

The formation of natural persons and diversity of attachment relationships in hunter-gatherer child-rearing

Implications for an archaeology of childhood

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Abstract: With a variety of conceptual intersections such as those of natural persons (ie people in their natural state), individual development, and socialisation, scholars have utilised examples of child-rearing practices in hunter-gatherer societies as a proxy for better understanding human origins in the dual sense of society and the individual. Significant diversity in child-rearing practices have been documented in a wide variety of hunter-gatherer populations. In particular, a range of forms of early childhood attachment has provoked active debates about humans' original parenting practices and what might be considered natural for human child-rearing practices. No society represents living fossils of our ancestors nor can be seen as a singular representative for all human child-rearing practices in the past and present. Nevertheless, much can be learned about possible child-rearing practices in human history through the careful consideration of ethnographic data from modern foraging societies. Taking up the author's studies of gymnastic behaviours (a series of behaviours displayed by caregivers such as holding infants on their laps early and often, holding them in a standing position, or moving them up and down) among San groups, this paper reconsiders the attachment relationships as a more dynamic system involving many people, based on intimate responsiveness. Gymnastic behaviours are performed by various caregivers, not only the mother, among San groups. Gymnastic behaviours thereby situate infants within a network of relationships with those around them long before they begin to use cognitive tools such as language to understand and engage in social situations. Flexibility and plasticity, which characterise child-rearing in hunter-gatherer societies, may also underlie parenting in other past and present societies. While most child-rearing practices, including gymnastic behaviours, might have left no archaeological trace, better understanding regarding who engages, and how, in a wide range of child-rearing practices in the present provides valuable insights for interpreting the archaeological record. The analysis of gymnastic behaviours among groups of the San indicates that rather than a singular focus on mother–infant relationships, non-maternal or allo-maternal care of infants might better reflect the flexibility and plasticity of child-rearing practices in human societies.

Keywords: natural persons, San, child-rearing, attachment, gymnastic behaviours

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Introduction

I study child-rearing among several groups of the San, well-known group of indigenous, hunter-gatherer societies in southern Africa (eg Takada 2020). Practices and lives of the San, also known as Bushmen, have been well documented in anthropological literature (eg Lee & DeVore 1968; Lee 1979; Tanaka 1980) and have provided a key example of a foraging lifestyle, which is considered to have important implications for archaeological investigations of human livelihoods. While foraging communities' lives can vary greatly, particularly based on environmental context, ethnographic research of the San has often been drawn into discussions of the general nature of humans and human society. The discussion of child-rearing is no exception. Since the 1980s, there has been a significant increase in studies on child-rearing among hunter-gatherers other than the San, which has led to a major update of theoretical frameworks of anthropologists and researchers in adjacent fields (eg Hewlett & Lamb 2005; Meehan & Crittenden 2016). In addition, much of what is known about these child-rearing practices can be categorised as intangible culture (ie practices, knowledge and skills shared by the community) that are extremely unlikely to preserve in a tangible way in the archaeological record. In keeping with the purpose of this special issue, this paper aims to explore the implications for archaeology of the findings of previous studies of child-rearing among hunter-gatherers, particularly those on attachment relationships between children and their caregivers.

The birth of 'natural persons'

In the nineteenth century, against the backdrop of European expansion into southern Africa, white travellers and explorers began to visit the San. German anthropologist Gustav Fritsch, for example, compiled ethnographic material on the San in the 1860s (Fritsch 1880). He portrayed the San as a small community without a strict political organisation, living a free and independent life based on hunter-gatherer activities. Fritsch's portrayal reflects the concept of 'natural persons', ie people in their natural state, as imagined by Europeans in the eighteenth century, the previous century, and which is characteristic of the prototypical image that later San researchers portrayed with detailed data (eg Lee & DeVore 1968). To situate how child-rearing practices among the San might provide archaeological insights, I first review the ideological background of how hunter-gatherers came to be regarded as the key to decoding the human

nature, focusing on three representative thinkers of the eighteenth century, namely, Vico, Linné and Rousseau.

In eighteenth-century Europe, many scholars in the Christian theological tradition attempted to reconstruct the past by interpreting classical literature according to the worldview of the region and time in which they lived. In contrast, Giambattista Vico (1668–1744) proposed a direction of study that placed common sense and human nature at the root of what he called the state system of the world. Vico examined the classical literature of ancient Greece and other societies from the viewpoints of the authors and the people of those times. Vico's vision was to establish a 'new science' that, in the light of divine providence, would reveal the common nature of all humankind, not just Christians, and on this basis to analyse the nature and changes of societies (Vico 2018[1744] vol 1:59–60; Croce 2011[1911]:106). Although this argument had the limitation in that Vico considered the findings of only the past and neighbouring societies known to Europe at the time (eg Egypt, Greece, Rome and India), he was far ahead of his time in attempting to break away from what is now called ethnocentrism and idealisation of the past, and to discuss common human progress based on observations of nature. After his death, Vico's vision brought about a Copernican turn in traditional Christian theological thinking and led to development of the modern humanities and social sciences.

