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## Darwinian Explanations of the Origin of Language

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# Summary of dissertation *Darwinian Explanations of the Origin of Language*

*Every chapter and sub§ already has a summary of its own, written in italics at its beginning; the summary here provides the red thread that runs through the four chapters.*

What counts as a Darwinian explanation in biology has varied from time to time and from biologist to biologist (§1.1). On the basis of modern research we have formulated the ideal of a Darwinian explanation in biology (§1.4) that can be used to currently assess the adequacy of a particular example of such an explanation. Central to this ideal are more precise definitions of the fundamental concepts of replication, variation, selection and fitness on the basis of current status of biological research (§1.2). We stress the importance of a good understanding of the proximate mechanisms involved in evolution if we want that our historical, ultimate explanations of adaptations are non-tautologous (§1.3). We conclude chapter 1 with a discussion of sexual selection and demonstrate that all forms of sexual selection except ornamental selection can be seen as straightforward sub-cases of natural selection. Ornamental selection on the other hand can only be treated as an indirect case of natural selection as it always include a 2-stage development, with a handicap used as indicator of a functional attribute (§1.5). As such, explanations involving ornamental selection will always be harder to test than regular cases of natural selection.

Evolutionary explanations outside of biology in the realm of culture come in many forms. We define culture as *all non-genetically determined behaviors, ways of life and beliefs as well as the artifacts and institutions of a population that are passed down from generation to generation*. We stress that human culture differs from animal culture in being cumulative, possibly due to different learning and transmission mechanisms in our species (§2.1). Darwinian explanations of biology should acknowledge at least a) the idea of cumulative evolution, but b) at the same time the abandonment of progress or direction in evolution, c) the idea of multiple cultural phenomena in competition with each other for survival and d) the idea of culture as being shaped by selection. We discuss 8 Darwinian or evolutionary models of culture that satisfy these criteria, 2 ontogenetic and 6 phylogenetic ones. We demonstrate that the dual-inheritance model is by far the superior one as it best disentangles the evolution of human skills to create or use cultural artefacts from the evolution of cultural artifacts themselves (§2.2). We then formulate the ideal Darwinian explanation of a cultural phenomenon in parallel to the ideal Darwinian explanation in biology.

In chapter 3 we turn to our discussion of the evolution of language. We define human language using Hockett's design criteria for (human) language (§3.1). One of the biggest obstacles to such a theory is the dominant formal-grammar paradigm of Chomsky (§3.12). Research from other areas in linguistics such as biolinguistics, animal language research, first language acquisition studies and diachronic linguistics including socio-linguistics show, however, that this paradigm is fundamentally flawed. The mechanisms identified in these areas can be used as the proximate mechanisms that constrain possible Darwinian ultimate explanations of the evolution of language (§3.2). Other constraints on Darwinian explanations come from the philosophy of language (§3.13). We show that mentalism in the philosophy of language is hard to combine with Darwinism which takes a fundamental use perspective of language; we further show that language cannot be a prerequisite for thought, but some elements of thought (such as memory) are necessary and others (such as a theory of mind and self-awareness) are very helpful in acquiring, understanding and using language. This disentanglement of language and thought allows us to treat the evolution of language to a certain extent independent from the evolution of thought.

In chapter 4 we define the problem of the origin of language as about the biological evolution of language skills and the evolution of proto-linguistic forms into our current languages. We show that the problem of the origin of language has to be treated from the perspective of the dual-inheritance theory as only this theory can accommodate the fact that in the evolution of language the cultural evolution of linguistic forms caused selection on biological language skills (§4.2). We show examples of Darwinian explanations in linguistics that implicitly or explicitly assume one of the other 7 Darwinian models of cultural evolution we distinguished in chapter 2 and we show why they fail (§4.2). We then focus on a number of general aspects of language evolution, using the material from chapter 1 and 3, to show that language is most likely an early, gradual, speech first, learnt (functional) adaptation evolved primarily by natural (and thus not sexual) selection (§4.31). We show that although language use most likely has not one unique functional use, its evolution was most likely triggered in the context of socio-politics (§4.32). We indicate the possible causal interrelations between a change of habitat, group size, brain growth, hunting, tool use, teaching, socio-politics and language use. We then take the perspective of the dual-inheritance

theory to look at the evolution of proto-linguistic forms: their phonology, semantics, syntax and their grouped occurrence within dialects. Most surprisingly, not syntax but phonology (especially the dual patterning of linguistic forms) is seen as the key break-through in the evolution of linguistic forms as it made the infinite growth of semantic elements possible. From a thorough use perspective we show how meaningless individual phonemes evolved *after* meaningful sound (or word-sound) combinations had evolved. We further show that whereas current diachronic evolution can be either adaptive or more like drift (or a balance of stabilizing selection with corruption and new adaptive generalizations by rule formation balancing each other), the evolution of proto-syntax out of fixed semantic combinations is clearly adaptive as they have led to a huge increase in the functionality of language. We then (§4.4) evaluate our discussion of the evolution of language by assessing our work in the light of the ideal of a Darwinian explanation in culture as formulated in §2.3. We conclude that although not all elements of the evolution of language can as yet be explained and although further empirical work on the proximate mechanisms involved is required to fill in the details of the evolutionary explanation, the dual inheritance theory comes close to the ideal in explaining the origin and evolution of language.