

Middle Childhood among Aka Forest Foragers of the Central African Republic: A Comparative Perspective

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Abstract

In this paper I present time allocation data from Aka children aged four through twelve and compare it to similar data from Whiting and Edward's classic Six Cultures study of agricultural populations. I then discuss the Aka in relation to data from the !Kung and Hadza and show that the combined forager data support what I call the Forager Middle Childhood Model, which consists of a majority of time spent in play and idleness, a lack of gender and age segregation with age, some participation in subsistence and other work but mostly independent of adults until the end of middle childhood at which time children join adults in communal labor, and few sex differences in activities. Cross-cultural variation in the development of a gendered-division of labor during middle childhood is discussed in light of the proposed model and the variation in time allocation between forager and non-forager children.

Keywords: forager middle childhood, anthropology of childhood, gender-role development, division of labor

Introduction

Currently, much of the published quantitative data on middle childhood are from agricultural, industrial or post-industrial communities, addressing gender role socialization and cultural and economic factors determining children's labor contributions. The assignment of responsibilities (Rogoff, Sellers, Pirrotta, Fox, & White, 1975) and the acquisition of gender roles (Kohlberg, 1966) are recognized as important aspects of development during this period. These socio-cultural changes coincide with aspects of cognitive development (Chandler & Lalonde, 1996; Siegler, 1996; Tomasello, Kruger, & Ratner, 1993) and clearly have importance in terms of the division of labor that will frame the child's activities and social relationships from adolescence onward.

The Six Cultures project (Whiting, 1963; Whiting & Edwards, 1973; Whiting & Edwards, 1988; Whiting & Whiting, 1975), as it is known, is the formative example of cross-cultural, quantitative studies of children's socialization. The main hypothesis of the Six Cultures study was that the proportion of time children spend with different categories of individuals in their environment will "predict salient aspects of their interpersonal behavior", and that the patterns of interaction will be influenced by the "economic pursuits, the division of labor, and the organization of people in space" (Whiting & Edwards, 1988, p. 4:4). Therefore, in terms of the socialization of gender roles, female and male children should increasingly spend time with same-gendered individuals and practicing gender-specific activities as appropriate, in parallel with their increasing understanding of the norms of their culture. Any gender-based division of activities should increase in scope throughout childhood as these roles diverge and individual identities form.

The Six Cultures project, with its focus on the ecology of children's daily experiences (Bronfenbrenner, 1979) and the use of standardized observation methods

across field sites, was an advance in methods and theory in cross-cultural child development research. However, the project only included samples from traditional farming communities and rural and urban families from industrialized and post-industrialized nations. Forager cultures contrast in many ways to cultures in these other societies. Furthermore, the forager lifeway is thought to share certain key traits with that of human ancestors, making the study of forager childhood a crucial piece of the puzzle of human evolution, as well as the evolution of human cultural diversity (B. S. Hewlett & Lamb, 2005). Without an account of forager middle childhood, any claims of universal features based on cross-cultural samples are unfounded, and our view of cultural variation in gender role development and children's work is incomplete.

For example, Whiting and Edwards (1988) refer to dominance as a "generic social behavior" (273), finding that cultures in their sample differ in how much or what types of dominance are controlled but that age-graded dominance among children is always present to some degree, and sex-based dominance is common in societies with marked patriarchy. The interpretation of universality here is supported by previous accounts. For example, Fortes (1970 [1938]) remarks of the Tale, "...relative seniority determines status and rights even in children's groups and their notion of time is explicit and clear (35)." Later, he writes, "From the authority of parent over child is derived that of elder sibling over younger. It is equally absolute. A youth or girl has no hesitation in restraining or correcting a younger sibling with a cuff which often sends the latter off howling at the top of his voice." (45) Similarly, Raum (1970 [1938]) writes, "The Chaga family can thus be looked upon as having three layers of disciplinary authority. The bottom layer is formed by the children, for even among them the boys and the older girls rule the others." (94). Indeed, such examples are common in the literature on hierarchical societies.

However, dominance of any sort is a social behavior rarely seen among the Aka. Adult men and occasionally adolescent boys will demand children relinquish preferred seats, perhaps, or adolescents or adults may order a child to bring an object to them, but children do not make such demands of each other, or if they do they don't expect compliance and do not complain if it's not obtained. Aggression in infants is laughed off and the child's attention is redirected, an aggression management technique performed toward infants even by young children. Cultural institutions to subvert the development of aggressive or dominant behavior in forager children are reviewed by Woodburn (1982), and described in detail by Draper (1978) for the Kalahari !Kung and Turnbull (1978) for the Mbuti of Democratic Republic of the Congo. Lewis (2008) describes *ekila* as such an institution among the Aka as well.¹

In general, childhood among sedentary, stratified, food-cultivating societies lies in contrast to what is described for foragers. Sex and age-graded divisions increase with age, and children are given sometimes heavy labor responsibilities, subsistence and otherwise, at young ages. For example, Yucatec Mayan boys work an average of 9 percent the number of hours their parents work between the ages of 3 and 8, and girls

¹ Henrich and Gil-White (2001) have gone to great lengths to distinguish "dominance" from "prestige," a distinction I find realistic and useful. I am open to the possibility that the Aka confer some level of "prestige" to some group members, and I would argue the biocultural basis of prestige in this context is learned by or during middle childhood.

already about 20 percent. By age 15 boys are up to 95 percent of an adult work day and girls have surpassed their parents in hours spent working (Lee & Kramer, 2002). Agriculturalist children in Java and Nepal are both reported to contribute between about 40 and 50 percent the average work input of 15 year old males between the ages of 6 and 8 (Nag et al., 1978). Similar to the Mayan children, girls in Java and Nepal work more than boys at all ages (Nag et al., 1978). Gaskins (2000) reports that Yucatec Mayan parents emphasize the primacy of adult work and involve children in labor activities as early as they are able to perform them, discouraging play as competition with work. Her numbers on Mayan children's work are a little larger than Kramer's for kids under 12 years old (c.f. Kramer, 2002 figure 1).

Existing accounts of forager middle childhood, on the other hand, tend to describe multi-age, often multi-sex, play groups enjoying little if any subsistence or other responsibilities (Konner, 2005). Since there are so few accounts, however, there is a debate as to the generalizability of the subsistence component of this pattern, as Tanzanian Hadza children spend a good deal of time hunting and gathering (Blurton Jones, 1993; Blurton Jones, Hawkes, & Draper, 1994). The Hadza case has been argued to be evidence for a facultative component to children's activity as an adaptive response to ecological variables. Specifically, in the hilly, rocky, Tanzanian savannah where the Hadza live, there are few predators or other hazards to hinder children's movement, and there are subsistence resources nearby to camp. Whereas among the Kalahari !Kung children rarely leave camp for chance of getting lost, and are not encouraged nor inclined to follow their parents on foraging bouts until they are old enough to keep up, not until around 14 years old (Draper, 1976).

Whether or not subsistence work is a general trait of forager childhood, in both of these cases, children are reported to enjoy a good deal of autonomy, play is a central component of daily activities, and there is little segregation by sex. A similar pattern is described vividly by Turnbull (1962; Turnbull, 1978) for the Mbuti, and Hill and Hurtado (1996) briefly note similar features of middle childhood among the Ache of Paraguay as well. A qualitative and quantitative account of Aka middle childhood will better frame our view of the variation in forager middle childhood. Aka children are known from previous accounts to participate in gathering and hunting activities (Bahuchet, 1990; B. S. Hewlett, 1991), and the tropical forest environment in which they live provides Aka children a seasonal variety of food resources requiring minimal to advanced skills to acquire. I am not prepared for an ecological analysis in this paper, but it would be informative. For the moment, I will emphasize that the core Aka values of egalitarianism and respect for autonomy afford children freedom in their choice of activities and social companions, and thus a quantitative account of their behavior will provide a window into how forager children actively navigate their development during this period.