Carl von Linné (1707–1778) was born about 40 years after Vico. Born in southern Sweden to a Lutheran pastor, Linné was a devout Christian all his life. This is not inconsistent with Linné's academic career. The goal of Linné's study was to find God's created order in nature, in response to the expansion of the European sphere of activity. In other words, natural history came into the limelight as a discipline that promoted natural theology. At age 28, Linné published the first edition of his *Systema naturæ* [*System of Nature*] (Linnæus 1735), which presented a new system of classification of the mineral, plant and animal kingdoms. Linné's classification system attracted a wide readership. *System of Nature* went through edition after edition, adding more and more concrete examples: the first edition had only 14 pages, including the frontispiece, but the twelfth edition had 2400 pages (Linnæus 1766). As is well known, the binomial system of genera and species established by Linné is still the basis of plant, animal and fungi taxonomy today. It should be noted that Linné proposed the taxon *Primates*, and he placed the genus *Homo* at the top of his list of primates. In the tenth edition, the taxon *Primates* was introduced in place of *Anthropomorpha* (Linnæus 1758; 1759). In the twelfth edition, the genus *Homo* was divided into *Homo sapiens* and *Homo monstrosus*. The former group includes Europeans, Americans, etc and differences in

characteristics according to education and situation were noted. The latter included mountain dwarves, the Hottentots, pastoralists closely related to the San, and others who varied according to climate and skill (Linné 1766). Linné and his apostles also compiled a number of excellent topographies (eg Linné 1975[1732]; 2009[1737]). Through these efforts, the natural history perspective based on empirical and systematic observations permeated travelogues, which had previously been based mainly on impressions and hearsay from explorers and others. The vivid descriptions also interrelated features of literature and science, which are often considered contradictory in modern times (Pratt 2008).

Jean-Jacques Rousseau (1712–1778) lived on the island of Saint-Pierre in Lake Bienné, Switzerland, in 1775, three years before his death. It is said that he went around the island every morning with a loupe in one hand and Linné's *System of Nature* in the other (Rousseau 2016[1777]). In his first major work, *Discours sur l'origine et les fondements de l'inégalité parmi les hommes* [*The Origin of Human Inequality*] (Rousseau 2016[1755]), Rousseau envisioned man in his natural state, or 'natural persons': a people among whom inequality is almost non-existent and there is no conflict. This is reflected in Fritsch's description, seen at the beginning of this section. In *Emile* (Rousseau 2007[1762]), Rousseau proposed a three-pronged educational plan based on the idea of natural persons: education by nature, education by things, and education by people, and he encouraged spontaneous and autonomous learning according to the developmental stage of children. This plan became the mainstream view of education in modern society. However, to the Christian Church of the time, which valued education based on the Bible, and to the government, which was strongly influenced by the Christian Church, this was seen as unbelief and even blasphemy, an extremely dangerous ideology. Rousseau's life on the island of Saint-Pierre represents a temporary respite from the exile he was forced to lead because of the backlash he faced over *Emile*.

Nearly 250 years have passed since Rousseau's death, yet his influence remains profound in various fields of the humanities and social sciences. Claude Lévi-Strauss credits Rousseau's ideology of the natural persons with calling attention to the relationship between nature and culture and the differences among peoples, leading to his later interest in ethnology and anthropology (Lévi-Strauss [1962]1969). Rousseau's contributions owe much to the work of Vico and Linné, who had elucidated the relationship between nature and humankind. In light of this process, the idea of the natural persons provided a perspective for considering humans and human societies as a cultural entity supported by nature. Today, when the place of nature in cultural anthropology

is being questioned again (eg Ingold 2000; Descola [2005]2014), it seems important to revisit these ideas and take a new step forward. In the next section, I will unpack the history of research on hunter-gatherer societies, which has been the subject of active debate in relation to the ideal type of natural persons, as well as the history of research on child-rearing.

The original parenting of humans

Rousseau envisioned people in their natural state, or ‘natural persons’, with little inequality and no conflict, and he also discussed the ‘original parenting of humans’ (Rousseau 2016[1755]; 2007[1762]). In cultural anthropology, hunter-gatherer societies have come into the limelight in the wake of such discussions of natural persons. After separating from other species six–seven million years ago, humans have lived most of their history dependent on hunting wild animals and gathering wild plants. It was only about 10,000 years ago that non-hunter-gatherer activities such as agriculture and pastoralism emerged. Researchers interested in the development of human societies have considered that traits of the natural persons and the original parenting practices of humans to be linked to lifestyles based on hunting and gathering, because prior to the Neolithic Revolution, all humans would have lived foraging lifestyles. Much focus has been turned to modern-day hunter-gatherers, particularly the Ju|’hoan, a group of San who led a nomadic lifestyle in the southern African savanna, which is said to be the cradle of humankind. Anthropologists have argued that the Ju|’hoan formed an egalitarian society based on familial bonds in the vast wilderness of semi-arid lands, with the principles of cooperation and distribution (Lee & DeVore 1968). In addition, child-rearing is an area of study where development of individual and reproduction of society intersect. Child-rearing among the Ju|’hoan was thus considered to suggest human origins in the dual sense (ie development of individual and reproduction of society among the natural persons). Indeed, child-rearing studies of the Ju|’hoan society found interesting contrasts when compared to child-rearing practices in Western society. For example, compared to Western countries, the degree of closeness between a mother and child, the frequency of breastfeeding, and the age of weaning were much higher among the Ju|’hoan. This close mother–child relationship was also thought to provide safety and security for the children by helping them to avoid danger and providing them with sufficient food during their playful life in a natural environment, thereby resulting in strong maternal attachment (Draper 1976; Konner 1976).

The popularity of attachment theory was largely due to the fact that the ideas of attachment and motherhood, which originated in Rousseau's thought, had already been widespread in the West as folk concepts, eg the belief that a loving, natural and homely environment is important in the early years of life (Takada, forthcoming). It should be noted, however, that cross disciplinary models of attachment have demonstrated considerable variation. Bowlby proposed his own theory of attachment based on these folk concepts of attachment and motherhood, while also taking over the issues raised by psychoanalysis, which emphasised emotional and sexual impulses, and actively incorporating the findings of animal behaviour and cognitive science, which were emerging at the time (Bowlby 1969). Furthermore, Ainsworth et al used the 'strange situation' method, an experimental observation paradigm, to classify attachment between mothers and infants into four patterns: stable, unstable-avoidant, unstable-resistant, and unstable-confused (Ainsworth et al 1978). Through these efforts, attachment theory became more and more developed as an empirical study. The above-mentioned Ju'hoan findings of close mother-child relationships were extrapolated as characteristic of hunter-gatherer societies, and were widely viewed as indicating the natural importance of attachment to humankind. Konner has recently called these characteristics collectively the 'hunter-gatherer childhood model (HGC model)' (Konner 2016). The HGC model seems to be a return to the ideal type of early life education that was depicted by Rousseau in *Emile* (2007[1762]) and had spread with the development of modernity. In this view, the purpose of education is to bring out children's spontaneous learning in a loving, natural, family-like environment, as typified by the mother-child relationship.

