

Chapter 7

Human Evolution: The Linguistic Evidence



Joana Rosselló, Liliana Tolchinsky, and Carme Junyent

Abstract In *The Descent of Man* (1871), Darwin substantiates the idea that our species originated by natural selection, including the mind. Consequently, he meets the challenge of Max Müller, for whom the capacity for language in particular cannot be explained as a result of natural selection. Darwin overcomes the challenge with a conjecture about the evolution of language that is less well known but more suggestive and powerful, complete and integrated than others currently in force; moreover, by focusing on articulate speech, it is more biologically plausible. The power of his proposal stems from a deep knowledge of language. Here too, Darwin studies phylogeny with an eye to ontogeny; glossogeny, that is, linguistic change, does not escape him either. Phylogeny, ontogeny, and glossogeny constitute, in this order, the three parts of this article.

Keywords Darwin · Speech · Vocal production learning · Evolution of language · Language acquisition · Glossogeny

7.1 Phylogeny

The Descent of Man, and selection in relation to sex (*Descent* henceforth) (Darwin 1871) is an extensive argument to demonstrate that our species has evolved by natural selection. Darwin, consequently, had to build in a selectionist explanation of the origin of language. Only in this way could he counter very widespread adverse positions embodied, for example, by the naturalist Alfred R. Wallace and the linguist Max Müller. The former, co-discoverer with Darwin of the theory of natural selection, denied that it was applicable to the human mind, and the latter considered that language establishes an impassable frontier between humans and animals. In *Descent*, the section specifically devoted to tackling the challenge of language consists of only ten dense paragraphs, which deserve to be read and reread for the

J. Rosselló (✉) · L. Tolchinsky · C. Junyent
Department of Catalan Philology and General Linguistics, University of Barcelona, Barcelona, Spain
e-mail: joana.rossello@ub.edu

cautious boldness, completeness and scope of the evolutionary conjecture they present. It is also worth reading them to know firsthand what Darwin said. It should be borne in mind that the Darwinian proposal has long been ignored (Fitch 2010, p. 474) and that, once rediscovered, it is often presented in part, as the precursor of what is now referred to as “musical proto-language” (Fitch 2013a, b; Tallerman 2013). At the same time or separately, it is fairly widely held that the proposal is limited to a conjecture about the origin of speech rather than language (Lorenzo 2006; Bolhuis et al. 2014). Speech, in turn, is considered secondary in the otherwise antagonistic approaches dominant today, namely constructionism (Tomasello) and nativism (Chomsky).

Contrary to these dominant views, by contextualizing and scrutinizing Darwin’s argument, it can be affirmed that the now called musical proto-language is an important piece of a complete and integrated evolutionary view of language in which speech is central. Completeness and integration are the two principles that Darwin never abandons in reconstructing the evolution of language; evolutionary continuity is presupposed. Completeness is especially evident in the fact that Darwin differentiates the notions of language, speech, and tongue (a particular language) and uses them accordingly. Moreover, to a certain extent he takes into account the signed modality. He treats the signs used by the deaf as a manifestation of language, something that took a long time to be accepted in linguistics. When necessary he goes even further and adds *articulate* (articulate language, articulate speech). His careful use of terms contrasts with what is observed today. Darwin, for example, never uses “speech and language.” Such a phrase, on the other hand, has become a common fixed expression in many articles (42,600,000 entries in *Google*, January 2021) where one thing is not differentiated from the other, thus contributing to the conceptual confusion prevailing in the language sciences. Moved by the principle of integration, at the antipodes of dichotomous and essentialist thinking, Darwin reconciles concepts normally considered antagonistic. Thus, the innate (instinct) and the learned (art), communication and thought, use and knowledge interact rather than oppose each other. The reader will be able to appreciate this below, in the reproduction of the story line of the section *Language*, in Chap. 3.