Egalitarianism and autonomy are widely acknowledged to be common among forager cultures worldwide (Bird-David, 1990; Gardner, 1991; Woodburn, 1982).

Below, I present the time budgets of Aka children aged 4 to 12 years old, age trends in their work and play activities, and the age and sex composition of their social companions. I then compare aspects of the Aka children's data with data from Whiting and Edwards' (1988) cross-cultural data on traditional farming and urban populations. Building from this comparison and the available data on Hadza and !Kung children, I

propose a general model of forager middle childhood which I hope will serve as a guide to future research.

The Aka

The Aka are subsistence hunter-gatherers living in the forests of southwestern Central African Republic and northern Republic of the Congo (Bahuchet, 1985; B. S. Hewlett, 1991; Lewis, 2002). The Aka subsist on gathered foods and game from hunting, as well as agricultural produce (primarily manioc but also corn, plantains, squash, and some others) procured through trade with neighboring farmers (Bahuchet, Guillaume, & Wyck, 1982). Communal net hunting is the most common hunting type during the drier season, and crossbow, spear, and shotgun hunting are used throughout the year as well.

The Aka are highly investing parents. Aka fathers spend more time in direct care of their infants than any other people on record (B. S. Hewlett, 1991, 1996). Siblings, juvenile females, other adult females, and grandmothers also perform a significant amount of infant care, though this depends somewhat on post-marital residence, which is nominally virilocal after brideservice but highly flexible (Meehan, 2005). Associated with high paternal investment in infants, there is also a high degree of close interaction between wife and husband across many domains of Aka life (B. L. Hewlett & Hewlett, 2008; B. S. Hewlett, 1992a).

The Aka are relatively gender-egalitarian, and the division between men's and women's tasks and roles in the social fabric are relatively malleable (B. S. Hewlett, 1991; Noss & Hewlett, 2001). It is common for an Aka married couple to go hunting together (B. S. Hewlett, 1992a) and there are accounts of women spear-hunting together in the absence of men (Noss & Hewlett, 2001). Aka cooperative net-hunting includes men, women, carried infants and children from as young as five years old (Bahuchet, 1990; Noss & Hewlett, 2001).

As noted above, respect for autonomy is a prominent aspect of Aka social relations. This value is reflected in Aka childrearing. Aka children are rarely rebuked by adults or other children, and corporal punishment is very rare and never severe (B. S. Hewlett, 1991, 1992b). Hewlett (1992) mentions that Aka parents would prefer their children listen to them, and Aka children told me that mothers use threats of violence or withholding food when they refuse to care for an infant. However, Hewlett's impression is that a lack of sibling caretaking among the Aka can be attributed to their respect for autonomy (B. S. Hewlett, 1992a, 1992b), and I never saw a mother administer punishment. I was also never aware of a refusal by a child to care for an infant and it was not uncommon to see children, typically girls but not always, seek out infants simply to interact with them without adult request. Further systematic, observational research is necessary to clarify these issues, though the value of autonomy to the Aka is indisputably clear.

There is a general sense among the Aka that children will eventually learn all they need to know through their own means, and little direct education is necessary. While skills are reported as learned from specific others (B. S. Hewlett & Cavalli-Sforza, 1986), the teaching, from an observational perspective, seems to consist of allowing children to freely observe and practice activities at their whim, though restricting certain activities, such as participating in hunting, until the children are developmentally ready. I witnessed very little direct instruction during my fieldwork, though Hewlett and Cavalli-

Sforza (1986) found that most Aka surveyed reported having learned the majority of skills by age ten.

A common in-camp play activities of Aka kids from as young as 2 years old is chopping or digging with a machete, axe, or knife. Children see adults using these tools everyday for a variety of tasks and, being one of the few material goods in camp, they are naturally attractive objects. Girls and boys will quite contentedly chop at saplings or stumps around camp for great lengths of time, or dig in the earth until they can bury their feet. Further study is needed to establish how much this activity contributes to skill-building, but by the time they are 10 years old Aka children are adept at cutting house or swing materials and digging for forest yams. Indeed, house construction and the liana swing figure prominently in children's play during middle childhood, and are important features of child culture during adolescence. It is the adolescent boys who usually climb the tree to tie up the liana swing, the *ezambi*, and adolescent girls must make their own small traditional dome hut while adolescent boys make a four-wall group house for themselves when the time comes.

Data and Methods

I collected focal follow data (Altmann, 1974) from 36 Aka children aged four to eighteen. Here I report results of analyses of primarily the 4-12 age range (Table 1). The children represent 15 different camps. The camps were situated along five distinct, clan-based trails that flow south from the village of Bangandu. I hoped that spreading the observations across the trails would allow me to better capture the "typical" Aka childhood, and get a better sense of the variation within Aka culture in this area. Using focal follows also permitted me to record with great detail a child's activities across a whole day, though at the cost of not being able to collect multiple child samples per day as one can achieve using scan sampling.

The content and the context of each child's activities were noted every minute for about six hours a day, one day per child, breaking for fifteen minutes each hour. The data reported here are weighted by the precise number of minutes each child was observed, as extraneous factors occasionally impaired consistency. A mean of 268.5 one-minute observation periods per child were recorded. I summed the individual column frequency scores for each variable and divided by the total number of minutes per child to obtain "percent of observation time" scores for each variable. Where applicable, coding of specific variables is described in the analysis below.

The Aka acknowledge two "stages" of development corresponding to our notion of "middle-childhood": *mona* (~weaning-7) and *mona bokala* and *mona ngondo* (males and females ~8-12, respectively). The term *mona* is used more generally for "child" and as a verb for "become smaller," as in "*Mona ophe, malo*" or "Make yourself small, there is a thorny vine" (something I was told frequently during net hunts in dense forest). A *bokala* is an unmarried adolescent male and an *ngondo* is an unmarried adolescent female. Thus, linguistically, the Aka also identify middle childhood as a stage between early childhood and adolescence. The data were coded by the Aka emic age categories and also by my best guess at each child's age in years. Each system is used where appropriate to show developmental trends throughout middle childhood. Where not otherwise specified the age range reported is from 4 to 12 years old.

In comparing my data with the data from Whiting and Edwards (1988), I follow the age ranges used in their analyses to facilitate direct comparisons. I will refer the reader to their manuscript for specific details of their samples. Briefly, the data used here come from two sets of cross-cultural samples using a variety of spot observation methods, referred to here as the “Six Cultures” and the additional “Spot Observations” samples consistent with Whiting and Edwards (1988). Together these include as few as 11 children from Santa Barbara, Peru to as many as 104 children from Beatrice Whiting’s own work in the village of Ngeca, Kenya. The original six samples include a mean of 90 minutes of observation per child. Thus, my sample has only as many children as some of the smaller samples in their collection but three times the number of minutes of observation per child. Each population is from at least a subsistence agriculture level society, and many have integrated commerce into their livelihood to various degrees. Two populations from the US are also represented, one rural and one urban.