Even after the HGC model was established, research on child-rearing in hunter-gatherer societies continued. In particular, while critically examining the HGC model, the debate on its cultural diversity has deepened. Hewlett (1991a), for example, noted from cross-cultural studies that direct population density in settlements is higher in many hunter-gatherer societies than in agrarian or pastoral societies. Therefore, hunter-gatherer societies are more likely to engage in multi-person foraging behaviour than agrarian or pastoral societies. In particular, among the Aka (a group of hunter-gatherers living in the tropical rainforests of Central Africa), many women, including mothers of infants, were mobilized for net hunting, the most important subsistence activity. When mothers were busy, their infants were cared for and loved by fathers or by relatives and friends who remained in the camp and were available, literally passed from hand to hand. Aka fathers, in particular, were found to be more intimately involved with and contributed more to the care of their infants

than fathers in any other society known to date (Hewlett 1991b). Although the Aka spent most of their working hours hunting, they also obtained useful food for weaning their infants by trading meat for the crops of neighbouring farmers. Breastfeeding by non-mothers was often observed when infants were difficult to feed (Hewlett 1991a; 1991b).

These results showed that Aka infants exhibited attachment to an average of five to six caregivers, including their mothers (Meehan & Hawks 2013). Similar characteristics were also observed in another hunter-gatherer society, the Efe. Attachment theory and practitioners have frequently argued that the lack of a fixed primary caregiver during infancy can hinder the development of healthy attachment (Bowlby 1969). However, ethnographic accounts such as those of the Aka and Efe demonstrate that multiple caregivers do not prevent attachment formation to the mother or other primary caregivers, and human attachment relationships need not be reduced to a single relationship form (Mesman et al 2016; Morelli et al 2017).

Some case studies have refuted the HGC model (Hewlett & Lamb 2005; Meehan & Crittenden 2016), and Konner's (2016) review shows that there are groups among hunter-gatherers where 1) weaning is relatively early, 2) other members of the camp (fathers, women other than mothers, older children, etc) are often involved in childcare and mother-child contact is relatively low, and 3) discipline of infants and toddlers is strict, with infant indulgence rarely observed. Konner (2016) calls a revised version of the HGC model, derived from these cases, the 'childhood as facultative adaptation model' (CFA model), and indicates the variety and flexibility of human environmental adaptation.

According to Konner's review (2016), however, diversity of child-rearing practices is only a matter of degree when compared to the Jul'hoan. Even in the hunter-gatherer societies thought to challenge the HGC model, the primary importance of maternal care and the high degree of closeness between mother and child are still noteworthy when compared to Western societies. For example, Hewlett's (1991b) data indicated that Aka fathers carried babies less than half of the amount of time carried by mothers. Fathers carried their infants as much as mothers in the camps but rarely carried them in the bush. Aka mothers were still the primary caregivers throughout infancy; fathers were the next most important caregivers, but their overall contribution was considerably less than that of mothers, and whether or not fathers provided care frequently was influenced by social situations. Moreover, Aka infants consistently showed the greatest number of attachment behaviours (eg approach, touch, seeks to be held) to their mothers. Fathers were the second most important caregivers of infants after mothers, though their attachment importance was scored far

behind mothers. Similar evidences are also shown among the Efe (Morelli & Tronick 1992; Tronick et al 1992). Furthermore, Konner (2016) highlights that even among the Jul'hoan, mothers are not and have never been claimed to be the sole caregivers of infants (as later researchers have critically implied). Konner's own data clearly show that in addition to mothers, fathers and other adults were in close contact with and cared for infants (Konner 1976).

Support of mother–child dyads in the social system: gymnastic practices among the San

The studies that led to the HGC and CFA models show remarkable consistency of child-rearing practices among the ethnographic sources on which they are based, despite their different theoretical emphases. Such studies indicate that in hunter-gatherer societies, the primary caregiver (typically the mother) plays an important role (a point emphasised by the HGC model), but the contributions of other caregivers are also critical (a point emphasised by the CFA model). So, how should we situate such ethnographic material in relation to attachment theory? Rather than a continued search for a definitive conclusion about human nature, greater anthropological insights might be gleaned from rethinking attachment relationships as a more dynamic system involving many people, based on intimate responsiveness. From this perspective, I have promoted research on the cultural process by which infants form responsibility through their relationships with their caregivers (Takada 2012; 2020). Here, I use the term 'responsibility' – which derives from the etymological word 'responsiveness' – as a relational term based on the aforementioned 'intimate responsiveness'; that is, intersubjective relationships between infants and caregivers. This conception of responsibility allows us to empirically explore the dynamic process by which infants and caregivers exchange actions.

According to my research, exclusive breastfeeding by mothers and close mother–child relationships are observed in various San groups (eg !Xun, †Akhoe, G|ui and G|ana). At the same time, in these San groups, caregivers, including non-mothers, frequently hold infants on their laps early and often, hold them in a standing position, or move them up and down, which I define as gymnastic behaviour (Takada 2005; 2012; 2020). Gymnastic behaviours 1) frequently elicit the infant's stepping reflex, 2) prevent the early disappearance of the infant's stepping reflex and promote later independent walking, 3) contribute to the development of folk theories characteristic of the group, and 4) promote the group's prosperity by encouraging non-mothers to participate

in early care giving (Konner 1973; 1976; Zelazo 1983; Takada 2020). Parenting practices are intertwined with the characteristics that have developed in the different time frames described above and involve the child, the surrounding people and their surrounding environment. In the following, I show that support for mothers and children is achieved through dynamic processes in social systems through the identification of the characteristics of San gymnastic behaviours.

