

living primates for such generalizing claims, and we know very little about relevant behavioral attributes in extinct primates (Plavcan & van Schaik 1997). The parental selection hypothesis (sect. 3.2), for example, supposes that infant stress vocalizations invite neglect and abuse “in primates generally.” Whether the majority of the more than 300 living primate species will exhibit the same response remains to be studied, but in the few primate species where mother-infant interactions have been studied in any detail, this is not the case (Gouzoules & Gouzoules 2002). Generalizations in the opposite direction are equally unhelpful. For example, the assertion that “apes and monkeys do not vocalize as often as humans” (sect. 3) can be refuted with examples of dozens of primate species that permanently utter vocalizations. Humans are therefore not unique in this respect. Thus, although this article presents some interesting new approaches to the discussion of the origins of language, I doubt that it will be the final word on this topic.

Apes, humans, and M. C. Escher: Uniqueness and continuity in the evolution of language

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Abstract: Ontogeny, specifically the role of language in the human family now and in prehistory, is central to Locke & Bogin’s (L&B’s) thesis in a compelling way. The unique life-history stages of childhood and adolescence, however, must be interpreted not only against an exceptionally “high quality” human infancy but also in light of the evolution of co-constructed, emotionally based communication in ape, hominid, and human infancy.

Locke & Bogin (L&B) bring together convincing data on primate life-history stages with informed speculation about the evolution of language. I limit my comments to the relationship between the evolution of language and the infancy life-stage.

Central to that part of L&B’s argument are the following assertions:

1. Few recent proposals about the evolution of language have given a primary role to matters of ontogeny.
2. In humans, the life-history stages of childhood and adolescence are added to the three stages – infancy, juvenility, and adulthood – found in other social mammals.
3. Compared to other primates, the quality of human infancy is enhanced by greater social stimulation of offspring by their parents. L&B’s parental selection hypothesis suggests that infants who were better at vocal engagement with their parents secured greater care and, in turn, learned more complex phonetic patterns. Then, with the advent of uniquely human childhood, and in the context of the family, new opportunities arose that drove the evolution of language via “negotiation of more structured and complex forms of vocalization” (sect. 9).

L&B’s emphasis on parent-infant engagement in the context of the family is a welcome addition to a swelling cache of theoretical formulations that – contra the first statement above – place ontogeny front and center when reconstructing the evolution of language from nonhuman primate communication. Humans communicate across the generations not as encoders and decoders of information using syntax and semantics but as emotionally attuned creatures who create meaning together as they go about their daily lives. An emphasis on the evolution of this emotional engagement (Greenspan & Shanker 2004; Mithen 2005) is crucial as scholars across the disciplines apply themselves with renewed excitement to experimental and theoretical work on the evolution of language (Fitch 2005). Crucially, it argues

against a current vogue to “fraction[ate] language into multiple interacting components” (Fitch 2005, p. 216). “Fractionating” means looking at speech, syntax, and semantics as discrete systems in order to trace their evolutionary roots separately. Some insights do emerge from this approach, but real progress requires that “mechanisms” of language be considered in the context of the ontogeny of meaning-making – that is, in a context that situates the origins of language in parent-child caregiver practices.

Some progress has been made already. Startlingly, L&B construct their parental selection hypothesis without reference to ontogeny-focused scenarios by Borchert and Zihlman (1990), Falk (2004), Parker (2000), or Savage-Rumbaugh (1994). Collectively these formulations support a view of *Homo* infants as supremely vulnerable, owing to the coupling of bipedalism and big brains. More importantly, they indicate that L&B’s claims for human uniqueness (statements two and three above) are best supported by a firm grasp of the continuity in development of meaning-making in apes and humans. This simultaneous embracing of human uniqueness, on the one hand, and of continuity with our closest living relatives, on the other, is no paradox. Rather, it is reminiscent of Escher’s famous drawing in which a hard look transforms fish-in-the-water to birds-in-the-sky. Look one way at the evolution of language and what comes into focus is human uniqueness; look another and you will see ape-human continuity.

