution had equipped infants with survival-enhancing behaviors that drew infants into social interactions with the primary careproviders to whom they became attached. From this perspective, the threat of careprovider loss (such as occurs in weaning) brings about great anxiety, sadness, and anger. Secure and insecure patterns of mother-child attachment are believed to shape the child's future social and emotional relationships.

The psychoanalytic and attachment theorists' interest in weaning prompted Albino and Thompson (1956) to conduct a detailed retrospective study of weaning among the Zulu of South Africa by interviewing 16 mothers with the help of translators. Albino and Thompson (1956) investigated methods of weaning, maternal reasons for weaning, as well as the preweaning, weaning, and post-weaning behavior of children; all data were collected by interviewing the Zulu mothers, rather than by observation. The Zulu mothers reported weaning their children at a relatively specific time (18 to 19 months). Weaning took place within a few days, with mothers repeatedly placing the bitter juice of an aloe plant on their breasts to discourage children from nursing, and tying "charms" around the weanlings' necks to help the children "overcome the troublesome effects of weaning" (1956:183). Reactions to weaning were coded as negativistic (refusal to respond to mother), aggressive (attacks on mother), oral (sucking of objects), repetitive, fretful (indicated by crying or whimpering), and apathetic (escape-oriented). The Zulu children, as reported by their mothers, most frequently demonstrated apathetic or escape behaviors, followed in order of prominence by negativistic behavior, fretfulness, and aggressiveness. Albino and Thompson (1956) concluded that weaning brought about a change in the child's social world, with the mother replaced as a love object by others (10 of the 16 children became more attached to either a sibling, "nursemaid," or grandmother), as the child began to spend more time alone and thus become more independent. Thus "it seems as if the child is attempting in an active way, to adapt himself to the situation of being rejected by his mother. . . . it seems as if a child is compelled by the weaning to become a mature and independent person" (Albino and Thompson 1956:197).

Like Albino and Thompson, Ainsworth (1963, 1967) was initially interested in the emotional effects of weaning, specifically instances in which Ganda (East Africa) mothers to send their demand-fed infants to live with relatives in order to promote weaning. Only one child in her sample was weaned in this manner, however, and Ainsworth thus refocused on mother-infant attachment. She nevertheless noted:

To demand-fed babies, weaning seems to imply rejection by and separation from the mother. The baby tends to respond with separation anxiety, and also with increased ambivalence, as indicated by hitting the breast or other behavior that the mother interprets as disliking the breast (Ainsworth 1967:412).

Ethnographic descriptions like Ainsworth's reflected the continued interest in weaning through the 1950s and 1960s, yet only Albino and Thompson (1956) conducted systematic research. Ethnographic descriptions include the LeVines' (1966) observations the Gusii of Kenya, as part of the Whitings' classic six cultures study. The LeVines (1966:129) described weaning as the "first of a series of drastic changes which take place in the second and third years of life of a Nyansongo child" when the child is able to walk and care for him- or herself. Through weaning, children were prepared for their "replacement as the primary focus of the mother's affection," with negative reactions to weaning attributable to a "degree of abandonment" by their mothers (LeVine and LeVine 1966:130, 133). Likewise, the Munroes (1975) described weaning among the Ainu, the Trobrianders, and the Gusii in a cross-cultural human development textbook, concluding that (*a*) abrupt or severe weaning was most prominent in less affectionately indulgent cultures, (*b*) sudden weaning resulted in more independence in later childhood, and (*c*) children were supervised by adults much less after weaning.

Another husband-wife team, Shostak and Konner, were also influenced by the Whitings while at Harvard. Their classic studies of !Kung infancy (Konner 1976) and female life cycles (Shostak 1976, 1981) described !Kung weaning as particularly traumatic. Shostak's primary informant, Nisa, recalled weaning as a traumatic experience in which she cried all the time for her mother's milk. "Some mornings I just stayed around and my tears fell and I cried and refused food. That was because I saw him (brother) nursing, I saw with my eyes the milk spilling out. I thought it was mine" (Shostak 1976: 251). Shostak (1976:255) warned that many other !Kung women were completely unable to recall events in their early childhood and that Nisa's memories of weaning are probably a "combination of facts, generalized experiences, and fantasy." Nevertheless, weaning, the birth of siblings, and the cessation of being carried on their mothers' backs appeared to be periods of "intense unhappiness" for !Kung children (Shostak 1976).