Results

Adult Presence in Aka Middle Childhood

In an Aka camp, there is nearly always at least one adult present, though this is not dependent upon there being children to look after, nor, when there are few adults around, will they necessarily be a child’s parent. In my sample, children were in visual range² of one or both of their parents with no other adults present a mean of only 1.8 percent of observation time, whereas there were other adults in visual range, in addition to or excluding the focal child’s parents, a mean of 76.7 percent of observation time (Table 2).

Children regularly accompany their parents (usually mothers) on foraging trips, but it is also common for kids as young as 5 to forage or wander and play along the trails, in the forest, or in camp with all-child groups. Children in my sample were out of visual range of an adult a mean of 19.6 percent of the time³. This data is summarized and broken up by sex in Table 2. There were no statistically significant sex differences in these values according to a Mann-Whitney non-parametric test.

Given the open layout of Aka camps and the genetic and social closeness of camp members, it is not surprising that children are so often within site of an adult. More significant, however, is the gender division apparent in which adults are more likely to be

² “Visual range” was the basic coding scheme I used for this variable, but there were instances where I had to make a judgment call as to the relevant aspects of the spatial relationship between the adults present and the focal child that did not strictly follow this rubric. For example, if a child were alone in a hut, clearly out of visual range, the code would consistently be “No Adult.” However, if a child was working out of visual range directly behind a lean-to style hut, and her parent and another adult was just on the other side, I would have coded this as “Other Adults.” In the first instance, the adults present would not necessarily have been aware of the child’s activities, whereas in the second, they would know the location and the activities of the child, even if she were not visible.

³ Aka children do not have their own specific play area like the Mbuti children’s *bopi* described by Turnbull (1962), though Aka kids will often congregate near the *ezambi*, a forest liana hung up as a swing. The *ezambi* is usually in or close to camp.

nearby. Nearest neighbor data was coded so as to record the age-sex category of all individuals who were equally proximate to the focal child. As seen in Table 3, focal children's nearest neighbors included an adult female 25.2 percent of observation time and an adult male 6.7 percent of observation time. Adults of both sexes at the same time were included among children's nearest neighbors in only 1.2 percent of observations.

Age trends in children's time spent nearest to adults of each sex can be seen in Figure 1. While both sexes spend relatively little time with adult males, as seen in Table 3, boys show a slight upward trend in time spent with men, while girls spend less time with them with age. Conversely, there is a much stronger trend visible for time spent with adult females, girls increasing their time in close proximity to women and boys reducing it. However, linear regression models of age on time spent near adult females and on time spent near adult males, controlling for sex in both cases, show neither of these trends to be statistically significant.

Considering that Aka men spend about 67 percent of daylight hours at work in the forest (based on Hewlett, 1991, Table 25, p.88, forest column), I examined further details of the relationship between time with adults versus children and time spent in the foraging workplace—the forest. Figure 2 shows age trends in time spent nearest adults and children both in camp and in the forest. What can be seen is a general increase in time spent in the forest with both adults and children, concomitant to a decrease in time spent with either group in camp with age. Notably, the trend in time spent with adults in the forest is statistically significant, independent of sex of the child *and* time spent near either adult males or adult females (Beta for age=.480, $p=.02$, model $r\text{-square}=.23$). Additionally, time spent with adults in camp is also negatively correlated with age, but the relationship is entirely dependent on the *positive* correlation with time spent near adult females (Beta for age=-.342, $p=.01$, Beta for proximity to women=.844, $p<.001$, model $r\text{-square}=.709$). Sex and time spent with adult males were not significant predictors in the model and were removed. Thus, the age trend in time spent nearest adults in camp is driven by the large amount of time spent in camp near adult females earlier in middle childhood (e.g. Figure 1, especially boys).

Children's Presence in Aka Middle Childhood

Table 3 also shows the percent of observations in which children were nearest other children of each sex. Aka girls spent a mean of 36.8 percent of their time with a same-sex child as one of their nearest neighbors, and boys spent about 45.4 percent of the time nearest to at least one other boy. Children were observed in mixed-sex groups a mean of 15.2 percent of the time. Mann-Whitney tests show no significant sex differences time spent nearest the same or opposite sex, or in mixed sex groups. As can be seen in Figure 3, with age both girls and boys tend to spend a little more time in closest proximity to girls, and girls show a drop in time spent nearest to boys. Girls also show a minor increase in time spent in mixed-sex groups with age. Linear regression models show there are no significant correlations between a child's age and their time spent near either male or female children, or in mixed-sex groups, controlling for sex of the child.

Table 3 also shows that Aka children spent on average about 10.8 percent of their time in closest proximity to other children of only the same age category (4-7 or 8-12 years old). This is in contrast to time spent in mixed-age groups, groups including at

least one child of another age category than that of the focal child (4-7, 8-12, or 13-18), in which children spent a mean of 47.5 percent of their time. There are no sex differences in these values according to a Mann-Whitney test.

Figure 3 suggests some decrease in time spent nearest only same-age children for both sexes, though these trends are not found to be statistically significant when modeled using linear regression and controlling for sex. However, there is a positive age trend in time spent in *mixed-age* groups that approaches conventional significant levels, independent of the sex of the child (Beta for age=.391, $p<.059$, $r\text{-square}=.153$).

Work and Play in Aka Middle Childhood

Everyday work for the Aka is divided up into a number of different categories including varieties of hunting, gathering, food preparation, materials manufacture and maintenance, wage work for villagers, and child care. The nature of work on any day depends on the season, location of camp, weather, and individual preferences. For children, access to any work that is available mostly seems to depend on the child's skill level and desire.

Table 4 shows the time budget for the sample divided by sex. As can be seen, for both girls and boys play and idleness took up a majority of their time. The only significant differences between the sexes were in childcare, which girls performed significantly more often ($p<.05$ by Mann-Whitney test), and in non-routine activities, which boys engaged in more often than girls ($p<.01$).

Figure 4 displays overall age trends in work versus play. In this figure "work" represents all of the work activities in Table 4 except childcare. There are clear increases in time spent in work and decreases in play with age. When amount of time spent in work by age is modeling using linear regression, we find there is a positive correlation independent of sex (Beta for age=.418, $p=.047$, Beta for sex=.019, $p=.924$, model $r\text{-square}=.174$). Amount of time spent in childcare was also positively correlated with age, but in this case sex was a significant independent predictor as well, correlating negatively with time spent in childcare, indicating that girls were more likely than boys to take care of infants and toddlers and this increased with age (Beta for age=.553, $p=.001$; Beta for sex=-.486, $p=.003$; model $r\text{-square}=.551$)⁴. The negative trend for play was also highly significant independent of sex (Beta for age=-.535, $p=.008$, Beta for sex=-.152, $p=.412$, model $r\text{-square}=.306$).

To examine the independence of Aka children's foraging and work activities, I coded work according to two different context variables: *adult-dependent work* is any work activity performed at the request of an adult, or participation in a work activity alongside one or more adults, independent of adult request. *Adult-independent work* includes any work activity initiated by the focal or another child (unmarried individual younger than 18) in which only children participated. I also coded for all play activities which involved the use of skills, objects, or activities typical to foraging, hunting, or camp work tasks that would not produce any caloric returns or useful work as *play work*, or *emulation of work in play* (e.g. building a play house, collecting inedible objects to "cook", pounding dirt as manioc flour, chopping at stumps with a machete). A summary of work behavior broken up by these categories is shown in Table 5.

⁴ Girls were coded as sex=0, boys as sex=1.

