Interaction promotes cognition: The rise of childish minds

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Abstract: Life history shaped language as, cascading in time, social strategies became more verbal. Although the insight is important, Locke & Bogin (L&B) also advocate a code model of language. Rejecting this input-output view, I emphasize the interpersonal dynamics of dialogue. From this perspective, childish minds as well as language could be derived from the selective advantages of a total interactional history.

For Locke & Bogin (L&B) childhood and adolescence changed the genetic underpinnings of human talk. Rejecting a learned/innate contrast as simplistic, they posit that our vocal-verbal behavior draws on the sum total of selection advantages. Development has created resources that transformed brains and behavior. L&B's achievement is to have shown why the evolution of language must use the whole of life history.

In L&B's model, childhood and adolescence take on a major role in language evolution. Defending this, they acknowledge that structure, pragmatics, and performance fall "under the same theoretical roof" (sect. 12, para. 4). With Hauser et al. (2002), mastery of human languages depends on a "biological capacity" (sect. 12.). Vocal-verbal signaling is purposeful, pragmatic action used in managing how people act and attend. Going further, L&B in section 4.1, endorse Linell's (1982) attack on the "long tradition of analyzing only written language." Turning from exclusive focus on sentences, linguistic capacities reconnect with action. In facing life's challenges, selection history favors "foundational behaviors" (sect. 2) for persuasion, pragmatics, and attention management. Not only does language require the whole of modern ontogeny but, with Hogan (1988), later behavior "automatically credits relevant developments in earlier stages" (sect. 10, last para.). Evolution thus has *cascading* effects. Today, an infant's cognitive armory includes behaviors whose selection derives from later phases of life. We are psychobiological systems whose lived environment reflects a history of, for example, how children seek nurture and adolescents struggle for status. Language uses the ways in which, in evolutionary time, development links strategic activity with the use of verbal forms. For L&B, language is based in "soft tissues" (sect. 14). So far so good!

L&B nonetheless think that, as early as age 36 months, the "basic components of a functional communicative system are operative" (sect. 2.2). Since language is code-like, speech is merely a "preferred modality" (sect. 2). Taking what Sutton (2004) calls an *expressivist* view, with Fodor, Pinker, and the younger Chomsky, performance depends on linguistic knowledge. Given cascade effects, I fail to understand why L&B commit to this input-output view. Instead, they might argue that, as interactional dynamics changed, language transformed child cognition. Were life history a source of cognitive effects, the evolution of development would have radical consequences. First, it could be argued that, as language is based in soft-tissues, talking uses a total history of social behavior. Second, it could be claimed that, even today, cognitive dynamics emerge both internally and in public language. With Hauser, Chomsky, Fitch, Linell, and many others, we would reject expressivism. The broad faculty of language might be seen to arise from infant use of resources for persuasion, attention-management, and pragmatics.

Anti-expressivists like Carruthers (1996), Clark (1997), Dennett (1991), Linell (1982), Love (2004), and Ross (in press) provide diverse reasons for rejecting code-models. Although taking contrasting views on the "computational core" (sect. 12) of language, all see *thinking* as intrinsic to verbal events. Specifically, Linell (in press) rejects code views because language, mind, and brains are dialogical. Such a perspective, I think, enhances the life history view. Intentional activity, vocalizing, and attention management come to depend on systems of neural control. With the evolution of *total* development, selective advantage goes to individuals who are skilled in sustaining dialogue. Instead of interrogating such views, however, L&B stick with the input-output picture. This conservatism shows especially in relation to humans under three years of age. Not only are infants seen as largely untouched by childhood or development, but L&B have no interest in how they use attention, affect, and nonverbal expression. Indeed, L&B's life history model ignores the use of cultural norms (Cowley et al. 2004; Trevarthen 1988), joint activity (Tomasello 1999), the narrating self (Dennett 1991; Fogel et al. 2002; Nelson 1996), and how brains accommodate silent thinking (Wheeler 2004). Instead of asking how interaction shapes talking persons, infants are taken to become human when an inner faculty starts to operate on linguistic forms.

