Children’s Play and Culture Learning in an Egalitarian Foraging Society

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Few systematic studies of play in foragers exist despite their significance for understanding the breadth of contexts for human development and the ontogeny of cultural learning. Forager societies lack complex social hierarchies, avenues for prestige or wealth accumulation, and formal educational institutions, and thereby represent a contrast to the contexts of most play research. Analysis of systematic observations of children’s play among Aka forest foragers \( (n = 50, \text{ages 4–16, } M = 9.5) \) and Ngandu subsistence farmers \( (n = 48, \text{ages 4–16, } M = 9.1) \) collected in 2010 illustrates that while play and work trade off during development in both groups, and consistent patterns in sex-role development are evident, Aka children engage in significantly less rough-and-tumble play and competitive games than children among their socially stratified farming neighbors.

There are very few systematic studies of children’s play in foraging societies (Bock, 2002; Bock & Johnson, 2004; Gosso et al., 2005; Kamei, 2005). While some evolutionary (Flanders, Herman, & Paquette, 2013; Pellegrini, Dupuis, & Smith, 2007) and psychological (Gray, 2012, 2014) theories of play have drawn from what little empirical research is published on forager children’s play, the authors cite more empirical research on rats than on foragers (Hewlett & Boyette, 2013). Yet, it is generally agreed that work with foragers is essential to building a comprehensive perspective on the origins of human diversity, because mobile foraging exemplifies the ecological and cultural niche constructed and occupied by all humans from 2 million to roughly 10,000 years ago, and because contemporary foragers represent a small minority of the world’s peoples today who should not be excluded from models of human psychology, including the ontogeny of cultural learning (Hewlett, Fouts, Boyette, & Hewlett, 2011). Most importantly, work with foragers provides an essential contrast to the vast majority of work conducted in psychology today, including ostensibly cross-cultural research, in that forager cultures lack complex social hierarchies, avenues for prestige or wealth accumulation, and formal educational institutions that structure children’s social and ecological environments (Hewlett & Lamb, 2005) and differentially promote adult involvement in children’s play and learning (Gaskins, Haight, & Lancy, 2006).

This article reports a comparative study of children’s play among Aka forest foragers and Ngandu small-scale farmers of the Central African Republic. These two ethnic groups make a living within the same natural ecology, the Congo Basin tropical forest, but have contrasting cultural values and economies. The comparative approach allows for an analysis of the independent and interactive influences of culture and biology—as represented by development and biological sex—on children’s play. I will briefly discuss some of what is known about the presumably universal influence of development and biological sex on children’s play. Because of its universal association with childhood, there has been a long-standing assumption that play has important implications for children’s development. In the United States, for example, the assumption has been integrated into policy recommendations (Ginsburg, Committee on Communications, & Committee on Psychosocial Aspects of Child and Family Health, 2007; Milteer, Ginsburg, & Mulligan, 2012) despite the absence of clear associations between play and specific outcomes in

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experimental and correlational studies (Lillard et al., 2013; Pellegrini & Smith, 1998b). In general, however, play is understood to decrease in frequency as children get older. What play is replaced by depends on the social, economic, and cultural context in which children develop. For middle-class children in industrialized societies, play is replaced by schoolwork or screen time, whereas for children in lower-class communities and in small-scale societies, play is replaced by legitimate participation in the family economy (Lancy, 2012). It is in these latter contexts, especially in small-scale societies, that the potential role for play in development, and in the ontogeny of cultural learning, is most evident. In small-scale contexts, there is little to no separation between child and adult worlds (Morelli, Rogoff, & Angelillo, 2003), and children have the opportunity to observe the activities and roles of everyday adult social and economic life (Paradise & Rogoff, 2009).