As can be seen, Aka children performed twice as much work *independent* of adults than adult-dependent work, excluding childcare and work for villagers (which a child would never do without adult involvement). They also spent more time emulating work in play than performing adult-dependent work. There were no sex differences in these measures according to Mann-Whitney tests.

To examine how age affects these three variables and the transition to participation in adult work, I plotted them across the entire sample through adolescence in Figure 5. What we see possibly illustrates a transition across middle childhood from child-only work, peaking at about 8 years old, to work alongside or at the request of adults and adolescents, increasing steadily at age 12. As would be expected based on the previous linear regression analysis of work on age, the trend in adult-dependent work is significant and linearly correlated with age independent of sex *and* time spent within adult visual range (Beta=.413, p=.045, r-square=.171). When modeled as a linear trend, age is not correlated with adult-independent work, however, when modeled as a quadratic trend by including age-squared as a co-variate with age we find a greatly improved model fit, though still not quite reaching conventional significance levels (see Table 6 for model results).

Children of Different Worlds Revisited

In this final set of analyses I present Aka time allocation data in the context of Whiting and Edwards' (1988) classic cross-cultural study on childhood socialization. As their goals were to identify the universals and cultural variations in settings for the development for gender roles, I have replicated their tables in order to show where the developmental contexts of Aka forager children vary and where they might be similar to those of the agricultural and urban populations in their samples.

If the sex of nearest neighbor adults is an indication of the magnitude of influence during development, the Aka children seem to be fairly typical, spending about as much time near female adults as 4 of the 6 other cultures in the "Spot Observations" samples. (Table 7). When their nearest neighbor is an adult she is a female about 80 percent of the time for both Aka girls and boys. The Aka have the smallest sex difference out of all the communities in this measure, but are most distinct from the Peruvians and urban Americans, whose boys spend a more equal proportion of their time near men and women when nearest an adult. The American 4-7 year old boys stand out by the relatively smaller proportion of time they spent with adult females.

As can be seen in Table 8, patterned variation in time spent in same-sex groups across the cultures is hard to discern. In general Aka children spend a smaller proportion of time within same-sex groups between 5 and 7 years old, whether or not adults are present when compared to the "Spot Observations" sample (bottom in the figure). With no sex difference, the Aka children are most similar to children from Conacoste/Santo Domingo who have only a relatively low 2 percent difference between girls and boys in time spent in same-sex groups without adults, but the Aka girls and boys still spent less than half the proportion of time in such groups. In magnitude, the Aka data for same-sex groups is most similar to Vihiga, a Logoli farming community in Kenya, where boys actually spent less time in male-only groups than did Aka boys (5 percent versus 7 for the Aka), and girls spent only 10 percent of the time in all-girl groups versus 7 percent for Aka girls.

Differences between the Aka and the age-graded “Six Cultures” sample (top in the figure) are less clear. Aka 4-5 year olds in my sample are closest in magnitude to the Nyansongo children of Kenya, though become more similar to the children from Taira village, Okinawa from 6-10 years old. In the both cases the Aka girls spend less time than the Aka boys or either sex from Nyansongo or Taira nearest same-sex companions.

Table 9 replicates Whiting and Edwards data on time spent in “chores” in the two sample sets. It is unclear in their description in the text how much of this activity is on adult command, or how much of it involves, for example, the collection of wild goods, casual hunting, or direct garden (subsistence) labor. In the text, they emphasize the role of adults, especially women, in assigning children tasks. If “chores” are viewed as tasks assigned to children or performed alongside adults then the Aka are much like the children of Taira village at ages 4-5, still asked to do some work at this young age, but are more like the American children of Orchard Town at 6-10 and Claremont at 5-7, who do relatively little work at the request of adults.

I include in parentheses in Table 6 the values for Adult-independent work, described above. While perhaps more for fun than the term “chores” might connote, these “child hunting and gathering” activities provide essential practice for work they will perform starting in adolescence and often do add to their own or camp subsistence. Much like descriptions of Hadza children’s foraging, there are many forest products Aka children can acquire independently of adults, which they often cook and share amongst themselves. When this data is examined in comparison with the other samples, the Aka are more similar to the children from Taira or Khalapur, India at older ages but have a minor bias towards boys at all ages, the opposite trend from most of the other cultures.

Lastly, Table 10 shows the relative percent of time children 5-7 spent in infant and toddler care as compared to the “Spot Observations” communities. The Aka spent the least amount of time in direct care of infants, as was the impression of Hewlett (1992a; B. S. Hewlett, 1992b), and boys spent a similar proportion of time as girls. Whiting and Edwards (1988) note that girls during middle childhood act as child nurses more frequently than any other age/sex group in their samples, clearly starting early in some cultures. As seen in Figure 4, Aka girls spent a greater percent of observations in caretaking after age 7, but only reached maximum of 9 percent with a young girl of 9 years old.

Discussion

In the analyses above I have demonstrated that several prominent features relevant to the development of gender-roles and the assumption of labor responsibilities characterize middle childhood among the Aka: a) a majority of children’s day is spent within visual range of one or more adults, b) the largest proportion of the day is spent in play and idleness, c) about half of the day is spent close to children of different age groups, d) children spend about equal proportions of the day near opposite-sex as same-sex children and a little less than half that time near both simultaneously, e) there is some participation in subsistence and other work, the majority of which occurs independent of adults until the end of middle childhood at which time children join adults in communal labor in the forest, and f) there are almost no sex differences in the variables examined.

Previous accounts of forager childhoods have tended to describe a similar pattern, a set of characteristics I will refer to as the Forager Middle Childhood Model (FMC).

However, there is variation among the few other quantitative data, for example in the amount of time forager children spend in subsistence and near to adults in camp. This variation should be examined in light of the proposed FMC model, after which the model can be discussed in cross-cultural perspective, and preliminary conclusions about human middle childhood from an evolutionary perspective can be proposed.

Draper (1976) reports that throughout her time with the !Kung camp at /Du/da, children spent very little time in subsistence work or labor of any kind, rarely left the camp, and played freely in the center or near periphery of camp. The exception was occasional voluntary trips accompanying adults to collect water. According to her data, !Kung from the ages of 4 to 12 spent a mean of 4.5 percent of spot observations engaged in chores (2.5 percent for girls, 6.5 percent for boys; my calculations from tables in Draper 1976). Additionally, !Kung children were rarely away from adult supervision, even into adolescence. They were in face-to-face interaction with a group including an adult in about 70 percent of spot observations, and girls aged 4 to 12 were out of adult eye and/or ear contact an average of only 3 minutes per hour, and boys an average of 23 minutes per hour (Draper, 1976).

In contrast, Hadza children are known to be active foragers (Blurton Jones, Hawkes, & O'Connell, 1989; Marlowe, 2005). Hadza children reportedly begin play foraging by age four and can fulfill about half of their caloric needs by ten (Marlowe, 2005). Marlowe (2005) reports that Hadza children by age 8 spend as little as 15 percent of time in camp within 3 feet of adults, spending their time close to other children in playgroups instead. After age 4 they spend an increasing amount of time away from camp foraging, spending a rough average of 6 hours per day out of camp at age 12 (extrapolating from his Figure 8.1, p. 183). He notes there are minimal sex differences in these measures.

As shown above in Table 4, Aka children spend about 18 percent of their time engaged in hunting, gathering, and other work activities, what amounts to about a mean of 1 hour per day, including about 26 minutes (7.2 percent) hunting and/or gathering. This is less than the Hadza children who are already spending over 2 hours away from camp foraging by about age 4 (again, extrapolating from Marlowe 2005, Figure 8.1, p. 183), but greater than the !Kung children who do not forage at all.

