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Joint Attention in Children and Chimps: Questions of Uniqueness, Universality, Plasticity, and the Evolution of Human Sociality

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Some years ago, I had the good fortune to work with a small group of juvenile, enculturated chimpanzees and orangutans at a great ape sanctuary in Wauchula, Florida. My colleagues and I found that the human-reared young apes showed some forms of social learning not typically displayed by mother- or nursery-reared apes but more like that shown by human preschoolers. During an interview about our research, I explained to a reporter that the enriched experiences of the enculturated apes resulted in enhanced social-learning abilities, producing some aspects of social cognition more similar to that of human children than that of mother-reared apes. The director of the sanctuary overheard the interview and wasted little time expressing her dismay about my statement. These were *not* enriched animals, she informed me, but rather young apes who had been snatched from their mothers at an early age and forced to live in captivity, something far removed from the natural environment they were “meant” to grow up in. After some reflection I realized the error of my ways, modified my statement to the reporter the next day, and in publications of our research described the enculturated apes’ rearing environment not as enriched but rather as *species atypical*, one that resulted in a species-atypical ontogeny that, in some sense, more resembled that of human children than that of mother-reared chimpanzees and orangutans (e.g., Bjorklund, 2006; Bjorklund et al., 2002).

This is one of the points that Kim Bard, Heidi Keller, Kristy Ross, Barry Hewlett, Lauren Butler, Sarah Boysen, and Tetsuro Matsuzawa make in their monograph, [Joint Attention in Human and Chimpanzee Infants in Varied Socio-Ecological Contexts](#) (Bard et al., 2021). We should not automatically assume that human rearing is “enriched” relative to chimpanzee rearing, but merely different. Moreover, any one form of human rearing environment, particularly those associated with *Western, Educated, Industrialized, Rich, and Democratic* cultures (WEIRD, see Henrich, Heine, & Norenzayan, 2010), should not be viewed as the ideal or prototypic context for our species, but only one of many possible species-typical environments; and something similar can be said for chimpanzees. What Bard and colleagues also emphasized is that aspects of social-cognitive development are influenced by rearing environment for both human and chimpanzee infants: The expression of species-typical abilities (in their study, joint attention) will vary depending on the socio-ecological context.

Significance of Joint Attention to the Development of Social Cognition

Although many researchers view joint (or shared) attention as being foundational to subsequent social-cognitive development (e.g., Tomasello, 2019), Bard and colleagues remain officially agnostic about joint attention's theoretical significance. The authors emphasized throughout their monograph that their study is descriptive: When using measures appropriate for both 1-year-old chimpanzees and humans living in varied communities, what are the similarities and differences in the presence and/or the expression of joint attention between the two species and among infants living in different socio-ecological contexts? These are important questions, for they go to the heart of determining if joint attention is species unique and species universal and if it plays a critical role in humans' (and chimps') more advanced social cognition. My opinion is that joint attention does indeed play a role in humans' more sophisticated social cognition, favoring some variant of Tomasello's (2019) *shared intentionality theory*. Joint attention reflects infants' and young children's tendencies to view themselves and others as *intentional agents*—as individuals who do things on purpose or *cause* things to happen in an effort to achieve some goal (see Bandura, 2006; Tomasello & Carpenter, 2007). Bard et al.'s findings of both overlap and variability in joint attention between species and among contexts may require advocates of this and related perspectives to rethink and redefine exactly what is going on in the minds of both human and chimpanzee infants growing up in different communities. However, I do not believe the findings call for rejecting joint attention as a reflection of infants viewing others as intentional agents, which, I believe, is foundational in all subsequent more advanced forms of social cognition (Bjorklund, 2021).

Universality and Uniqueness

Regardless of the answer one gets to the question, "Is joint attention foundational in all subsequent more advanced forms of social cognition," the proper assessment of joint attention in different species and different environments is essential to address the issues of species uniqueness and species universality. As various scholars (e.g., Henrich et al., 2010) have noted in recent years, the vast bulk of research in academic psychology has been performed on people from WEIRD cultures, making any statement about universality inappropriate. Developmental psychology is no exception, and researchers have recently recognized the importance of assessing major developmental phenomena in a wider range of cultures (Amir & McAuliffe, 2020; Nielsen et al., 2017).