The work of Bock (2002) and Bock and Johnson (2004) among mixed-subsistence cultures of the Okavango Delta, Botswana, provides a unique empirical example of the role of play in children’s acquisition of the skills needed to perform economic roles during development. It also serves as a useful exception to laboratory studies in large-scale, Western contexts. Through systematic observations of children’s daily lives, they empirically demonstrate that play improves children’s skill in the productive activities they face later in life—grain pounding and nut cracking, for example—and that children play less as their competence grows. Children’s sex, independent of developmental or cultural factors, has also been shown to influence children’s play preferences. In particular, boys are found to engage in more physical play of all kinds (Pellegrini & Smith, 1998a). Theories for why this is the case tend to focus on the prevalence of rough-and-tumble (R&T) play among boys. R&T is proposed to have a functional association with learning fighting skills and how to restrain aggression (Fry, 2005). Additionally, Pellegrini and Smith (1998a) propose an association between R&T and learning dominance relationships among adolescents, suggesting that the function of R&T may change with age. These evolutionary explanations for sex differences in R&T tend to emphasize universal differences between males and females in the importance of controlled aggression or dominance behavior. However, there is reason to believe such differences would be attenuated in forager cultural contexts, as gender egalitarianism and nonviolence are normative, socially enforced behaviors. For example, Fouts and Lamb (2009) found that there were no sex differences in frequency among Bofi forager toddlers of “aggressive play,” that is, play involving “hitting, pushing, wrestling, and pretend fighting” but without “any signs of anger or distress” (p. 268). Although Fouts and Lamb also found no sex differences among Bofi farmer toddlers, the farmer toddlers played “aggressively” significantly more often than Bofi forager toddlers (see below). This work suggests sex and culture are likely to interact in their influence on play, and perhaps differently at different times during development.

There is reason to predict that sex differences in time spent in play may also vary in relation to sex differences in involvement in economic activities. As mentioned, it is typically work that takes the place of play in children’s daily time budgets as they mature. Independent of age or cultural, social, or economic context, there is consistent evidence from studies of children’s economic contributions in small-scale societies that female children take on larger work responsibilities than do their male counterparts (Munroe, Munroe, & Shimmin, 1984; Nag et al., 1978; Whiting & Edwards, 1973), although this has not yet been demonstrated among foragers where, again, attenuation of difference might be predicted since the gendered division of labor is less stark.

Culture and play are expected to have a complex and reciprocal relation with regard to the ontogeny of cultural learning. Culture influences children’s play by defining the settings for play and the local and community-wide beliefs regarding play, while play is involved in the process of cultural learning as an imitative and interpretative performance of culturally determined behavior (Roopnarine & Johnson, 1994; Schwartzman, 1978; Whiting & Edwards, 1988). It is reasonable to hypothesize that the intrinsic motivation and positive affect associated with play (Smith, 2010) is oriented by culture during development, as children internalize the shared cultural models, or schema, of their communities (Shore, 1996). While the creative and imaginative components of play are often emphasized in Western research and popular culture, the material and immaterial content of children’s play is, for the most part, ultimately derived from the culturally constructed environment, or niche, in which children are raised.

For the Aka foragers, as for many contemporary mobile forager groups (for excellent recent reviews of childhood among the Batek and Efe, respectively, see Endicott & Endicott, 2014; Morelli, Henry, & Foerster, 2014), the culturally constructed niche includes: a physical and emotionally intimate social environment in which children are socialized to
trust many others, and core values of egalitarianism across generations and between sexes, respect for autonomy, extensive sharing, and nonviolence. Trust is formed through children’s daily lived experiences with responsive care from multiple caregivers (Hewlett, Lamb, Leyendecker, & Schöllmerich, 2000). Egalitarianism, sharing, and nonviolence become foundational schema as a result of early instruction and participation in sharing, and sanctioning of selfishness, aggression, and boastfulness through teasing or terse verbal feedback. Otherwise, children are not coerced or punished and are free to do what they choose.

Starting in infancy, patterns of play among the Aka and similar groups are different from patterns characterizing socially stratified societies. For example, Hewlett (1991) found that neither Aka mothers nor fathers were primary playmates for infants. Rather, older children—kin and nonkin—would more commonly seek out infants in order to play with them. Among the Bofi, a neighboring Central African forager ethnic group, Fouts and Lamb (2009) found that children 1–2 years old played “aggressively” with other children 39 times less frequently during observations than children from the neighboring Bofi (non-“pygmy”) farmers, and Bofi forager 3- to 4-year-olds played “aggressively” 17 times less frequently than their farmer agemates. These same Bofi farmer children were also significantly more likely to play with other children of the same sex than of a different sex, whereas this was not the case with the Bofi foragers (Fouts, Hallam, & Purandare, 2013).