Chapter 3 of *Descent* is the first chapter devoted to human and lower animal mental powers. On a documented empirical basis, sometimes anecdotal, Darwin reasons that incipient stages of capacities supposedly exclusive to man can be observed or inferred in other animals. This would be the case with the ability to progressively improve, to make tools or handle fire, abstraction, and self-consciousness, etc. Also, of course, with respect to language, which in the corresponding section is examined with more attention than the others by the fact that “this faculty has been considered precisely as one of the most important differences between man and the lower animals.” Moreover, according to our author, it is the case that language may well be the cause of other human peculiarities. Let us see it. Darwin, at the end of the fourth chapter of the second edition (definitive version of the text, Darwin 1877a), begins by saying that “the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind” (Darwin 1877a, p. 126); he summarily reviews the data that support the

assertion in question and, finally, with the caution that he occasionally intersperses with his boldness, he reasons thus:

If it could be proved that certain high mental powers, such as the formation of general concepts, self-consciousness, etc., were absolutely peculiar to man, which seems extremely doubtful, it is not improbable that these qualities are merely the incidental results of other highly-advanced intellectual faculties; and these again mainly the result of the continued use of a perfect language (Darwin 1877a, p. 126)

It should be noted that the possibility pointed out in the quote, rightly called plan B by Bickerton (2014), only makes sense if it can be shown that language does not escape natural selection. And no, it does not escape it since, as Darwin remarks—with an example of integration of opposites—language being “half-art, half-instinct [. . .] still bears the stamp of its gradual evolution.” Of note is that it is not on the basis of being a half-instinct that language falls under the sphere of action of natural selection. Also the half-art does. Such an integration is at the heart of the brilliant argument deployed in the ten paragraphs of Chap. 3 (Darwin 1877a); an argument to be followed carefully.

Paragraph 1. Other animals have language. Darwin, a redoubtable master in the art of introducing into his discourse quotations from others, puts into the mouth of the archbishop and “very competent judge” Whately that man “is not the only animal that can make use of language to express what is passing in his mind, and can understand, more or less, what is so expressed by another” (Darwin 1877a, p. 84). Darwin, even with the Archbishop’s support, is not content with anecdotes about how monkeys, dogs, or birds understand each other vocally.

Paragraph 2. The use of articulate language is unique to man. Unlike animals, man possesses an *articulate* language in addition to using, like other animals, [non-articulate] cries, *gestures and facial movements*—note the integration of the spoken modality with gesture and facial expression. But be careful, this exclusive use cannot be confused neither with the understanding of articulated sounds, something that dogs are capable of; nor with the mere production/articulation of such sounds, as parrots and other birds can do; nor with the ability to connect sounds with defined ideas in the production, a milestone within the reach of trained parrots. What truly differentiates us from the rest of animals is the “almost infinitely larger power [of man] of associating together the most diversified sounds and ideas; and this obviously depends on the high development of his mental powers” (Darwin 1877a, pp. 85–86).

Paragraph 3. Art or instinct: could language be an art, similar in this respect to brewing or baking, as some philologists seem to believe? Writing, perhaps yes, Darwin answers, but not language. Nor does language seem to be a pure instinct insofar as languages have to be learned. Still less would it be a pure art “since man has an instinctive tendency to speak, as we can see in the babbling of our little ones.” Languages, moreover, cannot be considered deliberate inventions in whole; they have been formed slowly and, unconsciously, through numerous steps. For that reason, *the closest analogy* to language is to be found in the *sounds of songbirds*, who exercise their ability instinctively but have to learn the song from parents or

tutors. Songs as such are thus as little innate as languages. Ontogenetic parallels between the development of speech and song in birds, transmission of learned songs belonging to another species, glossogenetic parallels between the dialectal differences in the song of a single species according to geographical distribution and the dialects of languages; because of that and some other details Darwin concludes that “an instinctive tendency to acquire an art is not peculiar to man” (Darwin 1877a, p. 86). In a clear but subtle way, it is formulated what much later Marler (1991) would call “instinct to learn,” the quintessence of the principle of integration. The nature vs. culture dichotomy is called into question. The half-art, half-instinct combination is not a partial product of natural selection operating on the half-instinct: it is the two halves that fall under its effect.