At the same time, other scholars have argued that taking an evolutionary perspective can greatly benefit our understanding of human development, making comparative research especially important (Bjorklund, 2018; Tomasello, 2019). Following Darwin, there should be phylogenetic continuity in species' mental characteristics, not just in physical features, with contrasts with *Homo sapiens'* closest genetic and phylogenetic relatives, the great apes, being particularly critical. This is no less true for infants' and children's mental lives as it is for those of adults. I think the authors of this monograph would generally agree with Tomasello's (2019, p. 6) statement that "if we wish to explain how uniquely human psychology is created, we must focus our attention on ontogeny, and especially on how great ape ontogeny in general has been transformed into human ontogeny in particular."

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Bard and her colleagues are off to a good start in this pursuit, comparing human and chimpanzee infants living in a range of communities at the same young age (1 year). Ideally, the *development* of joint attention would be assessed in decolonized studies, charting changes in species growing up in different socio-ecological contexts over time, rather than just providing a snapshot of species' similarities and differences at a specific point in time. Such longitudinal studies are understandably scarce. One such study reported that 2-year-old chimpanzees and children were comparable in terms of physical cognition, but the children exceeded the chimps in social cognition. The children continued to improve their performance for both the social and physical tasks at 3 and 4 years of age, whereas the chimps' performance remained stable (Wobber et al., 2014). This pattern of differences in the development of social and physical development is correlated with differences in brain development. The brains of human children continue to grow through the preschool years, whereas the brains of chimpanzees are nearly 90% complete by their second birthdays (Wilder & Semendeferi, 2022). Bard et al. point out, however, that studies such as this are limited in what they can tell us about the species uniqueness or universality of the measures under question because they assess children only from one cultural context (and a WEIRD context at that), with chimpanzees from a single, very different context (laboratory reared). Although I do believe that such studies provide some useful information, I concur that comparative research that includes both human and ape participants from varied socio-ecological contexts is needed if we are ever to definitively answer the questions of universality and uniqueness of joint attention or of any other social-cognitive ability.

The Importance of Plasticity

The findings of Bard et al. make it clear that both human and chimpanzee infants possess substantial plasticity with respect to the expression of joint attention. This plasticity is not infinite, however, but is constrained by an animal's biology, by their physical and social environments, and by the interaction of endogenous and exogenous factors over the course of development. Although constraints may limit how some information is processed, they make it easier for individuals to make sense of certain types of information (e.g., social relations). Such constraints are not innate but are the result of structured Gene $\times$ Environment $\times$ Development interactions, and are reflected by the concept of *evolved probabilistic cognitive mechanisms*, a construct I defined as:

information-processing mechanisms that have evolved to solve recurrent problems faced by ancestral populations; however, they are expressed in a probabilistic fashion in each individual in a generation, based on the continuous and bidirectional interaction over time at all levels of organization, from the genetic through the cultural. These mechanisms are universal, in that they will develop in a species-typical manner when an individual experiences a species-typical environment over the course of ontogeny (Bjorklund et al., 2007, p. 22).

I think the results reported by Bard and her colleagues fit the concept of evolved probabilistic cognitive mechanisms well, both for humans and chimpanzees. Joint attention is observed by 1 year of age for groups of children and chimps in a wide range of environments, although how

joint attention is expressed differs depending on the specific socio-ecological developmental context.