In terms of the influence of adults on forager children's social development, if we look simply at what we might call "cultural modeling opportunities" the Aka are also intermediate to the !Kung and the Hadza. If Draper's account of "face-to-face" interaction with adults is analogous to my nearest neighbor data, the Aka can be seen to spend less time in direct proximity to adults, only about 25 and 7 percent of observations near adult females and males, respectively (1.2 percent of which includes both sexes simultaneously, Table 3). However, they are within visual range of adults about 5 hours per day (77 percent, Table 2), not including time at night when everyone one is in camp and likely to be very close to one another. If Hadza kids are gone from 2 to 6 hours a day, it seems likely they would have less time to observe the adults in their lives at this time.

However, in both the Hadza and the !Kung what is clear from descriptions is that parents are indulgent yet respectful of their children's autonomy, similar to what I have described both qualitatively and quantitatively among the Aka. It is argued that the differences in children's foraging behavior between the !Kung and the Hadza are

mitigated by the foraging ecology of their respective domains (Blurton Jones, Hawkes, & Draper, 1994; Hawkes, O'Connell, & Jones, 1995). While the Aka data cannot directly address the relative hazards of their forest environment, I argue that adult respect for autonomy among foragers and both adult and children's awareness of such hazards explain the variation seen among these three groups in both time spent near adults and foraging behavior.

Hadza children will receive food from others no matter how much they acquire (Marlowe, 2005), suggesting it is not required of them to forage, they simply do so, emulating in play what they see others doing and eventually turning play into true child-group foraging in the relatively tame environment surrounding Hadza camps. Similarly, among the !Kung, Draper (1976) notes that children have a great deal of freedom despite their nearly constant proximity to adults in camp. !Kung children do what they want, but foraging isn't an option for play nor practice for !Kung during middle childhood. Among the Aka, foraging or net hunting trips far from camp are necessarily in deep forest and are dangerous without the company of experienced individuals. However, children still spend some time foraging, hunting, and practicing other work skills independent of adults in or near to camp. This minimal, child-directed work occurs at the child-group's whim between bouts of play and general idleness.

Marlowe remarks of the Hadza, "By age three or four years old, children begin to spend much of their time playing and foraging with age-mates and slightly older children. It is within these playgroups *where most learning takes place*. Children continue to be with both parents and siblings throughout the night however..." (2005, 189, italics added). And Draper writes, "Though the !Kung children are closely supervised, they have considerable leeway despite their continuous physical proximity to adults. Adults are ubiquitous, but they have a nondirective attitude toward the nearby children" (1976, 206). I hold that either of these statements could be said of the Aka as well.

Konner (2005) notes the phylogenetic importance of the age-graded and non sex-segregated children's group characteristic of foragers. In an earlier paper Konner (1976) shows that "peer groups" as we think of them based on Western institutional age-grade models of childhood are a demographic impossibility for the !Kung. For this reason he argues that this was the ancestral condition for human childhood. Both Hadza and Aka children's foraging data show that !Kung childhood is not completely representative of forager childhoods as Konner argued, but the pattern of "child-primacy" and autonomy at middle-childhood remains a distinct pattern. Even if demography may explain the pattern, that does not undermine its importance in terms of the transmission of gender roles and the development of the gendered-division of labor thought to be an important component of middle childhood. According to the available data, sex and age segregation during middle childhood is not the norm for foragers.

Thus, in light of the proposed FMC model, we must consider wider cross-cultural similarities and differences. The Six Cultures project data are informative. Table 7 showed that adult women are a consistently prominent component in children's lives. Only in the American community of Claremont and Peruvian community of Santa Barbara were females the adult present nearest children aged 4-7 less than 70 percent of observations, and then only for boys. This a somewhat surprising result given the importance of fathers in Aka infancy (B. S. Hewlett, 1991), compared to other cultures (also see Morelli & Tronick, 1992 for a comparison of Efe forager and Lese farmer

paternal investment). Though, Hewlett's data does show a striking 14.5 percent rise in time spent with infants during nighttime hours, from 8.8 to 23.3 percent, and my data does not include nighttime hours. Father's may, and most likely do, spend more time near their older children at night as well. This, of course, may also be true for the communities in Whiting and Edwards' samples.

In their summary of cross-cultural trends in adult involvement, Whiting and Edwards argue that in the agricultural communities in their study and others, children are likely to work near their mother, and thus spend more time with her, because of the nature of the division of labor. Farming or herding is men's work and, thus, they are often away from home and unavailable to spend much time with their children. They do note, however, that in communities such as Khalapur, India, boys of 6 and older go to the fields with men to carry back cattle fodder, for example. The nature of animal husbandry as men's work allows boys in middle childhood an opportunity to work and learn from dad.

The analysis illustrated in Figure 2 shows that, for the Aka, children spent a much greater amount of time with adult women in camp earlier in middle childhood, but then join adults of *both sexes* in work in the forest. Thus, while Aka children spend relatively little time in proximity to adult males, because "men's work" is often camp-inclusive cooperative work in the forest (e.g. net hunts), children are incorporated in this work as they age, and spend relatively more time with adults of both sexes *in this context*.

The cross-cultural patterns in sex-segregation in children's groups during middle childhood are unclear based on the Six Cultures comparisons. If restricted to ages 5-7, the Aka clearly show less time in same-sex groups than the "Spot Observation" samples, especially when adults are present (Table 8, lower right section). However, this difference is not in evidence when compared to the "Six Cultures" samples across two age groups. Regression results of the age trends seen in Figure 3 support a lack of sex- and age-segregation during forager middle childhood, but I cannot argue for the distinctiveness of this pattern compared to agriculturist childhoods from these data. Tables 9 and 10 provide clear support for the FMC model, showing a relative lack of responsibility among foragers. There is some indication of an increase in work responsibilities for girls with age, consistent with previous cross-cultural evidence, though regression results show this is only a statistically significant trend for childcare.

Thus, the Aka verify the cross-cultural pattern of girls caring for younger children more often than boys, and the peak during middle childhood. I should note, however, that in my full dataset, one of the individuals who spent the most time in childcare was an adolescent male (incidentally, the son of one of the men in Hewlett's Aka fathers study [1991]).

When the comparison is made between the Six Cultures data and Aka children's adult-independent labor activities, the values in parentheses in Tables 9, the sex-bias for older children shrinks and reverses. In general, Aka children, when left to their own devices, perform as much work as some of the cultures in the Six Cultures sample, but still not nearly as much as those of the Spot Observation sample. As a further comparison, Gaskins (2000) reports a slight but similar peak in middle childhood among the Yucatec Maya farmers in "self-initiated" work as opposed to "other-initiated." However, Mayan children perform substantially more work and the proportion of self-versus other-initiated is highly other-biased, the opposite of the Aka pattern.

Tables 9 and 10 also support previous evidence that there is a curvilinear relationship between “techno-economic complexity” and time spent in labor for adults and children (Munroe et al., 1983). The Aka were overall more similar to the American children from Orchard Town and Claremont in time spent in chores and childcare. The childcare data, though showing some trends and a sex bias, confirms the relative lack of “child nurses” in Aka society, and verifies a general trend among foragers (Crittenden & Marlowe, 2008; Draper, 1976; Henry, Morelli, & Tronick, 2005), which is arguably further evidence for forager autonomy in middle childhood (B. S. Hewlett, 1992a, 1992b).