Reframing of infant fussing by gymnastic behaviours

Takada (2021) showed that the !Xun, a group of San living in north-central Namibia, often soothe fussing infants with a combination of tactile, auditory and other forms of communication. Let us reanalyse the cases discussed in this paper from the perspective of multiple-care taking and attachment, which is the subject of this section. In Excerpt 1, B is a male baby aged 17 weeks. M is B's mother. Py is the wife of M's son, namely, B's adult sister-in-law. B is lying down on Py's lap, holding his hands in front of his body. Just before this excerpt, B and M exchanged vocal utterances repeatedly, in a face-to-face formation. Then, seeing B's signs of distress, Py started engaging B in gymnastic behaviour, which rekeys the infant's mood and brings a shift of participant framework.

Extract 1

- 1 B^{body}: moves both of his hands
- 2 Py^{body}: holds B's left arm with her right hand while wiping her left hand on her left thigh → (to line 4)
- 3 Py: *mtce, n|ŋ n!!ao man*
what sit down interjection
what ((are you doing)), hey, sit down
- 4 M^{body}: applies lotion on her own right leg → (beyond this excerpt)
- 5 B: * ((cry))
- 6 Py^{body}: * picks up B, holds him in a standing posture and makes him jump once → (to line 7)
- 7 B: *ann*
- 8 Py^{body}: holds B in a standing posture
- 9 Py^{body}: + makes B jump and then holds B in a standing posture

→ (beyond this excerpt)

10 B^{body}: + makes stepping movements

The signs * and + indicate the moment in which adjacent body movements or utterances started simultaneously.

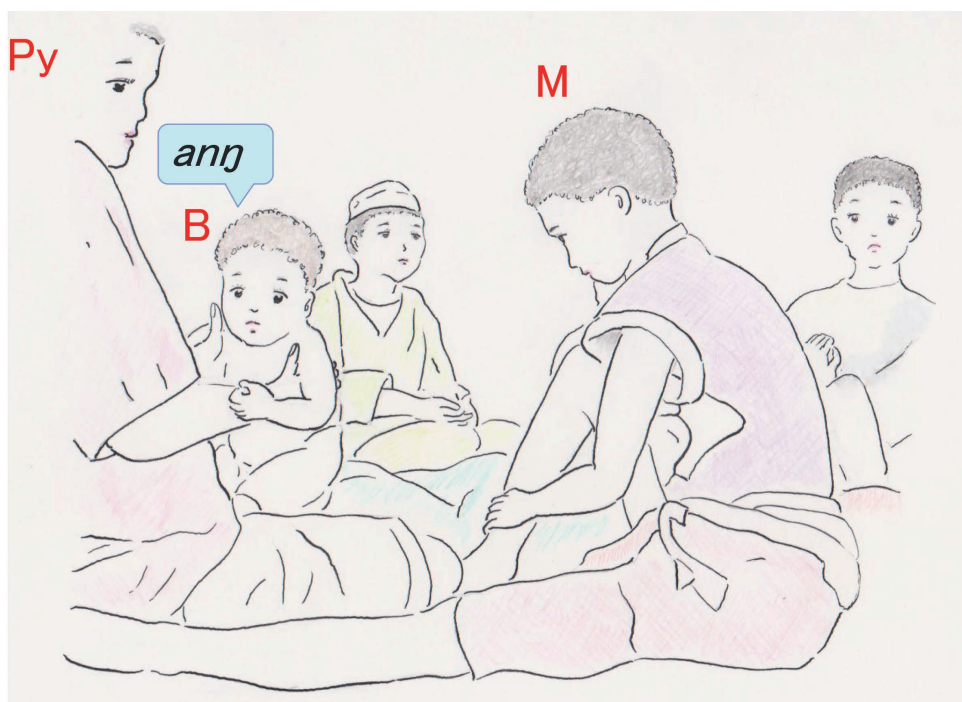


Figure 1 B vocalises 'ann' while shifting to a crouching position (line 7)

When B displays distress (line 1), Py, who has been observing B's movements, takes hold of B's left arm with her right hand (line 2). She then says to B, 'What ((are you doing))? Hey, sit down', (line 3) while wiping her left hand on her left thigh (lines 2–4). Sitting beside Py, M applies lotion on her own right leg (line 4 and beyond). When B starts crying (line 5), Py picks up B, holds him in a standing posture, and makes him jump once (lines 6 and 7). This leads to an observable change in B's mood. That is, B stops fussing and vocalises *ann*, which indicates his comfort (line 7; Figure 1). After holding B in a standing posture for a while (line 8), Py makes him jump again and continues to hold him in a standing posture (line 9 and beyond). She thus reframed the interaction from an expression of distress into a playful activity. Note that although B can sustain

the weight of his head while standing, he cannot yet sustain the weight of this entire body. Consequently, B gradually shifts to a crouching position. Observing this shift, Py immediately makes B jump again, which elicits B's stepping movements (line 10). This allows Py and B to maintain the playful activity. They repeat this playful activity several times with minor variations.