In retrospect, that there was both overlap and variability in how joint attention was expressed among the different human groups should not have been surprising. *Homo sapiens* live in the widest habitat range of any mammal and display substantial cultural variability in family structure (humans are a marginally monogamous/marginally polygamous species) and in how infants and children are perceived and treated (e.g., Keller, 2007, 2017; Lancy, 2015). Lancy (2015), for instance, sees cultures as existing along a continuum in terms of how children are viewed and treated. At one extreme are *neotocracies*, with children being viewed as innocent, requiring substantial nurturing and protection, often at great expense to their parents. Most middle-class WEIRD cultures can be described as neotocracies, but so can many hunter-gatherer cultures, such as the Aka, one of the groups investigated in the monograph. At the other extreme are *gerontocracies*, in which adults are the most valued members of society. Infants and children in gerontocracies are seen as a drain on resources, might be expected to work, valued primarily for their economic contribution to the family, and often treated harshly. The Nso, the traditional subsistence farming group investigated in the monograph, can be described as being on the gerontocratic end of Lancy's continuum. Despite the often-substantial differences in the early experiences of infants and toddlers in these extreme groups, navigating the social landscape is essential for all, and this begins, I believe, with joint attention. Yet, given the vastly different social ecologies in which human infants find themselves, it should not be surprising that they develop different psychologies when it comes to dealing with social others. According to Keller (2017, p. 834), the specific ecological, social, and historical milieu of a culture "necessitate[s] different psychologies to enable and facilitate competence in particular environments. Different psychologies are constituted along different developmental pathways." Infants and young children evolved to be sensitive to features of their early social environment and have the plasticity to adjust their social behavior to their ecological niche – the same underlying, evolved, species-universal social-cognitive mechanisms are modified to achieve a similar adaptive outcome – and this is clearly demonstrated by the overlapping but nonetheless variable patterns of joint attention in the three human groups studied in this monograph.

In contrast to the findings for the humans, I was surprised with some of the results for the chimpanzees and the comparisons between the chimps and humans. My familiarity with the published literature on joint attention in chimpanzees led me to expect that most within-species variation would be between the enculturated animals and the wild and captive groups, with the latter two showing similar patterns. Moreover, I anticipated that only the enculturated chimpanzees would show substantial overlap with the human groups, and this because of the chimps' grossly species-*atypical* rearing experience. Yet there was overlap and variability both within the three chimpanzee groups and between the *Homo* and the *Pan* genera. Although the authors are quite clear that their samples are small and limited and that no definitive conclusions can be made about species similarities and differences, it seems clear that young chimpanzees – members of a highly social species – evolved mechanisms of joint attention to facilitate their navigation of their social world and that, like humans, they also possess the

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plasticity to modify their evolved social-cognitive mechanisms to adapt to their local socio-ecological context.

The high degree of plasticity shared by humans and chimps with respect to early social cognition was presumably also possessed by the last common ancestor of the two species, and such plasticity may be, in part, the mechanism by which great ape sociality evolved into a unique form of human social cognition. This is a proposal I've made previously (e.g., Bjorklund, 2006, 2021; Bjorklund & Rosenberg, 2005), based mainly on research showing that some aspects of social cognition, including deferred imitation (e.g., Bering et al., 2000; Tomasello et al., 1993), referential communication (e.g., Povinelli et al., 1992), and helping (Warneken & Tomasello, 2005), are more similar in enculturated chimpanzees to those displayed by young human children than by mother-reared chimps. Based on this evidence, my colleagues and I theorized that modifications in ancestral child-rearing practices, chiefly by ape mothers, may have produced offspring with altered, more human-like, social-cognitive abilities, changing the ecological niche and selective pressures of the group (Bjorklund, 2006, 2021; Bjorklund & Rosenberg, 2005). Evidence that chimpanzee infants and (mostly) their mothers, living with conspecifics in different socio-ecological contexts (Gombe versus zoos) vary in their expression of joint attention, makes more plausible the possibility that humans' common ancestor with chimpanzees had the plasticity to make small changes in their social-cognitive behavior, leading eventually to species-typical patterns of social development and behavior in both modern chimpanzees and humans.

Conclusion

Bard and her colleagues have made it clear that joint attention, when broadly defined (joint engagement) is observed in both human and chimpanzee infants and that the expression of joint attention varies as a function of an infant's rearing environment. Joint attention may thus be universal in both children and chimps, but there is no single expression of joint attention that is prototypical of either species. Moreover, using the authors' definition, there is no evidence that joint attention at 1 year of age is unique to humans. These are important findings and have implications for theories of both human and ape social-cognitive development. What I find compelling, however, is that this research reflects the phylogenetic continuity of mechanisms of social cognition and evidence that humans, chimpanzees, and presumably the common ancestor of these two species, have (or had) the plasticity to modify their social-cognitive abilities to adapt to their particular socio-ecological niche, possibly altering the selective-pressure landscape as they did, and resulting in changes that set the stage for a unique form of human social cognition.

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