Cached, carried, or crèched

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Abstract: We believe that "caching" a baby would have been too great a danger in human prehistory, and thus could not serve as the context for prelinguistic vocalization. Rather, infants were most likely carried at all times. Thus, the question arises of why the cry of an infant is such a loud vocalization.

Many years ago, Blurton Jones (1972) did a comparative analysis of the physiology of mother-infant caregiving in mammals and distinguished between those that "cached" their infants, such as seals and ungulates, and those that carried them, such as primates (Jones 1972). He then looked at the physiological characteristics of the relationship between human infants and their caregivers and came to the conclusion that human infants were designed to be "carried" rather than "cached." Since that time, a consensus has developed (Barr et. al 2000) that intimate physical association between infants and their caregivers is an essential feature of human prehistory, an association that modern feeding arrangements contradict to the detriment of both infant and mother.

Dean Falk's theory of language evolution challenges that consensus. It is based on the novel premise that hominid infants were *less* physically attached to their mothers than either their australopithecine ancestors or their contemporary hunter-gatherer descendants. Sometime between the adherence to the feed-as-you-go strategy of our ape ancestors and our switch to the center-point foraging strategy of our hominin ancestors was a time when infants were less physically intimate with their caregivers, and this period has left its traces in language development.

Despite some very attractive features of Falk's arguments, we remain convinced that a human baby is not the sort of creature that can be long away from the physiological support and protection afforded by a human body. Nor do we think Pleistocene Africa was likely to have been the sort of place where caching a baby made much sense. Moreover, we doubt that putting a baby down would substantially increase foraging efficiency. Given that our ancestors were doing center-point foraging at that time, any food that was gathered had to be transported back to the home base. Therefore, at the point that carrying the baby would interfere most with foraging – when the fruits of foraging were being transported to the home base – the mother would have no choice but to put down whatever she was carrying and pick up the infant.

Finally, given what we know about tool use in chimpanzees and early hominins, Falk's idea that a primitive language would have evolved before a simple sling seems implausible. Wild chimpanzees use and sometimes carry tools as diverse as crushed leaves for soaking up water to drink, to simple stone hammers to open nuts (Beck 1975; 1980; Warren 1976). Basic Oldowan stone tools have been found in sites dating as old as 2.5 million years, associated with the fossils of *Homo habilis* (Klein 1999). These tools included rock tools that were carried to other sites, and hammerstones or rocks that were struck against other hard objects to make stone flakes. That tools were carried to other sites implies some form of carrying mechanism. Surely a creature that is carrying rocks could manage to create a simple sling, if only from vegetal matter (as Falk cites, Zihlman 1981). All these considerations lead us to prefer "carrying baby" to "putting baby down."

However, having admitted our allegiance to the carrying hypothesis, we also admit to having had nagging doubts about it, doubts arising from the nature of infant crying. Why should so loud a vocalization ever be deployed in so intimate a relationship as that between an infant and a mother who bears that infant pressed to her body 24 hours a day? One solution to the anomaly of loud human crying is that infants were crèched in the Environment of Evolutionary Adaptedness (EEA) as part of a group-selected (Thompson 2000; Thompson et. al 1996; Sober & Wilson 1998) co-rearing strategy that became available when humans made the transition to center-point foraging about 2 million years ago. In this account, infants are left in the charge of some mothers and juvenile females while other mothers join foraging partners in gathering for the group. Under these circumstances, infants are put down, but in the familiar surroundings of a home base, not in random points in the bush. This idea implies that mothers would have shared in the nursing of one another's infants, and it creates opportunities for an arms race amongst criers that would explain the loudness of human infant crying. It would explain the odd observation that crying in hospital nurseries tends to be contagious.

A compelling part of Falk's argument is based on Kawai's (1965) observations of the transmission of novel behaviors among Japanese macaques. After a juvenile discovered the benefits of washing sweet potatoes and wheat, this activity caught on among other group members, namely older females and siblings (the "Period of Individual Propagation"). Also observed is a "Period of Pre-Cultural Propagation," in which, as behaviors become fixed among a group, infants learn the behaviors from their mothers and pass the behaviors on to future generations. Following Falk's model, early language-like vocalizations of hominin mothers would have spread throughout the group via their infants and children.

Falk's ideas imply that motherese might not be a one-way street. We are exploring the idea that whining is a form of motherese that children use with their parents (Sokol et al., submitted). We are in the early stages of examining whining and find that it shares properties with infant-directed speech, specifically with increased pitch and slowed production. Further work needs to be done, but we are beginning to wonder if all human nervous systems, not just those of infants, are strongly affected by the properties of motherese.

Is it always really mothers' fault?

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Abstract: Falk's paper provides a nice cross-species perspective and an interesting background to formulate a theory of the evolution of human language. However, the author does not provide a complete overview and analysis of the origins of language and takes for granted the "continuity hypothesis." Also her "infant parking theory" is questionable, as it is not well supported by observations.

The target article by Falk addresses the important issue of the origin and the evolution of language. In order to investigate what counted as the origin of the process, one should delimit the phenomenon of language and assume that language can be recognised and distinguished from other forms of communication. Language is more profound than speech and its realisation may take different forms. Falk discusses the different communicative aspects of language, such as speech, gestures, and facial expressions including laughter, crying, and so on, without defining what she really means by language. Indeed, different people mean different things by the word "language": language can be thought of as the visual information conveyed in gestures and facial expressions, or as the tactile information exchanged by touch, or as the auditory information in speech (Gogate et al. 2000; Jouanjean-L'Antoune 1997; Meltzoff & Kuhl 1994). With Liberman (1996) a narrow sense of language, defining language as constituted of a sensory-motor system and pure linguistic computation, became available. Hauser et al. (2002) proposed two restricted conceptions of language: the faculty of language-broad sense (FLB), which includes sensory-motor system, conceptual-intentional system, and computational mechanism for recursion; and the faculty of language-

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