Paragraph 4. Origin. Familiar with linguists of contrary opinions like Schleicher and Müller, Darwin proposes his own view, namely that language originated by *imitation* and modification by means of *articulated sounds* of various natural sounds with the help also of signs and gestures. At an ancestral stage, the voice must have been used for *singing*, as among primates is observed in gibbons. In these animals, as in birds, singing has a primary function related to courtship and mating, which makes it an object of *sexual selection*, and is thus used for competitive purposes and territorial defense. With the capacity for vocal imitation in place and given the existence of different predator alarm cries in various species of monkeys and birds, could it not be that a particularly clever ape imitated the grunt of a predator to alert its conspecifics to the kind of danger that was approaching? “This would have been a first step in the formation of a language” (Darwin 1877a, p. 87).

Paragraph 5. The effects of the continued use of language on the brain are more important than the refinement of the organs of speech. Darwin argues that the mental powers of our ancestors had to be far superior to those of the present apes before the most imperfect form of speech was given. Now, once speech is installed, its *continued use* and consequent refinement must have impacted *the mind* by enabling and impelling it to carry out *long sequences of thought*: “An extended series of thoughts cannot be done without the aid of words, any more than an extended calculation can be done without the use of numbers or algebra.” The connection between the “faculty of speech” and the brain is furthermore beyond doubt as shown by brain diseases affecting “speech” (Darwin 1877a, p. 88).

Paragraph 6. Against Max Müller, concepts pre-exist words. The linguist argued that having words entailed being able to form general concepts and, thus, that without words no animal can have these concepts: an insurmountable barrier would thus separate humans from the rest. Darwin, for his part, insists here that he has already shown how other animals have the ability to form concepts, albeit rudimentarily. He also adds that it would not be understood how it is possible for children under one year old to connect sounds and ideas if these ideas are not already in their minds.

Paragraph 7. Primacy of speech. Darwin recognizes that, although the use of the fingers to translate speech shows that signing, as we would now say, is perfectly efficient, the fact that the hands cannot be used for other purposes while signing is a

serious drawback. On the other hand, vocal communication has many precedents in other animals.

Paragraph 8. Glossogenetic parallels. See Sect. 7.3.

Paragraph 9. Complex languages in barbarian peoples. See Sect. 7.3.

Paragraph 10. Brief conclusion. Just as the complexities and refinements of the barbarian languages are not proof that they were the object of a special act of creation—the content of paragraph 9—so neither does “the faculty of articulate speech” in itself present an insuperable objection to the belief that man originated from lower forms.

It would be difficult to find a proposal on the evolution of language as precise and nonrestrictive at once. Because of being generally precise, it is easy to detect its weak points. Given the importance of the specification *articulate*, for example, an explicit characterization of the term is missing. Fitch (2013a) interprets articulate vocalization as an augmented vocalization thanks to more fine-grained control of lip and tongue movements. No doubt that would be a condition for achieving articulate character but the concept of articulate goes beyond that. It can mean discrete, on the basis of a reduced and combinable inventory of segments/sounds, with a phonological basis in short. A related problematic point is the Lamarckian appeal to the inherited effects of use that appears repeatedly in *Descent*: it would be through such effects that articulate speech or language would come into being (Darwin 1877a, p. 48; and in the original paragraph 5 and 7, pp. 88 and 89, respectively). Better known perhaps is the error of attributing a high capacity for imitation to monkeys (original paragraph 4: Darwin 1877a, b, p. 87), which perhaps still dominates public opinion.