In the above extract, the participant framework shifted from the M–B dyad exchanging vocal utterances with Py observing to the Py–B dyad engaging in gymnastic behaviour with M observing. Gymnastic behaviour is a temporally extended haptic act that intensifies the sense of co-presence and the relevance of embodied responses (Cekaite 2015; Cekaite & Holm Kvist 2017; Cekaite & Bergnehr 2018). Accordingly, Py carefully monitored B's affective state, particularly his distressful behaviours and postural changes, and contingently reacted to them. This enforced B's bodily responses, particularly stepping movements and comfortable vocalisations. These features make it possible for !Xun caregivers to reframe the interaction into a playful activity, in accordance with !Xun cultural values, and to achieve mutual understanding with the infant within the 'intercorporeal framework for mutual engagement' (Goodwin & Cekaite 2013:136).

Ontogenetic development of children and gymnastics behaviour

Utilising the same example of this !Xun's 16-week-old infant expanding the time range a bit, allows a more robust consideration of gymnastic behaviours to include gymnastic behaviours, persons with whom the infant had contact, breastfeeding, jiggling (gently rocking the infant), patting (lightly tapping the infant) and infant sleep based on one day of continuous observation (Takada 2005). According to this analysis, during the total observation time of 12 hours and 25 minutes (of 9 hours and 52 minutes if sleeping is omitted), the caregivers engaged the infant in gymnastic behaviour for 2 hours and 21 minutes in total. This occupied 19% of total observation time and 24% of the time that the infant was awake. On average, gymnastic behaviour was observed for approximately one minute of every five minutes (or for one minute of every four minutes if the period of sleeping is omitted). Inter-bout intervals (ie duration of the break between two adjacent gymnastic events) lasting for more than 30 minutes were observed only twice, if the period of sleeping is omitted. Hence, the caregivers engaged the infant in gymnastic behaviours constantly while the infant was awake. Gymnastic behaviours tended to be performed by all persons who had contact with the infant. Time spent in contact with the infant included the mother 62%, the father 16%, older children 6%, and other 5% of the 12 hours and

25 minutes of total observation time respectively. Gymnastic behaviours were observed with the mother 7%, the father 5%, older children 3%, and others 3% of the total observation time, respectively. Thus, the proportion of gymnastic behaviours during contact with the infant (calculated by 'Time in which gymnastic behaviours were observed' / 'Time spent in contact with the infant') tended to be in the following order: other people (60%), older children (50%), the father (31%) the mother (12%). The relatively low proportion of gymnastic behaviours by mothers may be due to the fact that mothers often respond to the infant fretful behaviours with breastfeeding. Breastfeeding was also frequently observed, though performed only by the mother. During the observation time, the mother breastfed the infant for 3 hours and 5 minutes in total. This occupied 25% of total observation time and 31% of the time that the infant was awake. If we count a nursing episode that lasted for several minutes as one event, the mother engaged in nursing 31 times, and the average inter-nursing interval was 17.0 minutes (SD 13.9) during the total observation time. Breastfeeding in the lying position and gymnastic behaviours in the standing position are usually incompatible. Therefore, they tend to distribute complementary. Since both behaviours occur frequently, it seems likely that the infant continuously receives either gymnastic behaviours or breastfeeding while awake.

In age considerations, Takada (2010) showed the percentage of gymnastic behaviours observed during the total observation period (10 hours per child) for each age group of children aged 0–4 years in !Xun (17 children in total, in the survey of all children of that age range in the study site). The results show that gymnastic behaviours were usually performed on children who are 0 years old; in other words, children who were not yet able to walk unaided. In the first year after birth, mothers engaged in gymnastic behaviour in 4% of observed time. Other caregivers also practiced gymnastic behaviour in 4% of observed time. These percentages indicate that caregivers, including mothers, engaged in gymnastic behaviour several times per hour when the children were awake. Predictably, the practice of gymnastic behaviour declined drastically when the child began to stand and walk. In children ages one and two gymnastic behaviour by mothers, as well as by other caregivers decreased to less than 1%. Caregivers had stopped engaging in gymnastic behaviour completely by the time the child reached three years old. Thus, gymnastic behaviours are clearly a critical component of child-rearing before a child is ambulatory.

Folk knowledge about gymnastic behaviours

According to Takada (2020), among the San, there is a wide variety of folk knowledge related to gymnastic behaviours. Both similarities and differences between groups can be observed in such folk knowledge. For example, the !Xun describe the act of soothing an infant – more specifically, a series of actions of lifting the infant and lightly patting the back with both hands placed under the armpits – as *!ain*. This overlaps significantly with the definition of gymnastic behaviour. In addition, most children among the !Xun are given *!ain !ua*, a ‘nursing name’ (*!ua* means ‘name’), and caregivers often call the infant by this name repeatedly during gymnastic behaviours. Examples of giving children a nursing name are also found in other San groups, such as the Ju|’hoan, †Akhoe, G|ui and G|ana, but none as commonly as the !Xun. Other concepts, such as *!ubu*, which refers to jumping in general, and *khali ma*, which refers to catching something thrown in the air with the hands, have meanings that partially overlap with gymnastic behaviour. !Xun parents say that all of these are done to ‘make infant happy’. In other words, the !Xun believe that gymnastic behaviours have the function of soothing the infants. Furthermore, they believe that this is the first step for infants to participate in peer and community dances.

On the other hand, the background knowledge of ‘training’ to promote motor development, as emphasised in Ju|’hoan, seems not to be considered in daily life, although it is confirmed in !Xun. That is to say, the folk knowledge to promote motor development appears less common among the !Xun as opposed to the Ju|’hoan. The reason why gymnastic behaviours are frequently used in !Xun, which has become used to living a more sedentary lifestyle, is that it is often used as a form of soothing or amusement in everyday situations, and people are aware of this function as part of their background knowledge. At the time of the study by Lee, Konnor and others, the Dobe area Ju|’hoan had been living as nomadic hunter-gatherers with relatively less negotiation with other groups (Lee 1965). In contrast, the !Xun in north-central Namibia have a much longer history of settlement and contact with neighbouring agro-pastoralists. This suggests that it is not so much the gymnastic behaviour itself that is strongly associated with hunter-gatherer activity and a nomadic lifestyle, but rather its signification as ‘training’ to promote motor development. In other words, the emphasis on training in relation to a nomadic lifestyle based on hunting and gathering may have gradually faded in the process of settlement and contact with agro-pastoralists, and it has been replaced by an emphasis on gymnastic behaviour as a form of soothing and amusement.