Beyond selection due to nature, kin, and sexual choice, L&B emphasize that social sensitivity may be augmented by selected parental abilities. Given commitment to code views, however, no role falls to *cultural* selection. Even though using parental beliefs, human infants differ from other primates only because "social stimulation" gives "quality" (sect. 2.1) to their lives. Indeed, for L&B, cross-specific comparison makes it appropriate to define infancy as lasting to the age of three. By this stage, as noted, the structure of language is thought to be "laid down" (sect. 2.2). Although "some degree of integration" (sect. 12) occurs between pragmatics, performance, and structure, selection sensitizes only parents to expressive biomechanics. This is odd in a theory where code-models are linked with writing and vocal-verbal signaling with primate abilities. It is even more so in cognitive science where, today, many trace verbal forms to social evolution (see Kirby & Christiansen 2003) and grammar is increasingly seen as cultural (Deacon 1997; Tomasello 2003). For L&B, however, the evolution of development benefits infants through mechanisms like trickle-up phonetics, an instinct for inventiveness, and increased parental sensitivity. Cascading facilitates them neither in assessing and managing adults, nor in using affect to shape interaction.

L&B's linguistic individualism blemishes the life history model. If the evolution of development cascades onto modern infants, we would expect sensitive reaction and response to adult dynamics. Given cultural selection, infants would gain from linking verbal patterns with resources used in pragmatics, performance, and attention management. With Skinner, Bruner, Tomasello, and Hauser (among others), interaction might be a crucial *locus* of learning. Torn from an input-output model, indeed, life history might be used to interrogate how dynamics alter human cognition. For example, adults may design interactional events to prompt infants in using selected natural and cultural resources. Learning to talk may draw on how, in real time, adults use verbal patterns to construct social events. No purely internal language faculty could exploit the fluidity of interaction. Accordingly, L&B do not link life history with cognitive dynamics. Instead of challenging linguistic individualism, they focus on a modest goal. Even if we adopt a code-model, they show, the evolutionary process will use the whole of life history.

The phylogeny and ontogeny of adaptations

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Abstract: Locke & Bogin (L&B) rightly point to the absence of ontogeny in theories of language evolution. However, they overly rely upon ontogenetic

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data to isolate components of the language faculty. Only an adaptationist analysis, of the sort seen in evolutionary psychology, can carve language at its joints and lead to testable predictions about how language works.

Locke & Bogin (L&B) begin their paper by describing the recent history of scholarship in language evolution. The key point they draw out is that ontogeny has been largely ignored, and their aim is to rectify this omission. What they do not state is that most of the work has been on phylogeny; research has predominantly focused upon the evolutionary transitions that may or may not have led to human language as it is now.

Mapping out phylogenies is not the only use for evolutionary theory. Evolutionary psychology (EP) is in the business of individuating traits through adaptationist analyses, such that organisms are looked at in terms of the ecology in which they live and predictions are made about the kinds of psychological adaptations (mechanisms) required to meet ecologically relevant task demands (Andrews et al. 2003; Dickins 2005). Sometimes this is done against a backdrop of hypothesised environments of evolutionary adaptedness, and such hypotheses are generated from, among other things, comparative data. This kind of functional analysis provides key constraints for subsequent discussion of proximate mechanisms.

If we accept that language has evolved, and there is little reason not to, we can then apply EP reasoning to the subject matter – language itself. By carefully thinking through the adapted functions that language delivers we can begin to individuate components of this faculty. Then, once we have an EP theory of language we can, perhaps, begin to think about its phylogeny, for we know what has been selected for. This is a long project, and not without methodological problems, not least the absence of fossil evidence; but anything else would run the risk of generating just-so stories. However, once the EP project has been completed it is hard to imagine what use phylogenetic hypotheses could be put to other than to demonstrate that the already isolated adaptations could have evolved.