I do not wish to over-simplify the complexities of the cultural variation between the populations compared in this paper, but two notable differences between foragers and non-foragers must be noted as potential explanatory factors behind the results of this study. As mentioned above, forager parents can be characterized as respectful of their children’s autonomy, and children’s labor contributions can in part be explained by the feasibility of returns on their labor. Forager parents demand little of their children early on, so neither girls nor boys are placed into a routinized gender-based labor role until at least adolescence.

On the other hand, the general characterization of agriculturalist parents is demanding and harshly punitive. What is required of children, however, depends on the particular (man-made) ecology and economics of the subsistence practices. For example, among the Maya, children’s labor contribution is a matter of their abilities, not “any principle that values work differently for children than for adults” (Gaskins, 2000, 385). Similarly, Whiting and Edwards (1973) explain the variation in work assigned to girls versus boys in the Six Cultures samples of older children as “economic: in societies with animal husbandry or agricultural work that can be *assigned to* boys, there are no sex differences in amount of work *required of* girls and boys after 7-8 years of age” (183, italics added).

Thus, among agricultural societies, when children’s labor is useful and not counter-productive, it is required of them by parents. Sex differences in labor assignment are inherent to the types of labor males and females do in these societies, and boys and especially girls are involved early in routinized, gender-based labor roles.

Conclusion

In this paper I used time allocation data to illustrate the activities and companions that constitute the daily life of Aka foragers when they are between the ages of 4 and 12 years old. I have argued that these results expand on and support previous accounts of forager childhood, providing the basis for a Forager Middle Childhood Model. This model consists of a predominance of play and idleness, multi-sex and multi-age child groups, a nearly constant but undemanding adult presence, and a move from playing, to working with other children, to working with all members of camp. Cross-cultural variation in the development of a gendered division of labor is argued to be attributable at least in part to the ecological niche inhabited by societies of differing subsistence. The childhood data links this niche to parenting behavior as well, most notably the respect for autonomy characteristic of forager parents, which contrasts with the more demanding style of agriculturalists. Both styles influence children’s time allocation in differing ways, shaping the contexts of child development.

While I point to the influence of parental style, I do not wish to draw attention away from a key result of this study, and a consistent feature of middle childhood cross-culturally, what I've called "child-primacy." Whether or not they are working in animal husbandry, husking corn, or collecting caterpillars, children at this age spend much of their time with other children, and some proportion of this time in play. While adult influence may set the stage, to some degree, it is this time spent with other children that is likely to be a profitable area of research, especially in the areas of play, social learning, and cultural transmission. If we take the FMC to be representative of foragers, and foraging as representative of humanity's ecological niche, then here we have evidence that human children scaffold their own culture learning upon each other's shared and accumulating experience, and adults facilitate this process by maintaining the cultural contexts within which children grow. The proposed Forager Middle Childhood Model is a humble theoretical beginning that I hope prompts further investigation into this proposition.

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Table 1. Number of children in the Aka middle childhood sample by age (numbers in parentheses are minutes of observation of each category)

Sex	Age		Total
	4-7	8-12	
Female	7 (1696)	5 (1402)	12 (3098)
Male	7 (1878)	5 (1379)	12 (3257)
Total	14 (3574)	10 (2781)	24 (6355)

Table 2. Mean percent of observation time in which children are within visual range of parents only, parents and/or at least one other adult, and no adults at all

	Girls		Boys		Overall Mean	SD
	Mean %	SD	Mean %	SD		
Parents Only	2.9	5.1	0.6	0.9	1.8	3.8
Other Adults	72.5	12.9	80.9	9.2	76.7	11.8
No Adult	22.7	11.8	16.5	8.4	19.6	10.5

Table 3. Mean percent of observations in which Aka children's nearest neighbors included various categories of individuals

Neighbor	Girls		Boys		Overall Mean	SD
	Mean %	SD	Mean %	SD		
Adult females	23.2	9.6	27.2	15.5	25.2	12.8
Adult males	6.2	5.3	7.2	3.7	6.7	4.5
Mixed-sex adults	1.2	1.7	1.1	2.0	1.2	1.8
Female children	36.8	15	36.5	11	36.7	12.9
Male children	37.1	15.4	45.4	11.1	41.3	13.8
Mixed-sex children	15.2	11.3	15.2	8.8	15.2	9.9
Same-age children	10.5	13.4	11.2	13.2	10.8	13.1
Mixed-age children	43.3	19.8	51.7	16.5	47.5	18.4

Table 4. Aka children's daily time budget, ages 4 to 12 years old

Activity	Girls		Boys		Overall Mean	SD
	Mean %	SD	Mean %	SD		
Play	33.9	23.2	29.0	11.6	31.4	18.1
Gather	5.1	9.3	7.4	11.6	6.2	10.3
Hunt	0.1	0.2	1.9	4.0	1.0	3.0
Food Prep	3.7	4.9	2.4	3.3	3.1	4.2
Childcare*	3.1	3.7	0.3	0.5	1.7	3.0
Village Work	2.3	8.0	0.1	0.2	1.2	5.6
Other Work	5.7	6.6	3.9	5.8	4.8	6.2
Idleness ^a	34.9	18.0	40.9	13.5	37.9	15.9
Other Activity**	2.7	4.7	5.5	3.3	4.1	4.2

^aIdleness includes sleeping, eating, resting, and general idleness

*Sex difference is significant at $p < .05$ by Mann-Whitney Test

**Sex difference is significant at $p < .01$ by Mann-Whitney Test

Table 5. Mean percent of observations in which children were engaged in work with adult involvement, without adult involvement, and emulation of work activities in play^a

Activity	Girls		Boys		Overall	
	Mean %	SD	Mean %	SD	Mean	SD
Work, adult dependent	6.5	8.1	4.2	5.0	5.4	6.7
Work, adult independent	8.9	12.5	12.7	12.5	10.8	12.4
Emulation of work in play	9.0	13.5	5.6	6.2	7.3	10.5

^a "Work" includes hunting, gathering, and all routine and non-routine camp work but excludes childcare and work for villagers

Table 6. Linear regression of age and age-squared on time spent in adult-independent work

Model ^{a,b}	Variable	r-square	Beta	p-value
1	Age	0.034	0.185	0.386
2	Age	0.174	2.55	0.058
	Age-squared		-2.39	0.073

^a Dependent variable is "Adult-independent work"

^b Sex of child and the presence of adults were included in previous models and found to be non-significant predictors so were excluded from this model for clarity

Table 7. Among 4-7 year olds, when nearest person is an adult, percentage who are female across culture samples

Community	Girls	Boys	Diff.
Nyansongo	92	73	19
Vihiga	74	88	-14
Ngeca	88	79	9
Conacoste/Santo Domingo	91	81	10
Santa Barbara	100	63	37
Claremont	78	55	23
Aka	82	83	-1

Table 8.^a Percent Observation time in which children are in settings with same-sex children only^b

Community ^c	Age 4-5 years			Age 6-10 years		
	Girls	Boys	Diff.	Girls	Boys	Diff.
Nyansongo	31	28	3	35	34	1
Juxtlahuaca	40	21	19	27	21	6
Tarong	23	50	-27	32	23	9
Taira	36	40	-4	23	35	-12
Khalapur	22	43	-21	23	60	-37
Orchard Town	49	22	27	39	29	10
Aka	22	29	-7	19	30	-11
	The child is present with same-sex children only (no adults are present) ^d			Nearest child is the same sex (when nearest person is a child)		
Community ^d	Age 5-7 years			Age 5-7 years		
	Girls	Boys	Diff.	Girls	Boys	Diff.
Nyansongo	14	22	-8	64	66	-2
Vihiga	10	5	5	50	42	8
Ngeca	12	25	-13	42	69	-27
Conacoste/Santo Domingo	17	19	-2	61	55	6
Santa Barbara	11	16	-5	58	57	1
Claremont	30	17	13	72	54	18
Aka	7	7	0	21	35	-14

^aTable based on Whiting and Edwards (1980) Table 2.13

^bFor the Aka, my coding did not capture the sex of all children present around a child, only the sex of those equally proximate (nearest neighbors), however, using my more precise measure will, if anything, inflate the amount of time Aka children at this age spend "present" only with same-sex children.

