

## THE FUNCTION AND EVOLUTION OF CHILD-DIRECTED SPEECH

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### Abstract

Humans exhibit unusual vocal behaviour when interacting with infants and small children. In this ‘child-directed speech’ (CDS) the speech signal differs from speech addressed to adults, both acoustically and structurally, exhibiting increased conspicuousness and comprehensibility compared to regular adult-directed speech. CDS has been observed in numerous cultures and it is widely considered a human universal (Ferguson, 1978; Fernald et al., 1989; Soderstrom, 2007).

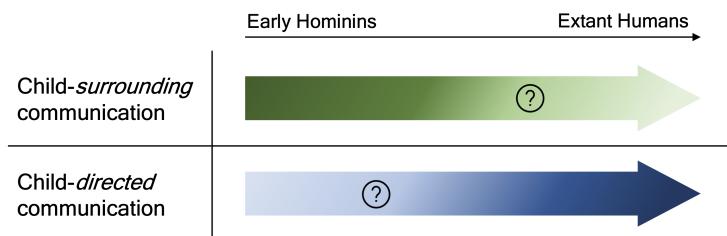
Over the past few decades, a plethora of studies has shown that these structural and acoustic features support the acquisition of language by infants at both comprehension (e.g. Singh, Nestor, Parikh, & Yull, 2009) and production (e.g. Porritt, Zinser, Bachorowski, & Kaplan, 2014; Rowe, 2012) levels, suggesting a functional teaching role.

Here, we discuss how CDS evolved by examining which elements of human CDS are present in our closest-living relatives and thus presumably also in the last common ancestor. We are interested both in frequency of CDS, i.e., how often the different species address their infants directly and whether they deploy features which increase conspicuousness/ostentation (e.g. repetitions, F0, pitch modulation).

Research on non-human great-apes suggests that apes rarely direct vocal behaviour at their infants (*chimpanzees*, *Pan troglodytes*: (Laporte & Zuberbühler, 2011); *bonobos*, *Pan paniscus*: (Oller et al., 2019)), and if so, most likely in ways indistinguishable from adult-directed communication (ongoing work). This

would then suggest that infant great apes mostly rely on infant-surrounding communication in the acquisition of their vocal communicative competence, and that infant-directed communication evolved *de novo* among our hominin ancestors. As such, we argue that child-surrounding speech in humans requires much more research attention to understand whether this originally predominant source of input remains significant in humans, or has been replaced by CDS (see Figure 1) as the main source of learning. The potential relevance of child-surrounding speech is supported by the fact that the interplay of child-directed and child-surrounding speech shows major cross-cultural variation in human child-rearing. Indeed, in some linguistic communities, surrounding speech seems to be the primary source of input in the early phases of child development since adults rarely directly address children (Kaluli and Samoan: (Ochs & Schieffelin, 1984); Yucatec Mayan: (Shneidman & Goldin-Meadow, 2012), Tsimane: (Cristia, Gurven, & Stieglitz, 2019)), at least in their first year of life. Despite these differences in input type, children still become competent native speakers (Brown, 2011; De León, 2011; Ochs & Schieffelin, 1984).

This raises critical questions regarding current theories and the importance of CDS compared to child-surrounding speech in the evolution of language. We conclude that, even though CDS does indeed serve to facilitate language acquisition in humans, it also remains plausible that child-surrounding speech can compensate for limited CDS, at least during some developmental stages, thus deserving more consideration in ontogenetic studies of language evolution.



**Figure 1. Transition of child-surrounding to child-directed communication.** The transition of the importance of use of child-surrounding communication to child-directed communication. Darker colour shows importance/presence and brighter colour possible insignificance of CSS and CDS from early hominins to extant humans.

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