Cross-culturally, same-age playgroups tend to be more competitive than those of mixed age (Whiting & Edwards, 1988). Konner (1976) argues that same-age peer groups are a recent phenomena in human history and before agriculture there would have been too few children of the same age in a group to make competition between peers possible on a regular basis. Therefore, children living in foraging societies can be expected to play fewer competitive games than is observed in more populous societies. Alternatively, it is possible that independent of group size, forager children are not motivated to engage in competitive games because their culture deemphasizes—and in fact imposes sanctions on—rankings, dominance relationships, and strict adherence to rules (Turnbull, 1978). If one of the benefits of play is the internalization of emotionally satisfying, culturally relevant behavior, competition is unlikely to be a common play choice among forager children, as it would not pay off in the short or long term. The same may be the case for R&T if it is associated with learning fighting or dominance (at least in adolescence). Fry (1988) found that frequencies of children’s R&T play is attenuated in a Zapotec farming village where adult violence is heavily discouraged relative to a neighboring village where violence is more common. Therefore, it is reasonable to predict significant attenuation in forager contexts where there are rarely chances to observe violent behavior and aggression is held to be highly disruptive (Dentan, 1978; Draper, 1978). Konner (1972) reports having seen “very little real or play fighting” (300) among young Ju/hoansi children (also see Draper, 1976) although, he reports that R&T emerged when several children of the same age were together. Therefore, it may be that games or R&T are not absent among foragers but that their frequency is reduced.

This study investigates play behavior among children from 4 to 16 years old, across the transitions into and out of middle childhood, among the Aka and Ngandu. This period envelopes the transition to nutritional independence and is cross-culturally a time during which children are given greater autonomy and considered capable of taking on greater responsibility (Lancy, 2008; Rogoff, Sellers, Pirrotta, Fox, & White, 1975). Among the Aka, at around 7 years of age, children begin to accompany other children beyond the immediate periphery of the forest camp to play or forage (Hewlett, 1991). Similarly, Ngandu 7-year-olds will run errands to the market or to other neighborhoods, or accompany their parents or siblings to gardens. This age range is ideal for examining the interface of children’s autonomous play choices, their biological sex, and the culturally constructed niche in which they are developing.

Several hypotheses are developed based on the above review and evaluated in the subsequent analysis. First, it is hypothesized that both Aka and Ngandu children, independent of sex, will spend less time playing with age. As it is likely that much of their time will be replaced by legitimate participation in work, it is also hypothesized that time spent in work will increase with age. However, cross-cultural patterns in sex differences suggest two additional sets of hypotheses: Females will play less frequently at all ages or an age-dependent decrease in play will be augmented in females, and female children will either work more at all ages or an age-dependent increase in work should be augmented in females. Regarding the forms of children’s play activities, it is hypothesized that Aka children will engage in competitive games and R&T play significantly less frequently than the Ngandu.
Finally, differences in frequencies of other play forms observed will be examined between the two ethnic groups and between sexes within each group.

Method
The study communities for this research inhabit the same ecological context, the tropical forests of the northwestern Congo Basin, but have dramatically different cultures and social and economic systems. The Aka are the largest population of active foragers on Earth today. While a large but variable percentage of their calories come from agricultural produce procured through trade, the majority of Aka still routinely live in the forest full time for portions of the year and rely on foraging for their diet, health care, and material culture. As noted earlier, Aka culture is characterized by nonviolence, egalitarian social and political relations, constant sharing that is wide in breadth and scope, avoidance of prestige, and a high level of respect for autonomy. In contrast, the Ngandu are small-scale subsistence farmers and traders. Their major crops include manioc, plantains, and corn. They also grow a variety of other vegetables and fruit, and coffee as a cash crop. They have a history of warfare with other farming ethnic groups, although more recently they have been victims of national-scale violence. Today within the village, domestic violence is common (Hewlett & Hewlett, 2008) and other forms of violence are most often associated with accusations around the practice of witchcraft (Hewlett, Mongossos, King, & Lehmann, 2013). These accusations are tied to individual striving for material wealth or prestige, and serve to restrict wealth differentials. Ngandu foundational cultural schemas include gender and age hierarchy, respect for authority, communalism, and a material basis to social relationships.