Other nearby hunter-gatherer groups demonstrate a similar linguistic connection between gymnastic behaviours and naming. The G|ui and the G|lana, two closely related groups of San living in Botswana, also have the concept of *sáó qχ'ám*, which can be translated as 'way of soothing/amusing' (*sáó* means to soothe, and *qχ'ám* is a derivation of the meaning of 'mouth' and means 'way'). *Sáó qχ'ám* typically refers to a nickname given to a young child. However, the practice of calling infants by *sáó qχ'ám* is not as common as in !Xun's *!ain !ua*. Furthermore, the association between *sáó qχ'ám* and gymnastic behaviour is not as strong (Takada 2004).

A concept that is more closely associated with gymnastic behaviour is that of *tsàndō*. This refers to having the infant stand or do light up-and-down movements while imitating walking or supported walking. The G|ui/G|lana believe that *tsàndō* helps children walk faster and dance better. According to the local people, *tsàndō* has been practiced since ancient times. The G|ui/G|lana also use the onomatopoeic sounds of the red hartebeest (*Alcelaphus caama caama*) and gemsbok (*Oryx gazella*) calves as *mē mē* and *ǃ ù ǃ ù*, respectively. These calves appear to be walking and hopping. In the G|ui/G|lana, these may be voiced while the infant performs gymnastic behaviours. Furthermore, like the Ju|'hoan when they lived a sedentary life (Konner 1976), the G|ui/G|lana, who until recently lived a sedentary life, have been observed to actively teach infants to sit, stand and walk.

The analysis in this section suggests both similarities and differences among Ju|'hoan, !Xun and G|ui/G|lana in their belief systems about gymnastic behaviours. Interpretations of gymnastic behaviour with infants vary in relation to the nomadic or sedentary lifestyle of the society. The connotations as 'training' that G|ui/G|lana ascribe to gymnastic behaviours are more similar to Ju|'hoan than to !Xun, even though linguistic typologically !Xun language is more similar to Ju|'hoan language. Moreover, such differences in emphasis are also reflected in the slight differences in gymnastic behaviour patterns (eg frequency and manner of vocalisation, rhythmic patting and degree of smile occurrence) between !Xun and G|ui/G|lana (Takada 2020).

The Ju|'hoan, G|ui, and G|lana lived a nomadic lifestyle based on hunting and gathering until relatively recently. The !Xun have a much longer history of settlement and contact with agro-pastoralists. Thus, there appears the strong association with hunter-gatherer activity and mobile life is more a signification of gymnastic behaviour as training to promote motor development than the gymnastic behaviour itself. However, the differences in the San groups' conceptualisations of gymnastic behaviours should be viewed as differences in the elaboration and weighting of multiple interpretations rather than as

different interpretations by each group. The origin of such differences can then be examined by defining the cross-cultural variations in belief systems and by examining the processes of lexical expansion and semantic change.

Evolution of gymnastic behaviours

Finally, let us consider the significance of gymnastic behaviours in the phylogenetic development of humans, ie our evolution as a species. In non-human mammals, caregivers (even mothers) rarely, if not never, engage in activities to educate their infants, such as walking training. On the other hand, play in physical interaction with children has been observed in a wide range of non-human mammalian species. Gymnastic behaviours have a function of ‘amusing’ as a type of play, as well as ‘soothing’ and ‘training’. Gymnastic behaviours thus may have originated in ‘play’ between mothers or other caregivers and infants, which may have contributed to the flourishing of their communities by also accomplishing the functions of soothing and training. At the same time, people have generated different beliefs related to these functions, and people from different communities often emphasise variation in beliefs and explanations of their practices. These different emphases are often reflected in slight differences in gymnastic behaviour patterns. Thus, there is some validity in assuming that the patterns of gymnastic behaviour that have arisen during the far-reaching evolution of species are now co-evolving with belief systems that have shaped the history of each community over a considerable, albeit much shorter, period of time. According to Bogin et al (2016:61), ‘this extreme human capacity for facultative adjustment in the social structuring of resource flows, shaped by both local ecological realities and cultural norms, is integral to what we see as unique about the inherently biocultural nature of the human breeding system’. Socioculturally constructed belief systems and their associated systems of conventions and practices interact with the behavioural systems of humans (Tomasello 1999) as a ‘hyper-social’ animal species, accumulating their changes.

Implications for archaeology: centripetal and centrifugal force in parenting

Gymnastic behaviours, like breastfeeding, are characterised by intimate responsiveness. However, in the Ju’hoan, !Xun, G|ui/Glana, and other San groups, breastfeeding is performed exclusively by the mother, whereas gymnastic behaviours are performed by various caregivers, including the mother. The

gymnastic behaviours also sooth the fretful infant and elicit the infant's stepping reflex, which is considered one of the primitive reflexes. In this way, gymnastic behaviours provide an opportunity for caregivers and infants to experience synchronisation and musicality of behaviour, which can be a source of a sense of belonging and togetherness. In addition, it has been shown that frequent gymnastic behaviours over a long period of time continue to elicit stepping behaviours in infants, leading to early achievement of unaided walking. Gymnastic behaviours not only have a significant impact on infants' physical organisation and sensorimotor development but also contribute significantly to the development of infant attachment to their mothers and other surrounding caregivers. In other words, gymnastic behaviours situate infants within a network of relationships with those around them long before they begin to use cognitive tools such as language to understand and engage in social situations.

