COOPERATIVE COMMUNICATION AND COMMUNICATION STYLES IN BONOBOS AND CHIMPANZEES IN THE WILD: SAME SAME BUT DIFFERENT?

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Human language is manifested by fast-paced and extensive social interactions, thereby representing an essentially cooperative endeavour. It has been repeatedly claimed that the cognitive skills related to participation in cooperative communication are unique to the human species (Levinson, 1995; Tomasello, 2008). One way to enable a better understanding of the factors and pressures triggering the evolution language is the comparative approach, which uses empirical evidence from living species to draw inferences about communicative abilities in our ape-like ancestors. Rossano (2013) recently provided evidence that the structure of communicative interactions between mother-infant dyads of captive bonobos is strikingly similar to the sequential structure of social action in human conversation. Using parameters established in human conversation analysis, he found that two dyads frequently established participation frameworks, engaged in cooperative adjacency-pair structures, and communicated at a pace that strongly resembled the timing of ordinary human conversation (Stivers et al., 2009). In the present study, we aimed to investigate and expand some of the parameters used by Rossano (2013) *in situ*, that is in mother-infant dyads of chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*) living in their natural environments. Although previous behavioural comparisons of the two sister species revealed a remarkable dichotomy in crucial

aspects of their social matrix, a direct systematic comparison of their communicative skills is to date non-existent.

Since true differences in communicative abilities between two species can only be proposed if within-species variability is taken into account (Boesch, 2007), we compared communicative interactions of 25 mother-infant dyads in two different chimpanzee and two different bonobo communities: *Taï South* in Taï National Park, Côte d'Ivoire (*Pan t. verus*), *Kanyawara* in Kibale National Park, Uganda (*P. t. schweinfurthii*), *Wamba* in the Luo Scientific Reserve, DRC, and *LuiKotale* in Salonga National Park, DRC. We focused on the single communicative function of mother-infant joint travel, since previous studies suggested that this is a fruitful context enabling the observation of frequent communicative exchanges in mother-infant dyads about a distinct goal: leaving a location (Rossano, 2013). The following criteria of human communicative interactions were analysed: (i) formation of participation frameworks before signal production, by analysis of gaze, body orientation and initiation distance, (ii) adjacency pair-like sequences, by analysis of gestural pursuits and response waiting after each pursuit; and (iii) the timing between signal and response. We analysed a total of 415 chimpanzee and 316 bonobos joint travel interactions filmed during 2200 hours of observation. Overall, our results showed that both bonobo and chimpanzee mother-infant dyads showed the capacity and motivation to engage in cooperative communication. Moreover, the two species differed significantly in terms of all three investigated criteria. While gaze, close initiation distance and fast-paced responses were features of bonobo mother-infant interactions, chimpanzees performed a larger number of gestural pursuits, more response waiting and more 'delayed' responses. Notably, none of these findings could be explained by mere within-species variability.

Taken together, we provided compelling evidence that our two closest living relatives differ regarding temporal patterns and styles of their gestural communication. Bonobos seem to anticipate and respond to signals before they have even been entirely executed, while chimpanzees frequently engage in more prolonged communicative negotiations. Nevertheless, both *Pan* species use sequentially organised, cooperative social interactions to achieve a mutual goal: leaving together to another location. Communicative interactions of bonobos and chimpanzees thus reflect crucial features of human social action during conversation, implying that cooperative communication emerged as a means to efficiently coordinate collaborative activities. Our study thus corroborates the hypothesis that the cognitive prerequisites for human language as a collaborative enterprise must have evolved in the primate lineage long before speech arose in modern humans (Levinson, 2006; Seyfarth & Cheney, 2008). Hence, our findings add a crucial facet to the *Pan* dichotomy and, as such, aid in pinpointing some of the crucial factors influencing language evolution.

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