Konner's (1976, 1977) and Draper's (1976) research with !Kung infants and children led Konner to hypothesize that early childhood among foragers was a time of social transition from an indulgent (i.e., frequent holding, immediate breast feeding) mother-infant relationship to a phase in which relationships with other children predominated. Konner indicated that !Kung infants spent most of their time with their mothers whereas weaned children developed primary relationships within multi-aged, multi-sex, juvenile play-groups.

Because weanlings are often considered incapable of eating adult food, special weaning foods—soft or mashed bananas, cassava, or gruels that are believed to help make weaning easier—are commonly mentioned in the ethnographic literature (Ivey 1993; Kardiner 1947; LeVine and LeVine 1966; Minturn and Hitchcock 1966; Nerlove 1974). Weaning foods may also have played a role in human evolution during the transition from hunting and gathering to more sedentary food-producing lifestyles. This period was also marked by a decrease in birth interval and by earlier 31

weaning made possible in part by the availability of foods (such as corn gruels and mashed cassavas) that could be fed to young children (Lancaster and Lancaster 1987). Despite a plethora of ethnographic studies describing when and how weaning takes place and the factors that influence the decision to wean (Akin 1985; Chowning 1985; Dettwyler 1995; Gray 1996; Nardi 1985), systematic observations of social and emotional interactions during weaning have never been reported.

Unlike psychologists and cultural anthropologists, evolutionary theorists have sought to develop theories that have cross-species applicability. Trivers (1974), for example, explained that conflicts between a parent's and an offspring's reproductive interests occur because they share only 50% of their genes. Weaning is the classic example: a mother may "want" to enhance her reproductive fitness by having another offspring while her child strives to extract as much time and energy from the mother as possible in order to enhance his/her own reproductive interests. Trivers identified "psychological weapons," such as temper tantrums in primates, that weanlings use to increase parental investment, and the use of such weapons or strategies has been observed in such primate species as orangutans (Horr 1977), chimpanzees (Clark 1977), and baboons (Altman 1980). Attempts to evaluate parent-offspring conflict theory have primarily focused on energetic costs and benefits (Altman and Sameuls 1992; Gomendio 1991; Lee 1987; Lee et al. 1991; Smith 1991), whereas socio-emotional aspects have rarely been addressed.

Taken together, the psychological, anthropological, and evolutionary theories have helped create the following widely endorsed beliefs or hypotheses about weaning: (1) weaning is initiated by mothers; (2) once mothers decide to stop nursing, weaning takes place within a few days; (3) mothers use specific techniques to terminate nursing quickly; (4) weaning foods (gruels and mashed foods) are essential around the time of weaning; (5) weaning is a traumatic experience that leads to temper tantrums and displays of aggression; and (6) weaning exclusively involves mothers and their offspring and leads weanlings to establish stronger relationships with other children. As indicated above, however, these hypotheses have only been loosely informed by systematic observations of human mothers weaning their children. The goal of the project was to evaluate common assumptions in the scientific literature by examining the social and emotional context of weaning among the Bofi foragers.

METHODS

Quantitative observations and qualitative information were recorded during structured interviews with Bofi parents. The data are considered "preliminary" because only 12 children have been studied to date. Although the sample size is small, the observations span 104 hours, more than in most cross-cultural behavioral studies of early childhood (Draper 1976; Konner 1976; LeVine and LeVine 1966; Morelli 1987; Whiting and Whiting 1975). As such, the data are sufficient for evaluating the broad characteristics of weaning.

The behavioral data were collected using a focal child sampling technique (Altman 1980) which involved observing one child (the focal child) at a time and recording a specific set of caregiver-child behavioral interactions. A detailed checklist was used to record the focal child's behavior as well as behaviors directed to him/her at 20-second intervals, with a 10-second interval used to record the observed behavior. The behaviors noted included nursing and feeding, caregiver-child visual orientation, caregiver-child social interactions, adult-child activities, child emotional states and attachment behaviors, child-child activities, and the location of other adults and children relative to the focal child. A message recorded on a portable cassette player signaled the observer when to observe and record. Each 45 minutes of observation was followed by a 15-minute rest. Ten of the children were observed for nine hours each, spanning all 12 daylight hours. Two of the children were observed for 8 and 6 hours, respectively, because of scheduling conflicts and the health status of one child. Since observations were only taken during daylight hours, night-time nursing could not be assessed. All of the children reportedly slept in the same bed as their parents.