Although Darwin’s proposal—see paragraph 3 *above*—can only please advocates (Marler 1976; Nottebohm 1975; Jarvis 2019) of the central role of *vocal production learning* (VPL) (modification of one’s own vocalization as an imitative response to experience with the vocalizations of others) in the evolution of language, it is a probably wrong overstatement to claim (*pace* Fitch 2013a) that this notion is already in Darwin’s proposal. In paragraph 7 we have proof of this. It turns out that there the great apes’ inability to speak is attributed to insufficient intelligence and not to the constitution of their vocal organs. The possession of vocal organs which by continued practice could have been used for speech is assimilated to the case of nightingales and crows, which, though having a similar disposition of vocal organs, are in the former case excellent singers, but not so in the latter. Reasoning by analogy fails here. It fails because crows should be the birds that excel with their songs given their superior intelligence, as we know today; we also know today that, in spite of the difference in their singing, both species are *vocal production learners*. This leads to separate vocal imitation from intelligence (see Searcy and Nowicki 2019) and associate the former instead with VPL, a relatively uncommon evolutionary feature resulting from the duplication of an older neural *pathway* for motor learning (Jarvis 2019), at the base of which there would be a deep homology (Fitch 2013b).

With VPL at the basis of speech, the importance of vocal imitation increases. Without vocal imitation (or its manual substitute in the signed modality) words could not be acquired in ontogeny and without words, no language; moreover, as Darwin

rightly says, no possible or at least controllable sequences of thought either. Taking a little further what he said in the paragraph 5 summarized above, Darwin presents language as the mechanism that “excites trains of thought which would never arise from the mere impression of the senses, or if they did arise could not be followed out” (Darwin 1877a, p. 610). Without words, how would we voluntarily access concepts (Bickerton 2014) and cease to be solely subject to mere sense impressions? How, in turn, could we produce these words in silent mental successions, i.e. do with syntax complex thought, if we could not also produce speech internally, if we were not *vocal production learners*? Our species is that of ancestors who invented “articulate language [and words with it] if, indeed, the word *invented* can be applied to a process, completed by innumerable steps, half-consciously made” (Darwin 1872, p. 60). Darwin’s suggestion is that speech, syntax, and thought would be inextricably linked, as Lieberman (2006) has always defended without resorting, however, to the biological substrate provided by VPL. The Darwinian proposal is complete, not partial; central, not peripheral.

The instinct to learn, which Darwin understood so well and before anyone else—see paragraph 3 *above*—is extremely important. How without language, learned with the instinct of *vocal production learners*, could we, humans, learn as much as we learn? The enormous limitations posed by the absence of language in the so-called non-verbal autism are in this sense very illustrative. This notwithstanding, the fundamental and primary character of this instinct to learn goes unnoticed. As a recent example, take *How we learn. Why brains learn better than any machine... for now* by Dehaene (2020). This book does not even mention that the learning of words requires a vocal imitation ability which is based in VPL. There is still a long way to go before Darwin’s view of language evolution in particular, with the corresponding (corrective) updates, gets the place it deserves in today’s cognitive science.

7.2 Ontogeny

Darwin records the behavior of his first-born son from his birth on 27 December 1839 until the age of 11 with the same thoroughness with which he had recorded the behavior of giant tortoises and marine iguanas, mockingbirds, and finches. Here are some examples from Darwin (1877b):

- After 64 days he made some little meaningless noises to please himself (p. 292).
- At 4 months the first indications of imitation of sounds appear, at 7 months the emission of the first sounds without meaning, but with affective value (p. 291).
- When he was exactly 1-year old, he made the great progress of inventing a word for food, “mum” (p. 293).

Darwin does not limit himself to observing what his child does spontaneously, but tests the child’s reactions to his intrusions: he intentionally touches the sole of the newborn’s foot, strokes his cheek or puts his finger in his mouth to check the precision of his reflex

movements, makes sounds to see if the baby looks at the place from which they are produced. This is a guided observation, aimed at testing hypotheses.

Why does Darwin devote himself to explore his child's behavior so thoroughly? What hypotheses guide his exploration? In the first place, Darwin turns to the study of human newborns to look for empirical evidence of phylogenetic continuity; evidence that there would not be a qualitative leap between the mental faculties of man and higher mammals, nor between these and other species. He looks for indicators of phylogenetic continuity in his child's behavior not only for language but also for reflexes, different emotions, and intelligence in general.