Data for this study were collected between March and September, 2010, in the Lobaye Province, Central African Republic. Participants included 50 Aka children from eight forest-dwelling communities and 48 Ngandu children from 18 families in the village of Bagandou. Both the Aka and Ngandu participants were between 4 and 6 years old (Aka $M = 9.5$, $SD = 3.9$, 52% female; Ngandu $M = 9.1$, $SD = 3.7$, 50% female). The Aka forest camps visited had populations of between 25 and 55 people ($M = 40.8$, $SD = 10.6$). The village of Bagandou had a population of roughly 4,000 people during the study period, divided among eight neighborhoods within the main section of the village. Censuses were taken of each Aka camp visited and of three Ngandu neighborhoods, and a random sample of children 4 through 16 years old and of both sexes was asked to participate. Aka do not know their ages, so these were estimated by my field assistant—an Ngandu man who grew up around the Aka and knew many of the people we interacted with since childhood—and by myself. If our estimates disagreed or there was uncertainty greater than 2 years, we ranked the children youngest to oldest by asking parents and others about the relative timing of births until we had established a solid estimate of years apart from children of known age. Ngandu parents knew their children’s ages in years. If the child was unavailable or unwilling, another child from the census was randomly asked to replace them. One Ngandu father refused his family’s participation, and one Aka child was reluctant to participate (though was often among the children in his group who did). Parental and child verbal consent were acquired before work began. The Washington State University Institutional Review Board approved the study.

Observations were systematically recorded using focal-child follows, a method adopted from ethology and previously used by other researchers working in the study area (Hewlett, 1991; Meehan, 2005; Meehan, Quinlan, & Malcom, 2013). In this study, individual children were randomly assigned three 2-hr sampling blocks between 6 a.m. and 6 p.m. across a series of days such that each child was observed for a morning, midday, and afternoon period. During behavior sampling, behavior was coded every minute using a 30-s observe, 30-s record procedure. If a child was not available during a sampling block, the block was either rescheduled or omitted, depending on the circumstances. Children were observed for 30-s intervals ($M = 233.6$ intervals, $SD = 56.5$) per child for a total of 22,896 observations.

Behaviors coding during observation is described in Table S1. Most categories of play behavior are commonly recorded in ethological studies of play, but others unique to the ethnographic context were added as a result of pilot work in 2008. The category of “work-themed pretense”—pretense play where typical productive activities are imitated—was occasionally challenging to code. In settings where children make autonomous contributions to the family economy, play and work commonly blend. However, Aka do have words for both work and play and will distinguish between the two in reference to a child’s activities. In this study, I categorized as “work” (exclusive of “work-themed pretense”) any activity that might contribute to the
child’s or another individual’s subsistence. This definition avoids the difficulties in assuming a child’s intentions (which may change during the course of an activity), but is limited in terms of measuring play from a motivational perspective. For example, a child may be motivated by positive affect to climb a tree, but come down with *koko* (*Gnetum africanum*) leaves that are later consumed. However, a minority of children’s activities were ambiguous, such that the distinction between “work” and “work-themed pretense” used here is at worst a conservative estimate of children’s motivation to play.

The hypotheses regarding overall frequencies of work and play were tested using negative binomial regression modeling in Stata/SE. Negative binomial regression is preferred for overdispersed count data with high variance (Cohen, Cohen, West, & Aiken, 2003). Counts of total observations of play and work were dependent variables. Ethnicity, sex, and age were independent variables, and the natural log of the total number of observations of each child was included in the models as an “exposure variable” to account for variation in total intervals of observation per child (Long & Freese, 2006). Two- and three-way interaction terms were also included and removed from the model if nonsignificant at or above the $\alpha = .95$ level.