Qualitative structured interviews were conducted with the parents of the 12 children and an additional 8 mothers and 5 fathers for a total of 20 adult women and 17 adult men. The interviews were conducted with the assistance of a Bofi farmer who translated the interviews from Bofi to French. The informants were asked when parents wean children, how they feel weaning should be accomplished, and how children typically react to being weaned. The parents' general opinions about parenting and childhood were solicited, and the parents were also asked about their family genealogy; birth, marriage, and child health histories; the season in which their children were born; and how many seasons had passed since then.

The Children

The eight girls and four boys studied ranged from approximately 18 to 59 months of age (Table 1). All ages were approximated using examinations of the children's teeth to estimate age and supplemented by a relative aging scheme in which parents and relatives ranked the children from oldest to youngest. Nursing status was assessed by asking parents if their child still nursed at all. Only when parents reported that their child had ceased nursing completely was he/she categorized as "weaned." Mothers who were

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Table 1. Characteristics of Focal Children

Child	Child's Age (months)	Sex	Nursing/ Weaned	Months pregnant	Birth Order	Hours of Observation
1	36-38	F	N	0-3	latter	9
2	18-19	F	N		latter	7.5
3	43-45	M	N		latter	9
4	48-50	F	N		latter	9
5	36-38	F	W		first	9
6	57-59	Μ	W		latter	9
7	24-25	F	N		first	9
8	57	F	W	7	first	9
9	39-40	Μ	W	8.5	first	9
10	44-46	F	W		latter	9
11	36-38	F	N		latter	9
12	25–27	M	N		latter	6

pregnant were palpated to assess the approximate stage of gestation. The children were from five clans and six camps. All of the observations took place between August and October of 1998. All children were reported by their parents to be healthy. If a child became ill during the research period, observations were discontinued until the child was fully recovered.

Ethnographic Background

The Bofi, the northern neighbors of the better-known Aka (Bahuchet 1985; Hewlett 1991), are a group of African forest foragers who have not previously been studied. Bofi foragers are primarily net hunters who reside in and around the Ngotto forest reserve of the Central African Republic (CAR) in the northern section of the Congo Basin rainforest and speak an Oubanguian language. Although the Bofi primarily hunt with nets, they also use spears, crossbows, net traps, and small snares. They hunt many species of duiker, monkeys, rats, porcupines, mongoose, and hogs. Caterpillars, which were in season during this study (August–October), are eagerly consumed, and the Bofi also gather a wide variety of other insects as well as roots, mushrooms, leaves, nuts, and fruits. Both men and women participate in hunting and food collecting, although members of each sex normally have different roles in the procurement of food.

Bofi camps consist of 20–30 individuals who are socially organized through patrilineal clans (*zim*). Although the Bofi foragers are primarily patrilocal, young Bofi forager couples usually live matrilocally while new husbands conduct bride-service during the first few years of marriage.

Like other Central African forest foragers, the Bofi inhabitat the forest for part of the year, living on the outskirts of Bofi horticulturalists' villages the rest of the year. The Bofi foragers have long lived in proximity and association with Bofi farmers. Relations between Bofi foragers and farmers are similar to traditional multistranded relations in other parts of Central Africa (Hewlett 1991, 1996).

Although this is the first ethnographic study of the Bofi culture, Hewlett (1996) has described some basic similarities and differences between the Bofi and Aka. On the surface, Aka and Bofi cultures appear similar in that their house construction techniques and hunting-and-gathering devices (nets, crossbows, string traps, digging sticks and baskets) are the same. Net hunting is the prime hunting technique among both Bofi and Aka. The Bofi do not speak the Aka language (Diaka), however; they speak the same language (Bofi) as their village partners. The Bofi also live in mixed savanna and forest ecologies and seldom farm, whereas the Aka live in the primary forest but farm on occasion. Finally, several aspects of Aka social structure such as "positions of *tuma* (great hunters) and *kombeti* (clan leader), *dzengi* (great forest spirit), and initiation of youths into *dzengi* do not exist among the Bofi" (Hewlett 1996).

