How to Merge Abruptly, Silently, and Successfully

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Chomsky's instantaneous account of the origin of Merge has provoked considerable controversy [1, 2]. We address two sources of disagreement.

One issue concerns the burst of modern behavior about 40 kya, taken as evidence for sudden appearance of Merge. Several lines of evidence suggest much earlier fully modern behavior [3, 4]. Using data on the ongoing human population explosion [5, 6], we demonstrate that culturally dramatic events need not closely follow genetic changes upon which they ultimately depend. Therefore an instantaneous account of Merge is compatible with a wide range of dates. Arguably the most dramatic consequence of the Merge innovation is that it enabled humans to function as 'information-fixing' organisms. This derives from the strong compositional relation between Merge-based structures and the interpretations they invoke. Whether applied in private thought or public communication, Merge serves to 'lock' conceptual elements into abstract relations. Exploitation of this capacity, however, is constrained by the social/cultural context within which it is exercised. Large communities with complex socio-political and economic differentiation may gather, integrate, preserve, share, and exploit larger bodies of information. Secondary innovations such as mnemonic techniques, scribal practices, writing, printing, and computing technology all have the power to vastly amplify the consequences of Merge-enabled thought and communication. Hunter-gatherer bands within which Merge appeared could benefit dramatically. But fitting individual communities to the specific challenges of a local environment would also call for a strong tendency toward cultural conservatism. This would often be essential to the survival of the community because the life-ways of the elders would incorporate various behavioral and cognitive cultural adaptations essential to meeting local environmental challenges. We propose that the combined effect of these factors could account for long periods during which Merge conferred significant advantages on cognitively modern humans without producing clearcut archeological traces of the Merge innovation.

The second contentious issue is Chomsky's skepticism about a linguistic precursor to Merge. Contra Chomsky, we argue that a protolanguage was necessary to the initial effectiveness of Merge. Though instantaneous appearance may be inherent in the concept of Merge [7], the operation needs a pre-existing foundation to be effective [8]. Bickerton and others have proposed protolanguages incorporating simple combinatoric mechanisms. However, we argue that the concatenating mechanism discussed by Bickerton cannot form a path to the compositionality principle [8]. We propose instead an aggregating function that better meets this requirement. We argue that this function could promote the emergence of a proto-lexicon and the differentiation of its items into functional types, foster the emergence of elements far more abstract than those of typical animal systems, and by these means lay a foundation of materials to which Merge could apply from the outset. We propose that this aggregating function has a continuing role in modern language in the analysis of coordinates. We cite various lines of evidence supporting this proposal and review behavioral results suggesting that coordinate structures, relative to experimental controls, do not hierarchically structure a sequence of conjuncts, but do exhibit aggregation of certain of their semantic properties. We conclude that with the right formulation of the combinatoric properties of a proto-language, this proposal can help to explain how Merge, despite having appeared suddenly and silently (without externalization), could have made an immediate functional contribution to the quality of thought available to its possessors. How to Merge abruptly, silently, and successfully

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