For wild and captive apes, emotional engagement of infants with their mothers, siblings, and other social partners motivates, and even more so enables, the expression of certain (though not all) communicational skills. Writing together and separately (Fogel et al. 2006; Greenspan & Shanker 2004; King 2004; King, in press; Shanker & King 2002), Stuart Shanker and I have laid out a series of ideas about the evolution of affective meaning-making that are grounded in data from apes and children. We argue that the “vocal-verbal” advances highlighted by L&B (see, e.g., sect. 3.2) evolve from the multimodal communication of primates already highly skilled, from infancy onwards, at participating in mutually constructive meaning-making. Our understanding of meaning-making involves not the conduit-like transfer of information from sender to receiver in linear fashion, but rather the mutual transformation in the actions, and perhaps the thoughts and moods, of two partners in the contexts of ever-changing interactions (see also Reddy 1993). Posture, gesture, and facial expressions are central here, as well as vocal behavior.

To say that after the second birthday, “infants develop a suite of cognitive traits that will enable language to be used at a basal level of creativity and efficiency” (sect. 2.2) is, then, awkward shorthand at best. It is not cognitive traits alone that enable increasingly proficient language usage, but also the emotional engagement of infants with their caretakers; this back-and-forth communication, playful and loving in some cultures, serious and less explicitly affective in others, unlocks and indeed helps to create the infant’s abilities. What *Homo sapiens* parents and infants do together, they have evolved to do together; vocal-verbal behavior increases in importance while remaining part of a communication system that is multimodal.

The “greater handling required by the human infant” as a result of the shift from quadrupedalism to bipedalism does produce “more intense social stimulation during a period in which the brain grows at a compensatorily rapid rate” (sect. 2.1). Secondarily, altricial human babies are appreciably different than ape babies; brain-growth pattern are distinct in the *Homo* lineage. Yet the parental social stimulation of infants in hominids and *Homo sapiens* evolved from a strong foundation of emotional engagement present in our ape ancestors. The linguistic accomplishments in later life stages in *Homo sapiens* flow from the powerful dynamic foundation set in infancy, and, indeed, should vary with the emotional signature of that parent-infant interaction. Testable predictions at both the phylogenetic and

developmental levels follow logically – for example, greater contingency and emotional nuance in cross-generational communication should lead (whether phylogenetically or developmentally) to more advanced communication (for details, see Greenspan & Shanker 2004; King 2004). Future primatological research along these lines will surely contribute in serious ways to evolution-of-language theorizing.

Words are not costly displays: Shortcomings of a testosterone-fuelled model of language evolution

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Abstract: Only by misconstruing the term *performative* are the authors able to argue that males surpass females in “performative applications” of language. Linguistic performatives are not costly displays of quality, and syntax cannot be explained as an outcome of behavioural competition between pubertal males. However, there is room for a model in which language co-evolves with the unique human life-history stage of adolescence.

This target article attempts an ambitious synthesis. It is high time that speculations about language evolution were grounded in an adequate understanding of the evolution of human life history. Where the article deals with human growth and development it appears authoritative; however, the specifically linguistic sections are less convincing.

Locke & Bogin (L&B) claim that “performative applications of language . . . consistently favor males” (sect. 5.1, para. 3, emphasis in original). In linguistics, the term *performative* is subject to precise definition. Austin (1975: 14) stipulates that “there must exist an accepted conventional procedure having a certain conventional effect, that procedure to include the uttering of certain words by certain persons in certain circumstances.” As a “conventional effect,” the performative force of an utterance is abstract and institutional – quite unlike the material impact which an animal signal is designed to produce. Hence, when a bride says “I do” during her wedding ceremony, her metamorphosis into a wife doesn’t depend on how she vocalises those sounds. Provided the circumstances are appropriate and her intention clear, the physical details of her performance – for example, whether she whispers or stridently declaims – are irrelevant. Speakers’ communicative intentions are accomplished by being socially recognised (Grice 1989); they are not judged by reference to physical qualities such as amplitude, stamina, or vigour.