While recognizing the "immense interval" between the cognitive and communicative abilities of infants (humans) and those of other species, he maintains that this interval is covered with innumerable gradations. It is these gradations that Darwin seeks, both phylogenetically and ontogenetically; discovering them will lead him to demonstrate that, indeed, there is no qualitative difference between man and other species.

Be that as it may, it is clear to Darwin that the emergence of language in the individual (and in the species) marks an important difference, a milestone that requires an explanation. The second reason for observing his son is to explain the emergence, the appearance of a fundamentally different function in development. This explanation is provided by his interpretation of his own child's behavior: novelty in development arises from the growth and fusion of early (more primitive) functions. In the specific case of the child, some psychological functions appear in a rudimentary form, develop in parallel and then merge to give rise to a new function: in the plan of action, from reflexes one moves to an incipient intentionality, in the plan of emotions, from a diffuse and reactive discomfort one evolves to a wide range of emotional responses, and in the plan of reasoning one progresses from associations to the anticipation of one event from another. The three evolved functions, intentional action, emotional expression, and anticipation, merge to give way to the first signs of language. Thus, Darwin advances one of his general evolutionary principles: new functions—in this case language—emerge from more primitive functions. There is no creation, only evolution.

Finally, Darwin's decision to scrupulously record his son's behavior is to support his anti-creationist stance. Indeed, from creationist positions, it does not make much sense to observe children, given that human beings are created as adults. Nor is it justified to observe development if we assume, as empiricists do, that human beings are a direct result of their environment. According to nativism, the introspective study of the adult would be sufficient. An interactionist position such as Darwin's invites to study specific subjects in specific contexts in order to understand how their individual characteristics interact with the specific circumstances in which they have grown up (Gruber 1981).

The influence of the Darwinian enterprise and its interactionist stance on the study and conceptualization of language development is enormous. His observations established the empirical basis for research in developmental psycholinguistics (Cole and Cole 1996) and for one of the most widely used methods at the dawn of

the scientific study of language: the observation of particular cases. In this research methodology, a small number of subjects—sometimes only one—are observed in natural contexts and their behavior is carefully recorded.

Moreover, many of Darwin's descriptions of his son's first utterances made it possible to identify evolutionary peculiarities and some fundamental characteristics of ontogenetic development. For example, the fact that in early infant language an expression can have many meanings, as he points out:

At exactly the age of a year, he made the great step of inventing a word for food, namely *mum* [...] he used this word in a demonstrative manner or as a verb, meaning 'Give me food'. [...] But he also used *mum* as a substantive of wide signification; thus he called sugar *shu-mum*, and a little later after he had learned the word 'black', he called liquorice *black-shu-mum*, black sugar-food (Darwin 1877b, p. 293).

More than a century later, psycholinguists wonder about the scope and meaning of this evolutionary feature.

Darwin detects that his son understands many more expressions than he is able to produce. Today we know that the number of expressions that young children understand usually doubles the number that they are able to produce. He also clearly points out the notable acceleration that occurs around 20 months in the acquisition of lexical items, a phenomenon that is currently called "lexical explosion" whose neurological correlate has been demonstrated (Pujol et al. 2006). Finally, Darwin stops to point out very precisely the variations in intonation that he notices in his son's first utterances and which correspond to different sentence modalities: "I was particularly struck with the fact that when asking for food by the word *mum* he gave to it (I will copy the words written at the time) 'a most strongly marked interrogatory sound at the end'" (Darwin 1877b, p. 293). Consistent with his fundamental phylogenetic hypothesis, Darwin does not interpret varieties in intonation in relation to a linguistic phenomenon, as a possible expression of modality, but as a rhythmic phenomenon, "musical pitch," which serves him to argue for phylogenetic continuity.