^c"Six Cultures" sample. Here I assume they included observations with adults present.

^d"Spot Observations" sample

Table 9.^{a,b} Percent of observations in which children are observed performing chores

Community ^c	Age 4-5 years			Age 6-10 years		
	Girls	Boys	Diff	Girls	Boys	Diff
Nyansongo	36	29	7	43	51	-8
Juxtlahuaca	4	0	4	19	7	12
Tarong	19	14	5	24	7	17
Taira	5	4	1	16	14	2
Khalapur	8	3	5	16	16	0
Orchard Town	0	0	0	8	4	4
Aka	4 (7)	3 (8)	1 (-1)	10 (13)	5 (15)	5 (-2)

Community ^d	Age 5-7 years		
	Girls	Boys	Diff
Nyansongo	18	36	-18
Vihiga	40	21	19
Ngeca	50	30	20
Conacoste/Santo Domingo	20	17	3
Santa Barbara	46	30	16
Claremont	3	6	-3
Aka	4 (7)	3 (9)	1 (-2)

^aBased on Whiting and Edwards (1988) Table 2.11, p. 68. Aka sample includes 5 girls and 4 boys age 4-5, 5 girls and 7 boys age 6-10, and 6 girls and 7 boys aged 5-7.

^bValues in parentheses are "Adult-Independent work"

^cFrom "Six Cultures" samples, does not include child care

^dFrom "Spot Observations" samples, includes child care

Table 10.^a Percent of observations in which children aged 5-7 are engaged in childcare

Community	Girls	Boys	Diff
Nyansongo	21	8	13
Vihiga	14	4	10
Ngeca	6	3	3
Conacoste/Santo Domingo	9	6	3
Santa Barbara	10	0	10
Claremont	2	0	2
Aka	0.4	0.3	0.1

^aBased on Whiting and Edwards (1988) Table 2.12, p. 73. Their data is from the "Spot Observations" samples. The Aka data is from 6 girls and 7 boys. I have not replicated their table from the "Six Cultures" samples for children 5-10 because it is restricted to sibling caretaking, which I did not specifically record. However, the Aka values would be equal to or less than the values for childcare seen here and in Figure 4.

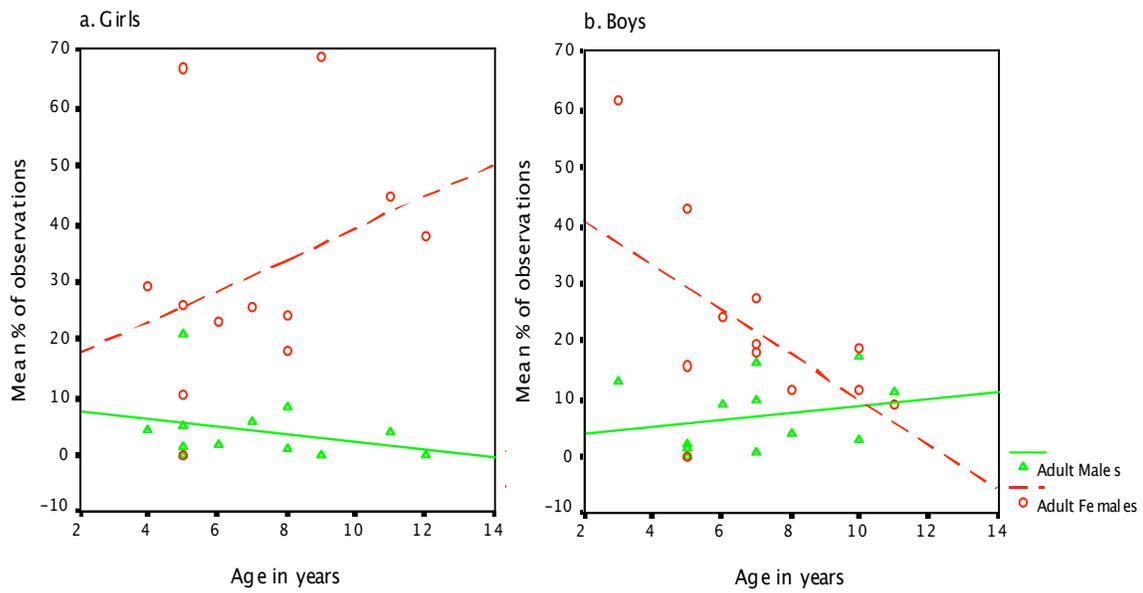


Figure 1. Age trends in proximity to adults of each sex for Aka girls (a) and boys (b). Lines are least-squares linear regression best fit lines. These trends not are statistically significant (see text).

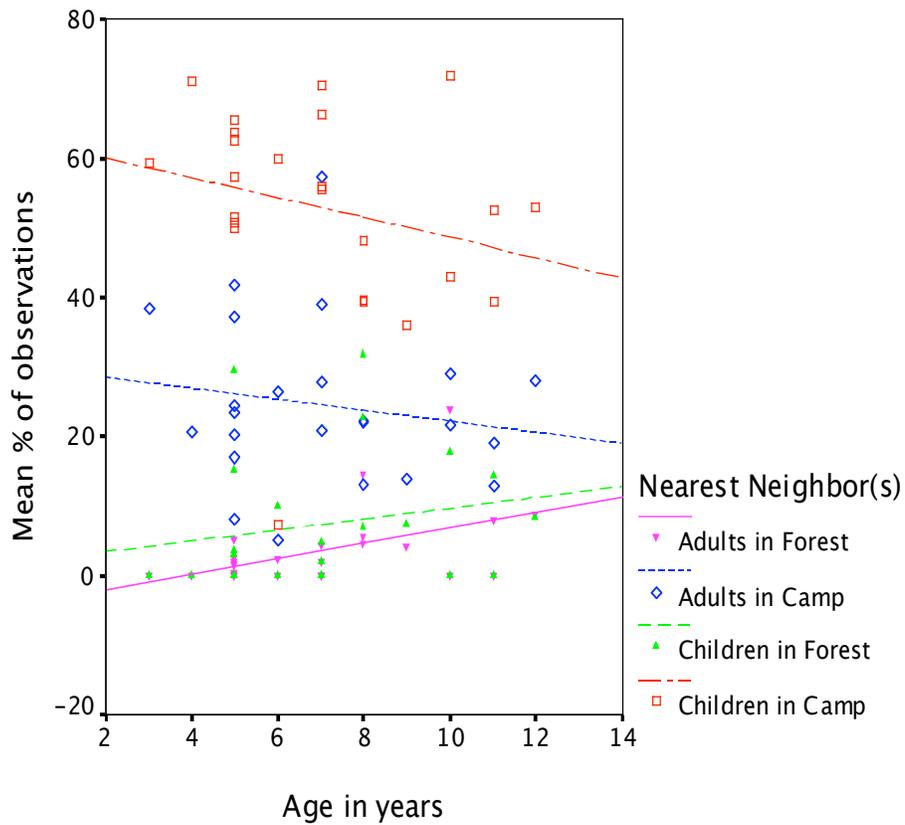


Figure 2. Age trends in proximity to adults and other children in camp versus forest (subsistence) contexts. Trend lines are least-squares linear regression best-fits. Linear regression models show that the trend in “time with adults in the forest” is statistically significant, and the trend in “time with adults in camp” is also statistically significant but only when time spent with adult females is included in the model (see text).