EVALUATION OF WESTERN HYPOTHESES ABOUT WEANING

Weaning is initiated by the mother and takes place rapidly with the use of specific techniques and demarcates developmental stages.

The Bofi word for nurse is *amabili* and the word for weaning is *zallabili*, which means "refuse or hide one's breast." *Zallabili* does imply directionality. When parents were asked "How do you wean a child?"—and, more specifically, "How did you wean your last child?"—all stated that children simply stop nursing. Their unanimous comments were consistent with the fact that none of the mothers—including mothers in the first and last trimesters of pregnancy—were observed attempting to prevent their children from breastfeeding. When questioned, the foragers indicated that they did not apply hot peppers to their nipples or use other methods mentioned by Bofi village women.

When asked "When does breastfeeding end for a child?" mothers and fathers most commonly answered "when they are big" (often indicating with their arm the height of a three- or four-year-old child) and "when a mother is pregnant." These answers were also consistent with observations: all weaned children were three or more years old, and two of the weaned children's mothers were pregnant (in their third trimester). The limited cross-sectional data suggested enormous intracultural variability in the timing of weaning, however, with the process generally taking place gradually over a period of several years. Bofi 18-month-olds nursed 18% of the time, two-year-olds 23% of the time, three-year-olds 10% of the time, and four-year-olds nursed 17% of the time. All of the children who nursed at the start of the observation period were still nursing three months later. Overall, weaning was not identified by Bofi foragers as a specific event, an encapsulated process, or part of a developmental stage. By contrast, groups like the Aka have a specific term, *djosi*, to refer to the period when mother is pregnant and still has a nursing child (Hewlett 1991).

Weaning foods (gruels and mashed foods) are employed when weaning takes place.

When asked "What kinds of food do children eat after weaning?" Bofi parents responded "everything" (*pay*). We did not observe caregivers selecting special foods or preparing foods in special ways for children being weaned. The children were observed eating the following foods (with percentage of total eating time [i.e., intervals] the child was observed consumed the specific food provided in parentheses): manioc (37%), wild yams (18%), *koko* (*Gnetum* spp.—green leafy vegetables—12%), caterpillars (12%), nuts (7%), corn (4%), bush meat (4%), fruits (3%), snails (3%), and mushrooms (1%), with the relative prominence of these foods quite comparable to that for adults. Interestingly, although caterpillars can contain toxins, no attempt was made to limit the young children's consumption of them. Because Bofi farmers use rice mashes at weaning, the Bofi foragers clearly knew about these foodstuffs but did not use them.

Weaning is traumatic for children.

Trauma was behaviorally operationalized by high frequencies of distress behaviors such as crying, aggression (attempts to physically harm another person [or object] by hitting, kicking, biting, scratching, pushing, etc.), and negativism (refusing to respond to a caregiver) behaviors. If weaning is a traumatic event, children who are being weaned should cry more and direct more aggressive or negative behaviors towards their mothers than children who have already been weaned, with the frequency of these behaviors increasing as the frequency of nursing decreases (Trivers 1974).

Negativism and aggressiveness were rarely observed: they occurred in less than 0.3% of the observation units, and there was no difference between the frequencies with which weaned versus nursing children exhibited negative behavior ($\chi^2 = .13$, ns, df = 1) although there was a difference between the two nursing children and two weaned children that exhibited a few instances of aggression ($\chi^2 = 4.1$, p < .05, df = 1). Four of the six nursing and three of the five weaned children never exhibited negativism or aggressiveness. A careful evaluation of the instances in which aggression and negativism took place indicates that these behaviors never occurred in or around bouts of nursing or feeding. As one might expect, all children

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cried at least once, but there was no difference between the frequencies of crying on the parts of weaned and nursing children ($\chi^2 = 3.47$, ns, df = 1) and there was no significant correlation between the frequencies of nursing and crying (r = .07, ns).

Weaning exclusively involves mothers and children. Weaned children move from predominant relationships with mothers to predominant relationships with other children.

Figure 1 compares the average percentages of time (in number of intervals) weaned and nursing children were in physical contact with their mothers, juveniles, or other adults. Weaned children spent substantially less time with their mothers ($\chi^2 = 98.9$, p < .0001, df = 1) but, contrary to Konner's hypothesis, spent that time in close proximity to other adults rather than juveniles. Although weaned children spent less time in physical contact with someone than nursing children did, they were still touching someone 65% of the time. Furthermore, nearly half of that time was spent in physical contact with adults other than their mothers (fathers, grandmothers, etc.).