Language is, for Darwin, fundamentally a means of communication, of expression of emotions and of reasoning. Although in his own reflections he shows familiarity with different grammatical aspects, particularly morphological ones, which serve to compare different languages in his observations of children's behavior, none of these features is even mentioned. His descriptions focus on the occurrence, increase and precision of the meaning of words, and he does not seem to attach any special importance to the fact that he understands words or sentences. Much more striking, for Darwin, is the difference in the speed with which children learn new words or the capacity for imitation they have, as opposed to dogs; much more striking than the ability to combine words present in the former and absent in the latter.

From the current emergentist positions on language development, many of Darwin's interactionist ideas have been recovered and, fundamentally, his notion of ontogenesis as growth and fusion of previous functions that give rise to new

functions and that in a very succinct manner Elizabeth Bates subscribes to: language is “a new machine made of old parts” (Bates et al. 1991, p. 35).

7.3 Glossogeny

When discussing Darwin’s view of language diversity and linguistic change, it is necessary to distinguish ideological interpretations impregnated with a misnamed Darwinism from the Darwinian position itself. The former justifies inequalities as the “natural” result of evolution and translate into the idea that some languages are more advanced than others, or that the development of languages corresponds to the development of the peoples who speak them. Darwin could not be further from these ideas, so where did this confusion originate? Simplifying considerably, we could say that in an interpretation of his thought based on considerations such as those found in the eighth paragraph of the section devoted to language and ignoring what the author says in the ninth, penultimate, paragraph.

The eighth paragraph begins with the observation that there is evidence that both languages and species have formed gradually. Indeed, as Alter (1992) has documented, Darwin repeatedly argued, partly as *captatio benevolentia*, that his evolutionary ideas had been reinforced by contact with linguistics and ethnology. It should be borne in mind that in Darwin’s time it had already been shown that linguistic change operates largely by modification and diversification from a predecessor language (homology). It is not surprising, therefore, that our author had a great interest and considerably high technical knowledge of glossogeny and established several biological-linguistic parallels. Thus, in the eighth paragraph, in addition to the homology referred to, he mentions that in the relations among languages one can see the application of the same formation processes (analogy). The dominant languages and dialects (*sic*) would spread everywhere and lead to the extinction of the others. A language is considered either as a species or as an organism. As a species, a language cannot be born in two different places or reappear once extinct—ideas that Darwin attributes to Lyell; as an organism it can be classified by its ancestry or other characters. Other possible parallels go down to the scale of words. One of them reproduces a fragment from Max Müller that goes like this: “A struggle for life is constantly going on amongst the words and grammatical forms in each language. The better, the shorter, the easier forms are constantly gaining the upper hand, and they owe their success to their own inherent virtue” (Darwin 1877a, p. 91). That the author of the quotation is Müller, an anti-selectionist, and not Schleicher, the ultra-Darwinian who crossed the border of similes to assume literally that languages are organisms, is not without irony and shows to what extent Darwin’s influence on linguistic conceptualization was as great or greater than the other way round.

The ninth paragraph contrasts with the previous one. An argument is presented there against the idea that there are some languages more perfect than others. “With respect to perfection,” he says, “a naturalist does not consider an animal [with perfect

symmetry in radiating lines] more perfect than a bilateral one with comparatively few parts, and with none of those parts alike, excepting on the opposite sides of the body.” (Darwin 1877a, p. 91). So it is with languages. As if this were not enough, it turns out that the *leitmotif* of this analogy is Friedrich Schlegel’s observation—to whom he alludes and quotes indirectly—that languages corresponding to “the lowest grade of intellectual culture”—a dictum that Schlegel himself exemplifies with “the Basque and the Laponian, and many of the Amerindian languages”—show “a very high and elaborate degree of art in their grammatical structure.” In other words, neither a path of perfection nor a correspondence between degree of artifice and “high civilization.” In the end, the fact remains that many popular ideas about languages are still steeped in the ideology exuded by the eighth paragraph rather than the rigor of the ninth.

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