In this respect, Negayama, who has promoted the developmental ethology of various primates including humans, believes that affinity and repulsion exist in all relationships between individuals, not limited to mother–child relationships, and calls the tendency for individuals to attract each other the 'centripetal' force, and the tendency for individuals to move away from each other the 'centrifugal' force. Using these concepts, he criticises attachment theory for idealising an unbalanced mother–child relationship in which only affinity is emphasised (Negayama 2021). There are situations and periods in the mother–child relationship in which centrifugal force is strengthened. This provides an opportunity for the child to form centripetal force with caregivers other than the mother, thereby reducing the burden of parenting on the mother. The gymnastic behaviours by non-mothers among San groups, described above, make a significant contribution to the formation and maintenance of a social network beyond the mother–child relationship by taking advantage of such opportunities from early infancy.

Hrdy has been influential in a wide range of research fields in addition to primatology and anthropology, and argues that human ancestors evolved in a system in which parents and surrounding individuals were invested in the nurture and care of their children and in which 'emotionally modern' infants were preadapted to such a coordinated social arrangement (Hrdy 2016). This argument suggests that our ancestors may have flexibly altered their attachment relationships in response to the resources available in their environment and the relationships among the members of their population. As Meehan et al note, human 'mother–child dyad is not isolated, but rather is steeped in and affected at both the physical and psychological levels by the broader social world' (Meehan et al 2016:199). Thus, it is not only children who owe much to

the cooperation of others. The primary caregiver, beginning with the mother, also needs the concern of those around her to care for and support her and her child (Meehan & Crittenden 2016).

Therefore, in examinations of hunter-gatherer societies for insights into the ‘original parenting of humans’, the following should be our starting point. Hunter-gatherer societies are more directly supported by the natural environment than other societies. Therefore, they can and need to change their forms flexibly in response to changes in the natural environment. Such flexibility and plasticity characterise child-rearing and interpersonal relationships that support it in hunter-gatherer societies and may underlie them in other societies – including those that have been the subject of archaeological investigations – as well. Imagining the flexibility and plasticity of human livelihoods is the key to a deeper understanding of human nature.

References

- Ainsworth, MDS, Blehar, MC, Waters, E & Wall, S 1978. *Patterns of attachment: a psychological study of the strange situation*. Mahwah, NJ: Lawrence Erlbaum.
- Bogin, B, Bragg, J & Kuzawa, C 2016. Childhood, biocultural reproduction, and human lifetime reproductive effort. In Meehan, CL & Crittenden, AN (eds) *Childhood: origins, evolution, and implications*. Albuquerque: University of New Mexico Press:45–72.
- Bowlby, J 1969. *Attachment and loss. Vol 1: attachment*. London: Hogarth.
- Cekaite, A 2015. The coordination of talk and touch in adults’ directives to children: touch and social control. *Research on Language and Social Interaction* 48(2):152–175.
- Cekaite, A & Bergnehr, D 2018. Affectionate touch and care: embodied intimacy, compassion and control in early childhood education. *European Early Childhood Education Research Journal* 6:940–955.
- Cekaite, A, and Holm Kvist, M 2017. The comforting touch: tactile intimacy and talk in managing children’s distress. *Research on Language and Social Interaction* 50(2):109–127.
- Croce, B 2011[1911]. *Philosophy of Vico*. Tokyo: Miraisha. (Originally published in Italian in 1911; Japanese translation by T Uemura.)
- Descola, P 2014[2005]. *Beyond nature and culture*. Chicago: University of Chicago Press. (Originally published in French in 2005; translated by J Lloyd; foreword by M Sahlins.)
- Draper, P 1976. Social and economic constraints on child life among the !Kung. In Lee, RB & DeVore, I (eds) *Kalahari hunter-gatherers: studies of the !Kung San and their neighbors*. Cambridge, MA: Harvard University Press:199–217.
- Fritsch, G 1880. Die Afrikanischen Buschmänner als Urrasse. *Zeitschrift für Ethnologie* 12:289–300.

- Goodwin, MH & Cekaite, A 2013. Calibration in directive/response sequences in family interaction. *Journal of Pragmatics* 46:122–138.
- Hewlett, BS 1991a. Demography and childcare in preindustrial societies. *Journal of Anthropological Research* 47(1):1–37.
- Hewlett, BS 1991b. *Intimate fathers: the nature and context of Aka Pygmy paternal infant care*. Ann Arbor: University of Michigan Press.
- Hewlett, BS & Lamb, ME (eds) 2005. *Culture, ecology and psychology of hunter-gatherer children*. New Brunswick, NJ: Transaction Publishers.
- Hrdy, SB 2016. Development plus social selection in the emergence of ‘emotionally modern’ humans. In Meehan, CL & Crittenden, AN (eds) *Childhood: origins, evolution, and implications*. Albuquerque: University of New Mexico Press:11–44.
- Ingold, T 2000. *The perception of the environment: essays on livelihood, dwelling and skill*. London: Routledge.
- Konner, MJ 1973. Newborn walking: additional data. *Science* 179(4070):307.
- Konner, MJ 1976. Maternal care, infant behavior and development among the !Kung. In Lee, RB & DeVore, I (eds) *Kalahari hunter-gatherers: studies of the !Kung San and their neighbors*. Cambridge, MA: Harvard University Press:218–245.
- Konner, MJ 2016. Hunter-gatherer infancy and childhood in the context of human evolution. In Meehan, CL & Crittenden, AN (eds) *Childhood: origins, evolution, and implications*. Albuquerque: University of New Mexico Press:123–154.
- Lee, RB 1979. *The !Kung San: men, women, and work in a foraging society*. Cambridge: Cambridge University Press.
- Lee, RB & DeVore, I (eds) 1968. *Man the hunter*. Los Angeles: Alfred Publishing Company.
- Lévi-Strauss, C 1969[1962]. Rousseau, the founder of anthropology. In Yamaguchi, M (ed) *Savage and civilization*. Tokyo: Heibonsha:58–60. (Originally published in French in 1962; Japanese translation.)
- Linnæus, C 1735. *Systema naturæ, sive regna tria naturæ systematice proposita per classes, ordines, genera, & species*. Lugduni Batavorum: Haak.
- Linnæus, C 1758. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I*. Editio decima, reformata, 10th ed. Holmiæ: Salvius.
- Linnæus, C 1759. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus II*. Editio decima, reformata, 10th ed. Holmiæ: Salvius.
- Linné, C 1766. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I*. Editio duodecima, reformata, 12th ed. Holmiæ: Salvius.
- Linné, CV 1975[1732]. *Lapplands resa ar 1732*. Stockholm: Wahlström & Widstrand. (Originally published in Latin in 1732.)
- Linné, CV 2009[1737]. *Flora Lapponica, exhibens plantas per Lapponiam*. Whitefish, MT: Kessinger. (Originally published in Latin in 1737.)
- Meehan, CL & Crittenden, AN (eds) 2016. *Childhood: origins, evolution, and implications*. Albuquerque: University of New Mexico Press.