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EMERGING PATTERNS

Grandmother and Father Careproviding

Hawkes et al. (1997) suggest that Hadza grandmothers made especially high investments in children around weaning, whereas Hewlett's (1991) work with infants among the Aka suggests that fathers would be key contributors at that time.

Tables 2 and 3 shows intracultural variability in the Bofi grandmothers' and fathers' caregiving and proximity. Four of the 12 children had grandmothers living in their camp, but only two of the grandmothers (both maternal) were highly involved. Both children were firstborns who were recently weaned (as reported by their parents) and had mothers in the third trimester of pregnancy (the only two mothers in the third trimester of pregnancy). One other mother was in her first trimester of pregnancy and the remaining mothers were not pregnant. The two children with noninvolved grandmothers were primarily cared for by their mothers.

Three of the twelve children had highly involved fathers. Two of these children were still nursing, and one had reportedly stopped nursing more than a year earlier. The two nurslings spent much less time nursing (2.0% and 7.7%) than did the other nurslings (11.2%, 15.6%, 17.1%, 18%, and 28.5%). All three of the children with highly involved fathers were latterborns (i.e., had two or more other living offspring) with older parents (in their thirties) and no living grandparents.

Self-feeding and Weaning as a Process

Further reducing the "traumatic" nature of weaning is the gradual transition from nursing to self-feeding (defined as any instance in which a child fed him/herself) rather than feeding by adults (food was presented to the child's mouth). Self-feeding most commonly occurred when a careprovider had prepared food and then set the food down near a family member, after which the focal child and others would congregate around and take pieces of the food. Feeding by adults also occurred most commonly in similar circumstances, with adults grabbing a piece of food and presenting it to the child. Table 4 summarizes the mean percentage of intervals and the frequency of bouts (number of consecutive intervals) in which the different types of feeding occurred. Evidently, adults rarely fed children directly: In only seven of 2,160 intervals were adults observed feeding children, and five of the 12 children (two nursing and three weaned) were never fed by an adult. Four nursing children and three weaned children were each fed once by their mother, sister, and maternal grandmother. The patterns of self-feeding were very similar. Although there was a substantial difference Table 2. Individual Variability in Grandmother's Holding, Touching and Proximity to Children

				Grandmother		
Child	Child's Age (months)	Nursing/ Weaned	Grandparent (GP)/ Grandmother (GM) Context	Hold- ing	Touch- ing	Prox- imity
1	36–38	N	Only paternal GPs alive; live in different camp	0.0	0.0	0.0
2	18–19	Ν	Maternal GM living in same camp	0.0	0.0	0.0
3	43-45	N	No living GPs	0.0	0.0	0.0
4	48–50	Ν	Maternal GPs alive, but on trip during observations	0.0	0.0	0.0
5	36–38	W	Maternal GM living in same camp	0.0	0.0	0.0
6	57–59	W	No living GPs; father's mother's sister lives in camp and is viewed as "GM"	0.0	0.0	0.0
7	24-25	Ν	Only paternal GPs alive; live in different camp	0.0	0.0	0.0
8	57	W	Maternal and paternal GMs living in same camp; only maternal GM involved	6.1	9.7	10.2
9	39-40	W	Maternal GM living in same camp; Paternal GPs alive and live in different camp	45.6	64.9	74.4
10	44-46	W	Maternal GM dead; Ma- ternal GF in same camp; mother's father's sister in	0.0	0.0	0.8
			camp and counted as "GM"; Paternal GPs alive and live in different camp			
11	36-38	N	No living GPs	0.0	0.0	0.0
12	25-27	Ν	Only maternal GPs alive; live in different camp	0.0	0.0	0.0

Note: Proximity is defined as instance in which an individual was within a forearm's length of the focal child.

in the amounts of time weaned and nursing children fed themselves, the shift was gradual; as nursing slowly declined, self-feeding increased (r = -.55, p = .03).