Ontogenetic hypotheses can be used slightly differently from phylogenetic ones, in that they can be tested in the laboratory and, in so doing, aid in the individuation of psychological adaptations. Nonetheless, before one goes into the lab one needs to propose a sound evolutionarily based hypothesis about how ontogeny would pan out. Again, adaptationist analysis should come first.

L&B appear to have operated a somewhat mixed strategy, but one that mostly falls in line with the tradition of speculating on phylogenies. Their initial observations about what language is clearly originate from thinking about its adapted functions. So, as with much contemporary EP, they see language as fulfilling a variety of social signalling tasks. What is more, they move away from the traditional Chomskyan focus upon grammar and content, and note that language is a many-stranded communication system. They rightly point to the qualities of voice, pragmatic inference, and verbal fluency, among many other things, as sources of signal and information. However, they only use this insight to broadly define the aspects of language they are interested in. After this, L&B go on to outline various key features of language development, which they in turn use to speculate about phylogeny. So, they note that as we develop from infancy to adulthood social contexts become more complex and this is matched by increased communicative sophistication. In particular, they claim that adolescence is a period of near-adult social complexity in which the rules of adult life can be learnt and to some extent implemented without the cost. During this period, language develops such that grammar becomes more sophisticated, speech is more fluent, more and more pragmatic communication is engaged in, and the native language is modified. Adolescence sees the onset of gossiping about others, as well as "joking, deceiving, mollifying, negotiating, and persuading, with increases in the use of sarcasm" (sect 2.8). In brief, the social uses of language become more prevalent.

L&B discuss the possibility that human infancy has been foreshortened by natural selection in order to allow maternal resources to be diverted to new offspring more rapidly, and that this in turn led to childhood. Children are semi-independent and require less care, and, importantly for L&B, are able to engage in verbal interactions with adults that will shape their linguistic development. It is during this period that what could be referred to as a Chomskyan basis for linguistic communication is established. L&B further hypothesise that the social practice functions of adolescence were directly selected for and this allowed for the emergence of the other strands of linguistic communication discussed above.

L&B have essentially married detailed observations about language development with a loose thesis about the phylogeny of ontogeny, and without engaging in a detailed adaptationist analysis. They are undoubtedly right that ontogeny is a product of natural selection, and their life-history approach, which looks at maternal trade-offs, makes evolutionary sense. But it is unclear what predictions we can now make about the kinds of proximate mechanism underlying language that we could not make prior to this argument. One reason for this is the slight circularity of the adolescence argument. By observing how adolescents use language, and assuming that this life-stage is a product of natural selection, L&B suggest that the social complexities of adolescence drove selection for the social signalling functions of language. But it is equally possible that social complexities were able to emerge as a consequence of social signalling abilities. There is nothing in the current argument that can resolve this, and no obvious testable predictions are made.

The target article concludes by stating that the various strands of language "were stitched together in evolution, as they are in modern times, by the whole of human ontogeny" (sect. 14). This is a different claim from the authors' predominant one that developmental stages were selected for – indeed, this is a claim for a role for ontogeny in phylogeny, and is perhaps the main point L&B wish to make. But it does not follow from any of their observations. Developmental stages, as L&B have discussed, are the consequence of evolution through natural selection. Any developmental "decision" made by natural selection will have consequences that in turn may provide selection pressures and lead to phenotypic change, but this is not coded into the developmental process. In this way, ontogeny does not stitch together various capabilities in phylogeny, but rather specific ontogenetic pathways are selected for and this establishes further selection pressures, the outcomes of which are readily observable in contemporary development.

L&B are right to discuss ontogeny and right to think about the multiple strands of language, but they should have moved away from historical speculation and toward EP if they wished to have made substantive and testable claims about the nature of the language faculty.

The evolution of language: Present behavioral evidence for past genetic reprogramming in the human lineage

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Abstract: Language and life history can be related functionally through the study of human ontogeny, thus usefully informing our understanding of several unique aspects of the evolution of species. The operational principles outlined by Locke & Bogin (L&B)

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