- Meehan, CL, Helfrechr, C, & Malcom, CD 2016. Implications of lengthy development and maternal life history: allomaternal investment, peer relationships, and social networks. In Meehan, CL & Crittenden, AN (eds) *Childhood: origins, evolution, and implications*. Albuquerque: University of New Mexico Press:199–220.
- Meehan, CL & Hawks, S 2013. Cooperative breeding and attachment among the Aka foragers. In Quinn, N & Mageo, J (eds) *Attachment reconsidered: cultural perspectives on a Western theory*. New York: Palgrave:85–114.
- Mesman, J, Van Ijzendoorn, MH & Sagi-Schwartz, A 2016. Cross-cultural patterns of attachment: universal and contextual dimensions. In Cassidy, J & Shaver, PR (eds) *Handbook of attachment: theory, research, and clinical applications*. 3rd ed. New York: Guilford:852–877.
- Morelli, GA, & Tronick, EZ 1992. Efe fathers: one among many? A comparison of forager children's involvement with fathers and other males. *Social Development* 1(1):36–54.
- Morelli, GA, Chaudhary, N, Gottlieb, A, Keller, H, Murray, M, Quinn, N, Rosabal-Coto, M, Scheidecker, G, Takada, A & Vicedo, M 2017. Taking culture seriously: a pluralistic approach to attachment. In Keller, H & Bard, KA (eds) *The cultural nature of attachment: contextualizing relationships and development*. Cambridge, MA: MIT Press:139–169.
- Negayama, K 2021. *Beyond the trappedness of 'parenting': developmental ethological theory of 'moderate parents and children'*. Tokyo: Shinyosha. (in Japanese)
- Pratt, ML 2008. *Imperial eye: travel writing and transculturation*. 2nd ed. London: Routledge.
- Rousseau, J-J 2007[1762]. *Émile, ou, De l'éducation*, vols 1 to 3, new ed. Tokyo: Iwanamibunko. (Originally published in French in 1762; Japanese translation by K Konno.)
- Rousseau, J-J 2016[1755]. *Discours sur l'origine et les fondements de l'inégalité parmi les hommes*. Tokyo: Iwanamibunko. (Originally published in French in 1755; Japanese translation by K Honda and N Hiraoka.)
- Rousseau, J-J 2016[1777]. *Les rêveries du promeneur solitaire*. Tokyo: Shinchosha. (Originally published in French in 1777; Japanese translation by M Aoyagi.)
- Takada, A 2004. Nomadic lifestyle and childrearing: analysis of gymnastic behavior among the Central Kalahari San. In Tanaka, J, Sato, S, Sugawara, J & Ohta, I (eds) *Nomads: living in African wilderness*. Kyoto: Showado:228–248. (in Japanese)
- Takada, A 2005. Mother–infant interactions among the !Xun: analysis of gymnastic and breastfeeding behaviors. In Hewlett, BS & Lamb, ME (eds) *Hunter-gatherer childhoods: evolutionary, developmental, and cultural perspectives*. New Brunswick, NJ: Transaction Publishers:289–308.
- Takada, A 2010. Changes in developmental trends of caregiver-child interactions among the San: evidence from the !Xun of northern Namibia. *African Study Monographs Supplementary Issue* 40:155–177.
- Takada, A 2012. Pre-verbal infant-caregiver interaction. In Duranti, A, Ochs, E & Schieffelin, BB (eds) *The handbook of language socialization*. Oxford: Blackwell:56–80.

- Takada, A 2020. *The ecology of playful childhood: caregiver-child interactions among the San of southern Africa*. Cham: Palgrave Macmillan.
- Takada, A 2021. Pragmatic reframing from distress to playfulness: !Xun caregiver responses to infant crying. *Journal of Pragmatics* 181:180–195.
- Takada, A forthcoming. *Natural history of parenting: perspectives from hunter-gatherer societies*. Kyoto: Minerva Shobo. (in Japanese)
- Tanaka, J 1980. *The San hunter-gatherers of the Kalahari: a study in ecological anthropology*. Tokyo: University of Tokyo Press.
- Tomasello, M 1999. *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.
- Tronick, EZ, Morelli, GA & Ivey, PK 1992. The Efe forager infant and toddler's pattern of social relationships: multiple and simultaneous. *Developmental Psychology* 28(4):568–577.
- Zelazo, PR 1983. The development of walking: new findings and old assumptions. *Journal of Motor Behavior* 15:99–137.