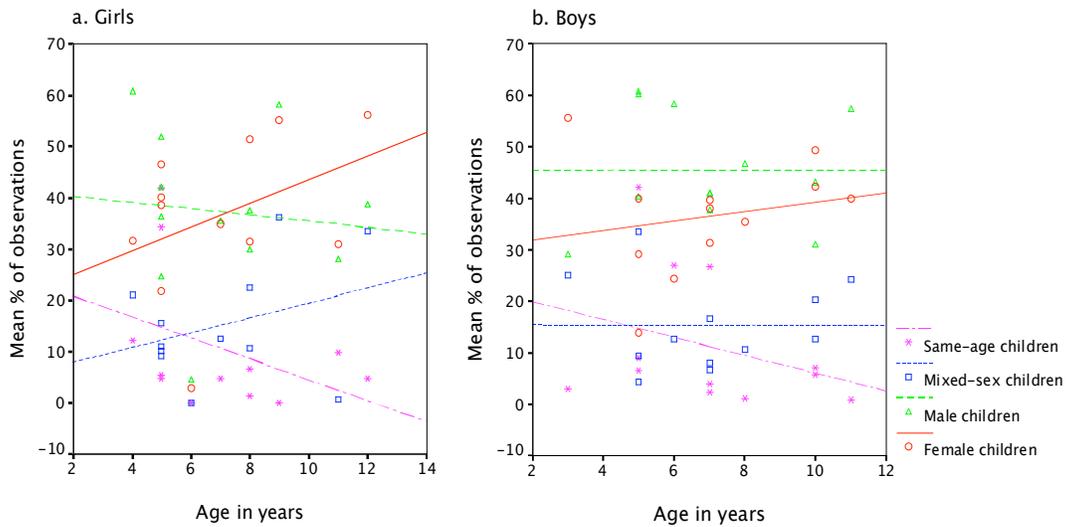


Figure 3. Age trends in proximity to male children, female children, both sexes simultaneously, and same-age category children only for Aka girls (a) and boys (b). Lines are least-squares linear regression best-fit lines. None of these trends are statistically significant (see text).

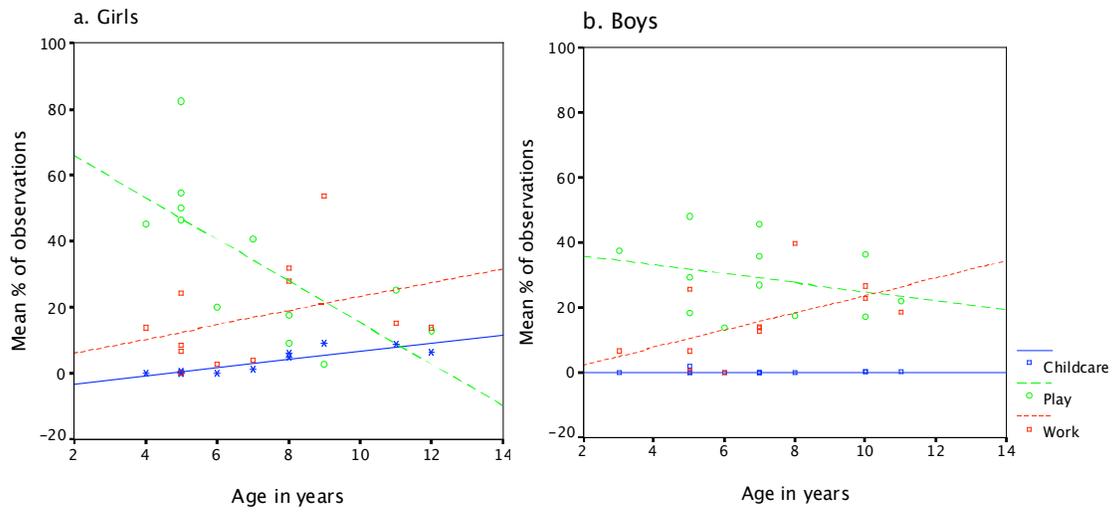


Figure 4. Age trends in time spent in work (including hunting, gathering, food preparation, and chores) childcare, and play for girls (a) and boys (b). Lines are least-squares regression best-fit lines. Linear regression models show each of these trends to be statistically significant, but only in girls for childcare (see text).

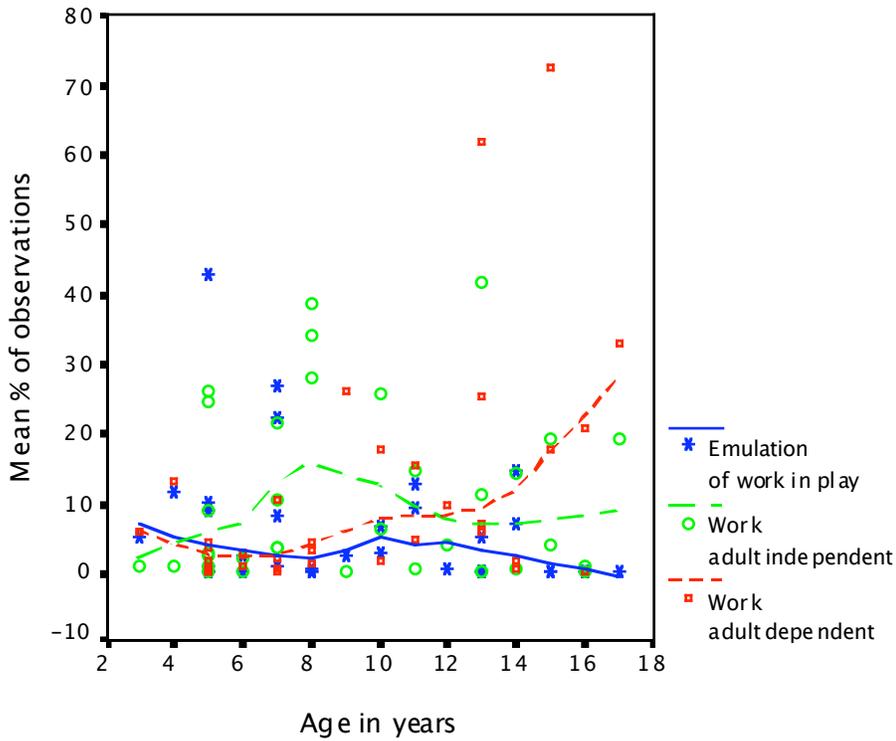


Figure 5. Age trends in children’s “adult-dependent work”, “adult-independent work”, and “emulation of work in play”. “Work” includes hunting, gathering, and all routine and non-routine camp work but excludes childcare and work for villagers. Lines are Lowess weighted-least squares curves fit to 50% of the data points. The linear trend in adult-dependent work is statistically significant and the curvilinear trend in adult-independent work approaches significance when modeled as a quadratic relationship with age (see text).