**Results**

To place children’s play and work into context, Table 1 presents the children’s overall time budget. Aka children were playing during roughly 26% of all observations, and Ngandu children were playing during roughly 37% of observations. Ngandu children also worked more than Aka children, spending 24% of observations in work versus 18% for the Aka. An estimate of minutes per 12-hr day can be derived from the number of 30-s observation intervals recorded every minute in which the children played or worked divided by the total number of intervals each child was observed. Accordingly, the Aka can be estimated to play an average of 2 hr and 54 min per day during daylight hours ($SD = 1$ hr, 50 min) and work an average of 2 hr and 6 min per day ($SD = 1$ hr, 42 min). Similar estimates for the Ngandu are an average of approximately 4 hr and 12 min per day of play ($SD = 2$ hr, 36 min) and 3 hr and 6 min of work during daylight hours ($SD = 2$ hr, 54 min). For children of both ethnic groups, play was distributed evenly throughout the three observation periods, morning, midday, and afternoon. Work also did not vary greatly across parts of the day, but was observed least often in the morning among the Aka (25% of work) and most often in the afternoon among the Ngandu (40% of work).

The hypothesized relations between age, sex, and ethnicity and time spent in play and productive subsistence labor, or work, were tested in two sets of regression models (Tables S2 and S3, respectively). In the first model, age was found to be an independently significant negative predictor of time spent in play ($B = -.15$, $p < .001$), as predicted; Ngandu ethnicity positively predicted time spent in play ($B = .33$, $p = .007$); and there was also a significant interaction effect between female sex and age, indicating that the age-dependent decrease in time spent in play is augmented in females ($B = .10$, $p = .004$), consistent with the hypothesis based on general cross-cultural patterns of females’ early entrance into the family economy. In the second model, age had an independently significant positive relationship with time spent in work, as predicted ($B = .12$, $p < .001$); Ngandu ethnicity also had a significant positive relationship with time spent in work ($B = .44$, $p = .01$) independent of age, consistent with general cross-cultural patterns of forager versus agriculturalist time allocation; and finally, male sex was a significant and negative predictor of time children spent in work independent of ethnicity or age ($B = -.61$, $p < .001$), again supporting the prediction that females would assume greater labor responsibilities earlier than males.

Frequencies of the play forms observed are presented in Table 2. It was hypothesized that R&T and games would be associated with the Ngandu, and this was found to be the case. Ngandu children played R&T about twice as often, $\chi^2(1, N = 6,943) = 18.9$, $p < .001$, and games 4½ as often, $\chi^2(1, N = 6,943) = 696.6$, $p < .001$, as did Aka child-

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**Table 1**

Children’s Overall Time Budgets by Culture (% of Observations)
dren. Nonwork-themed pretense was also twice as common among the Ngandu, χ²(1, N = 6,943) = 45.6, p < .001, whereas Aka children performed significantly more work-themed pretense, χ²(1, N = 6,943) = 36.0, p < .001; object play, χ²(1, N = 6,943) = 93.4, p < .001; roaming, χ²(1, N = 6,943) = 150.3, p < .001; and intimate play, χ²(1, N = 6,943) = 13.0, p < .001 (by two-sided Fisher’s exact test), than did the Ngandu.

There were also several significant sex differences within each ethnic group. In both ethnic groups, female children played less overall than did males, Aka: χ²(1, N = 11,931) = 321.5, p < .001; Ngandu: χ²(1, N = 10,965) = 193.7, p < .001. Additionally, in both ethnic groups, female children engaged in more work-themed pretense, Aka: χ²(1, N = 2,972) = 11.9, p = .001; Ngandu: χ²(1, N = 3,971) = 66.1, p < .001, and object play, Aka: χ²(1, N = 2,972) = 21.5, p < .001; Ngandu: χ²(1, N = 3,971) = 95.6, p < .001. On the other hand, males in both groups played more games than did females, Aka: χ²(1, N = 2,972) = 137.5, p < .001; Ngandu: χ²(1, N = 3,971) = 10.3, p = .001. While there were no further sex differences among the Aka, Ngandu males played more nonwork-themed pretense, χ²(1, N = 3,971) = 97.2, p < .001; tree climbing, χ²(1, N = 3,971) = 32.9, p < .001; and idiosyncratic play, χ²(1, N = 3,971) = 14.5, p < .001.