Intercultural Variability

Comparable studies of weaning in small-scale cultures do not exist, but some studies among African forest foragers provide data on children in Weaning and the Nature of Early Childhood Interactions among Bofi Foragers

Table 3. Individual Variability in Father's Holding, Touching, and Proximity to Children

				Father		
Child	Child's Age (months)	Nursing/ Weaned	Father (F) Context	Hold- ing	Touch- ing	Prox- imity
1	36-38	N	F in camp	2.5	3.2	5.9
2	18-19	N	F in camp	2.0	2.4	4.2
3	43-45	N	F in camp	22.4	24.4	37.5
4	48-50	Ν	F doing bride service in camp	0.0	0.0	0.0
5	36–38	W	F doing bride service in camp	0.1	1.1	5.3
6	57-59	W	F in camp	20.1	21.8	24.9
7	24-25	Ν	F doing bride service in camp	0.0	0.0	0.0
8	57	W	F doing bride service in camp	4.3	4.3	9.7
9	3940	W	F taking 2nd wife; away doing bride service	0.0	0.0	0.0
10	44-46	W	F in camp	2.0	8.2	16.9
11	36-38	N	F in camp	23.2	26.8	30.9
12	25–27	N	F taking 2nd wife; away doing bride service	0.0	0.0	0.0

Note: Proximity is defined as instance in which an individual was within a forearm's length of the focal child. *F in Camp* indicates that the father was living in the same camp as the focal child. *F doing bride service in camp* indicates that the father lives in the same camp as the child, but that his activities are predominantly dictated by his service to his in-laws. *F taking 2nd wife; away doing bride service* indicates that this father is not living in the same camp as the child, but is instead away conducting bride serice with the family of his second wife.

Table 4. Feeding Patterns of Nursing and Weaned Children

	Mean Pe	rcentage of Time (In	Bouts per Hour		
	Nursing	Fed by an Adult	Self-fed	Nursing	Self-feeding
Nursing children	14.3	0.6	5.7	3.7	1.1
Weaned children	0.0	0.6	10.0	0.0	1.7

this age range. Ivey (1993) and Morelli (1987) collected data on infant to three-year-old Efe children and Hewlett (1991; Hewlett et al. 1998) observed Aka infants up to 18 months of age. Ivey's (1993:33) qualitative descriptions of Efe weaning are consistent with Bofi parents' images of weaning: "Weaning is often never actively enforced by the mother . . . mothers invariably stated that it is the infant who decides to leave the breast." Morelli (1987) reported that Efe children were weaned between the ages of 18 and 24 months and that 88% of Efe mothers with two-yearolds were either pregnant or nursing a younger infant. By contrast, only children over 36 months of age were weaned among the Bofi despite the fact that the Efe total fertility rate is much lower (2–3 live births) than that of the Bofi (5–6 live births). One might expect parents with lower fertility to invest more time and energy in each child.

According to Morelli (1987), the percentage of time that Efe children nursed decreased with age from 17% of the time among one-year-olds to 9% among two-year-olds and 1% among three-year-olds. Among the Bofi, by contrast, 18-month-olds nursed 18% of the time, two-year-olds nursed 23% of the time, four-year-olds nursed 10% of the time, and four-year-olds nursed 17% of the time.

DISCUSSION

The preliminary data presented in this paper are not consistent with the predominant images of weaning in the psychological and anthropological literatures. First, weaning was not initiated by Bofi mothers, and Bofi children were reported to cease breastfeeding on their own. Second, weaning did not appear to occur at a specific point in time and Bofi parents neither identified nor prepared special weaning foods for children. Third, weaning did not appear to be stressful or traumatic for Bofi children; crying, aggressiveness, and negativistic behaviors were not common and were not associated with nursing or feeding bouts. Lastly, weaning was not an event exclusively between mothers and their infants; other family members, such as the fathers and grandmothers, often played key roles in the transition from breastfeeding to self-feeding.

Although Trivers's (1974) parent-offspring conflict theory appeared consistent with the results of all prior observational studies of weaning among primates, parent-offspring conflict theory proved difficult to test among the Bofi. In part, this is because, in order to observe parent-offspring conflicts about weaning among the Bofi foragers, one must first determine which conflicts were centered on weaning and which were not. This was complicated both because weaning was not identified by the Bofi foragers as a specific encapsulated event (whereas groups like the Aka foragers categorize the period of weaning as a stage called *djosi*; Hewlett 1991) and because nurslings were not more likely than weanlings to cry or refuse to respond. Nursing children were more likely to be aggressive towards their caregivers, however, although mothers never prevented children from nursing and none of the aggressive behavior appeared related to nursing or weaning. Thus, the higher frequencies of aggressiveness appear unconnected to the weaning process. Also contributing to the absence of observed weaning conflicts among the Bofi was the graduated cessation of breastfeeding and the continuation of intimate social relations between children and their various careproviders (mothers and other adults). The cessation of nursing does not demarcate the cessation of being held for Bofi children.

