

## Recursion or recursions? Understanding a family of linguistic concepts

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Hierarchical recursion has long been an accepted property of natural languages. Since the claim by Fitch et al. (2005) that recursion is the only necessary property of natural languages, much controversy about recursion has arisen, partly centred on Everett's claim (2005) that Pirahã lacks recursion. Most of the discussion has been overly informal although recursion in languages is formally well-defined (Aho et al. 1983), and some discussion was even acrimonious, arising apparently from a gut feeling that a language without recursion, and its speakers, must be somehow inferior. As Bickerton (2009) pointed out: "Both sides entirely missed the point that while a biological capacity enables behaviors, it does not enforce them. The absence of recursion from Pirahã grammar says no more about universal grammar than the absence of prenasalized consonants or verb serialization from English grammar." Logically, then, recursion is not a necessary property of human languages. Recursion in other species and cognitive domains supports the view that recursion is a general cognitive facility rather than language specific, and manifested in semantics rather than syntax, and thus not sufficient as a property of human language.

The explanatory context here is twofold. (1) Languages are polysystemic systems of different formal and functional registers, related by family resemblances, not monosystemic as 'a language' or 'language' with a universal core. (2) Distinctions are made between (a) two linear recursion types, both equivalent to purely right-branching or purely left-branching patterns, and (b) hierarchical recursion. Some operations (cases of transformations and 'merge') of earlier theories, have been said to be unnecessarily powerful but turn out to be abbreviations for non-recursive and indeed non-hierarchical structures.

Empirical evidence for (1), the polysystemic approach, comes from corpora of spontaneous spoken English and German: while linear recursion is common in spontaneous speech, hierarchical recursion, though not impossible, is rare and leads to syntactic fragmentation. In practised formal speech and written text, hierarchical recursion is less rare. Formal evidence for (2), characterisation of recursion, is provided by linear formal models: recursion is not 'necessary' in phonology, prosody, morphology, the syntax or discourse structure of spontaneous speech; recursion in morphological compounding is typically not syntactic but semantic and more generally cognitive, while syntactic combinatorics are linear.

The specific claims of the polysystemic approach in relation to recursion in languages are: (a) hierarchical recursion is a general cognitive facility, not language-specific, requiring additional memory aids (writing or practice routines) to handle the inherent complexity even of linear structures; (b) hierarchical recursion in languages is register-specific, thus not 'sufficient', with only some formal, mainly textual registers or functional styles using a general cognitive facility of hierarchical recursion; (c) in non-recursive restricted registers recursion is not 'necessary' and whole communities may choose to restrict communication to non-recursive restricted registers. Hierarchical recursion is thus neither a necessary nor a sufficient property of languages.

### References

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