### Discussion

While this study was not designed to provide evidence that specific work-themed pretense behaviors improve children’s skills in productive equivalents as Bock and Johnson (2004) and Bock (2002) have shown, several results support a role for play in the ontogeny of culturally determined economic activities, as well as potentially universal sex differences in play that may relate to the sexual division of labor. Additionally, clear patterns were found that support the roles of both sex and culture in determining children’s play, several of which replicate findings of the few prior studies of play among egalitarian forager societies. For one, play among children of the Aka foragers exhibits a pronounced attenuation in frequency of R&T and competitive games in comparison to Ngandu farmer children’s play.

According to my analysis of systematic observations of children’s play among these two groups, children spent less time in play and more time in subsistence labor with age. Additionally, work-themed pretense play, in which children engaged autonomously in imitation of the work activities and roles they must perform as legitimate participants in the family economy, constituted 19% of Aka play and 14% of Ngandu play—much larger percentages than were constituted by other types of pretense, such as playing with toy automobiles or imitating cultural heroes (e.g., Dzengi, the spirit of the forest, or Eto’o, the Cameroonian footballer). Previous studies of children’s play in small-scale societies have found the same to be true (Lancy, 2008), supporting the notion that when child and adult worlds are not segregated, as they often are in the industrialized societies in which most play research has been conducted, children are independently motivated to perform in play those roles and practices that organize community life as they see
it. It is reasonable to propose that work-themed pretense may help scaffold not only the physical skills associated with legitimate productive labor, but also the culturally derived values and meanings behind the associated social roles of particular activities, as children’s role models are directly observable and intimately known members of their communities. That the Aka children more frequently performed work-themed pretense supports this assertion, since the intimate social and physical settings of their camps and greater degree of autonomy afforded Aka as compared to Ngandu children would increase the availability of role models and, perhaps, the positive affect associated with imitation of their activities. Also, many foraging tasks are easier for children to perform than agricultural or commercial labor.

Analyses of sex differences in work and play also supported the hypotheses that females would stop playing earlier than boys and work more than their male counterparts at all ages, independent of their ethnicity. Moreover, female children also played more work-themed pretense than their male counterparts in both groups, suggesting that girls had greater motivation to take on immediately observable adult roles in play than did boys. Work-themed pretense was more frequent among the Aka than the Ngandu overall, as noted, and the difference between males and females was much smaller among the Aka than the Ngandu. It is also noteworthy that object play was significantly associated with females in both groups, and more frequent among the Aka. A female bias in object play is consistent with findings regarding “construction play” in Western studies, and object play has been proposed to have a functional association with gathering skills (Pellegrini & Bjorklund, 2004).

These results indicate that the previously demonstrated female-biased early introduction into the labor force is also present in one of the most gender egalitarian societies in the ethnographic record. However, the influence of culture on participation in work is also evident. The negative binomial regression results show that, as expected, the Ngandu children were more likely to work than the Aka children at all ages. The result makes sense given the Ngandu foundational schemas of obedience and family communalism, which emphasize the importance of responsibility to one’s parents and the patrilineal clan. These values are inculcated in children early on through harsh shaming or corporal punishment for disobedience or irresponsibility. Surprisingly, however, the Ngandu children were also more likely to play, independent of age and sex.