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The absence of observed weaning conflicts is consistent with Bateson's (1994) argument that "the process of weaning in mammals is not happily explained in terms of conflicts of interest that inevitably lead to squabbling." Furthermore, he proposed that a weanling's state must be taken into consideration. Among the Bofi the cessation of breastfeeding occurs relatively late by cross-cultural standards and hence the weanlings' metabolic needs have long been met jointly by breastfeeding and solid food consumption. Thus, the conflict of metabolic interests between Bofi mothers and children at the time of weaning is minimal.

Bofi parents (and our observations) indicated that children are generally weaned around the age of three or four, or when a mother is pregnant, suggesting that there is no specific point in time or even a general season for weaning. Sellen (1998) also found that weaning, among the Datoga of Tanzania, did not happen at a specific point in time, and instead there was considerable variation in age of weaning with a range between 4 and 33 months. The idea that weaning happens at a point in time is further contradicted by the unanimous beliefs on the part of Bofi parents that children simply stop nursing on their own and that there are no specific weaning foods.

Such findings suggest that the concept of weaning needs reformulation. Lee (1996) recently suggested that weaning should be viewed as a process rather than a simple event, such as is found among Bofi foragers where the weaning process can be plotted in relation to the self-feeding with which it is inversely related. Bofi toddlers do not collect or prepare their own food, however, and they do not move into multi-age play groups. Young Bofi children acquire and eat food without encouragement or discouragement by caregivers.

Other adults are involved in the weaning process as well. For two of the 12 children, one of the key adults was a maternal grandmother, and these two children were the only children who had mothers in the third trimester of pregnancy. Hawkes et al.'s (1997) Hadza grandmothers lightened the foraging load for nursing mothers by foraging and provisioning their grandchildren, and the limited and preliminary results reported here are consistent with Hawkes et al.'s hypothesis. It appears reasonable that mothers in the third trimester of pregnancy might need more help than mothers who are either not pregnant or in earlier stages of pregnancy. As among the Aka, however, newlywed fathers usually participate in matrilocal bride-service, which requires that they provide services for their

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brides' families. In an effort to minimize this "service," they tend to hunt or gather together, take long trips, and are simply not around the camp very often. Both of the fathers whose children had highly involved grandmothers were young men conducting bride-service.

In contrast, three of the 12 children had highly involved fathers (indexed by touching and holding) and two of these children nursed least and were thus in the final stages of weaning. These data suggest that fathers may play a crucial role in weaning, perhaps especially when fathers are older and have two or more other offspring.

Although only two grandmothers and three fathers were highly involved in child care, the overall percentages of involvement of these five individuals combined with other adults (including less involved fathers, grandfathers, aunts and uncles) is noteworthy. For example, weaned children in our sample on average spent 32% of the total observation time in physical contact with adults other than their mother (Figure 1).

CONCLUSIONS

This preliminary research among the Bofi foragers suggests that weaning is a gradual process and is not a traumatic event. It occurs in an intimate socio-emotional context and parallels the development of autonomous self-feeding. The amount of contact with mothers declines and the amount of contact with other adults increases as children are weaned, contrary to Konner's notion that infants move from a mother-infant dyad to a multiage play group. Bofi toddlers continue to spend substantial amounts of time with adults. The time spent with juveniles actually decreases among the Bofi as children move through the weaning process. Clearly, however, further research on both Bofi children and children in other groups is needed to inform an integrative theory of weaning.

We offer our sincere thanks to the Bofi forager families for kindly allowing us to work among them. We acknowledge and thank the government of the Central African Republic (CAR) for authorizing the research. We also thank the ECOFAC-RCA project and the ministry of forests and water in the CAR, especially George Ngasse and Alain Pènelon for their logistical support and authorization to conduct research in the new Ngotto reserve. The National Institute of Child Health and Human Development supported the research.

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