L&B make their sexual selection case by claiming that “important aspects of language cannot appear until sexual maturity” (target article, Abstract). By this they mean that young children lack sufficient “real world knowledge” (sect. 10) – presumably regarding sexual behaviour – to be able to make pragmatic inferences about speakers’ intentions. But the presence or absence of adult content is irrelevant to the presence or absence of key features of language such as performative force, which is wholly within the capability of four-year-olds playing “let’s pretend.” L&B envisage a juvenile phase during which “teasing, joking, and gossip” serve “group-oriented goals” (sect. 9). This is uncontroversial, but how would such processes be reinforced through an adolescent phase of intrasexual, epigamic selection? Can the authors clarify the circumstances in which individualistic male sexual rivalry promotes “group-oriented goals”?

The authors’ evolutionary model gives pride of place to youths fighting with rap as chimpanzees pant-hoot or caribou bulls roar. Suggesting that “testosterone promotes verbal dueling” (sect. 6), the authors invoke shortages of this hormone to explain why female “performative applications” don’t measure up to those of males. However, they then let slip an observation that turns this extraordinary argument on its head. Adolescent females, they concede, gossip against rivals by enlisting “the support of peers, greatly surpassing males in this practice” (sect. 6). Only by systematically conflating linguistic performatives with bodily performances do the authors succeed in obfuscating the awkward truth: namely, that to enlist the support of peers in manipulating collective judgements is precisely to deploy “performative force.” Here, we encounter a gender bias in “performative applications” that contradicts their entire argument.

Gossiping teenage girls, then, compete by enlisting the support of peers in constructing and contesting perspectives on the world. In the case of male-on-male rap, the standards are different. As one informant puts it: “Don’t hafta make whole bunch sense, long sounds pretty” (see target article, sect. 7, para. 4). So, while, according to the authors, females compete with socially relevant information, males compete by making pretty sounds. Accepting this contrast for the sake of argument, whose strategies would have driven the evolution of syntactical and semantic complexity in speech? Gossiping is a distinctively linguistic skill (Dunbar 1996). Singing is not. Male-on-male vocal competition may help explain phonological complexity in the songs of birds, whales, and, arguably, hominin youths; it cannot explain the morphosyntactical or semantic complexities of gossip.

We readily agree that costly performances are valuable as hard-to-fake indices of individual quality. But how is this relevant to the evolution of language? The issue concerns more than narrowly vocal abilities. How and why did distinctively human verbal abilities become so decisive in social competition among our ancestors? Among nonhuman primates, attention paid to vocalisations may be symptomatic of dominance, but it is not causative. The reverse is true of humans. Among hunter-gatherers, social relations are best described in terms of “counterdominance” (Erdal & Whiten 1994). In such egalitarian contexts, physically unimpressive individuals may gain prestige and influence through their verbal fluency. Contrary to L&B, the pressure on speakers is not to show off with spectacular vocal displays. Typically, hunter-gatherers avoid signs of personal ambition or boastful aggression. Most valued are conversationalists skilful at managing conflicts and securing community-wide consensus. Often, older women have the last word. L&B convey the opposite impression by selecting examples of formal oratory typical of horticultural “Big Man” societies – as opposed to egalitarian hunter-gatherers who are more likely to be representative of early human societies.

Unlike animal vocal displays, which are evaluated on an analog scale, linguistic messages are digitally encoded. There is nothing intrinsically costly or reliable about a linguistic sign. The distinctively human language faculty – language in its “narrow” sense – lacks any counterpart in animal social communication (Hauser et al. 2002), where honesty is underwritten by investment reliably demonstrating signal quality (Zahavi & Zahavi 1997). L&B envisage linguistic evolution driven by direct behavioural competition between siblings or adolescent male sexual rivals. But such dynamics could only drive the evolution of signals that are honest because they are costly – exactly what linguistic signs are not.

In short, the authors show little awareness of the scale of challenge facing any theory of language evolution. To quote Chomsky, language is “based on an entirely different principle than any animal communication system” (Chomsky 1988, p. 183). As a milestone in the evolution of communication, “language is off the chart” (Chomsky 2002b, p. 146). Above all, what cries out to be explained is the abstract computational principle of digital infinity (Hauser et al. 2002). Instead of attempting