Konner (2005) proposed that more play would be expected in forager children in contrast to children in food-cultivating societies because of the substantial autonomy and minimal work demands characteristic of forager childhood. There are at least two possible, nonmutually exclusive explanations for the contrary findings reported here. First, the Ngandu might be overall more active. As can be seen in Table 1, the Aka children spent about 10% more of their day in “rest” than did the Ngandu. This difference was tangible during fieldwork. The Aka children were calm and never hurried, whereas the Ngandu children were extremely boisterous unless obviously ill. It is possible that the Aka were exhibiting lower energy levels due to poorer health, although one study compared Aka and Ngandu adolescents’ parasite loads and found no differences (Hewlett, 2004). Another possible explanation is that when given the autonomy, Ngandu and Aka children’s activity choices are motivated by very different culture learning interests. For the Aka, the need for consensus around group decision making and the value placed on modesty and self-control is manifest in more down time, whereas the Ngandu cultural values of competition and status striving can be practiced safely in a variety of forms of play.

As hypothesized, the Ngandu played significantly more R&T and games than did the Aka. The difference was substantially greater in the case of games than R&T. These results support the idea that children’s autonomous choices in play are motivated by the values and goals that fit their foundational schemas. Much like Western children’s games, Ngandu games are not necessarily derived from adult activities, but they involve the same themes—namely, competition and social dominance. Soccer, a very common game, is one important exception, which many Ngandu children have had the chance to watch at occasional matches between local teams (during fieldwork the teams were not playing because of a feud that had repeatedly resulted in fights between players) or at viewings of the Africa Cup at the cinéma (a generator-powered television). However, only boys played soccer. Yet the difference between Ngandu males and females in proportion of time spent playing games was small in magnitude, despite being statistically significant, and games that the girls played were not observed performed by local adults or professional athletes, but did involve themes of competition, dominance, and ranking.
The energetic girls' game of gbagba is illustrative of how hierarchy and competition are emphasized in these games. In gbagba, two girls stand opposite each other, one of whom is "it," and they begin singing and clapping. At the end of each repeated verse of song, each girl kicks one foot. If the girls kick the same foot they continue. If they kick the opposite foot the girl who is "it" gets a point, and they repeat until there is a champion. Score is kept by drawing a grid of squares on the ground and moving a marker into the next square after earning a point. Often, younger children not skilled enough to compete effectively are recruited to stand in the grid as the score markers.

Aka boys also played games, and significantly more frequently than did Aka girls, though half as frequently as the Ngandu. Gosso et al. (2005) also found Parakaná Indian boys to play more competitive games than girls. Aka boys' game play included soccer, but Aka soccer was not as intensely competitive as observed among the Ngandu. Rather, it was more akin to ndanga, a traditional Aka ball game in which two teams of players pass a small, natural rubber ball between team members, attempting to keep possession of the ball. While the two teams compete for control of the ball, there is no winner in the game and there is no score kept—thus, ndanga would not fit the definition of a "game" used here. Ndanga incorporates hunting metaphors and the expressions used by players in calling for and receiving the ball are often references to food sharing (e.g., "Busa, dija bima": "take it, eat food"). Thus, the content of play and its value for culture learning is distinct from soccer. Ndanga constituted about 2% of Aka boys' play (Table 2), and was more common before soccer became popular.

R&T especially has been heavily theorized to be associated with biological sex differences in aggression, dominance striving, and coalitional behavior (Boulton & Smith, 1992; Flanders et al., 2013; Fry, 2005; Smith, 1984; Symons, 1978). However, Gosso et al. (2005) found minimal difference in R&T play between Parakaná Indian girls and boys during middle childhood, though a slightly larger one for children ages 4–6 years old. Additionally, Fry (2005) reports that in two Zapotec indigenous farming communities, R&T is more common in both boys and girls in the more violent of the two communities, and girls play R&T more frequently than boys in the less violent community (men perpetrating the majority of violence in both communities). The results of the present study are consistent with culture having an important influence over the degree and manifestation of sex differences in R&T play: There were no significant sex differences within either the Aka or Ngandu in frequency of R&T play. In fact, there was a statistical trend toward an association between females and R&T play among the Ngandu. In comparison to the Aka, Ngandu R&T does not simply consist of spontaneous roughhousing, but is sometimes an activity overtly chosen by girls and boys alike—ngia ti combat, in Sango, or "fighting play." Often, Ngandu R&T escalates until someone hits too hard and provokes a truly aggressive response. I never saw play escalate to conflict among the Aka.

The three remaining play forms observed more frequently among the Aka can also be explicitly linked to the forager cultural niche and associated foundational schema. First, the ezambi is only used by children, and takes trust in one's playmates and the forest to enjoy it. Some versions of the swing are tied between two trees by a boy of 10–15 years, allowing the children to swing high above the forest floor. Others are made from lianas naturally anchored at the top of mature trees. On these, the swinger must mount the swing, and repel off of the trunk of the tree to swing around it, often a few meters from the forest floor, and possibly in synchrony with another on a nearby liana. Second, the purpose of roaming is to walk and observe familiar camp or forest settings. For example, the Aka prefer the cool forest over the heat of the camp clearing during the middle of the day, and the children often justified their roaming to me in so many words. As opposed to "exploration," which is characterized by seriousness and concentration (Hutt, 1966), roaming is characterized by positive affect and a focus on means over ends, and might draw from and build on children's trust of each other and their knowledge of the forest ecology. Finally, intimate play was uncommon but has been noted by other forager researchers (Konner, 1972; Turnbull, 1978). This type of play may be interpreted as both the expression of the wide scope of attachment within Aka communities (Konner, 1972) and a mechanism that continues to support the internalization of trust—and thereby promoting the learning of egalitarian social relationships.

In conclusion, this study represents one of very few systematic studies of play across middle childhood among foragers. A major strength of this study is the uniqueness of the data, which allow a direct comparison of children's behavior in natural settings among foraging and farming societies sharing the same ecology. Among the weaknesses of this study is the fact that I was the only observer...
and have no measure of interrater reliability. However, during pilot work in 2008, comparable data were collected from a smaller sample of Aka children of a similar age range and distribution. A comparison of these data shows strong consistency in behavioral frequencies across years of observation, suggesting that my coding was reliable (see Appendix S1). An additional weakness is that I have not established the validity of my categorizations of children’s activities from an indigenous point of view, most especially the differences between work and play. Such work is currently underway. However, operationalization of standard ethnological categories of behavior has allowed for the production of cross-culturally comparable data, not only between the two groups here, but also others collected by researchers working in other parts of the globe (Boyette, 2016). Hopefully, this research will prompt further attempts to better characterize the variation in children’s play repertoires and the complex role of culture in motivating children’s autonomous learning.

To summarize, the results of this study show that in these two small-scale societies, children play less with age as they take on legitimate productive roles in their families’ subsistence. Additionally, girls trade off play for work sooner than do boys, play more work-themed play, and work more at all ages, consistent with previous cross-cultural research. However, the frequency and content of children’s play differs in ways consistent with the view that children’s play preferences reflect their foundational cultural schema and may continue to help in culture learning. Specifically, children of the egalitarian Aka foragers were observed playing R&T and competitive games significantly less frequently than were Ngandu farmer children. As these types of play are theoretically associated with learning skills in conflict and social dominance, and are common in typical playground settings in the West, it is significant that they are of less interest to Aka children, whose culture’s core values include egalitarianism, cooperation, respect for autonomy, and nonviolence.

References


Forager Children’s Play and Culture Learning


**Supporting Information**

Additional supporting information may be found in the online version of this article at the publisher’s website:

**Appendix S1.** Coding Reliability Analysis

**Table S1.** Description of Behaviors Coded

**Table S2.** Negative Binomial Regression Model Results for Variables Predicting Number of Observations of Children’s Play (*N* = 98)

**Table S3.** Negative Binomial Regression Model Results for Variables Predicting Number of Observations of Children’s Work (*N* = 98)

**Table S4.** Comparison of Aka Time Budgets Between Years of Data Collection

**Figure S1.** Least-Square Regression Lines, Point Estimates, and 95% Confidence Intervals Representing (a) the Frequency of Play on Age and (b) the Frequency of Work on Age Among the Aka as Measured in 2008 and 2010. There is a high degree of overlap in the estimated mean percentage of time spent in both activities for children of every age across both years of observation.