

September 4, 2009

The role of analysis by synthesis in universals
of language behavior and structure

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ABSTRACT OF THE TALK

A known conundrum of language behavior is that sentences are phenomenologically serial (aka “horizontal”) but structurally parallel (aka “vertical”). I first review recent evidence in favor of the analysis by synthesis model of sentence comprehension that resolves this conundrum. Critical feature of these models is that complete syntactic and semantic analyses are assigned after an initial syntactic organization provides a preliminary semantic analysis: that is, as my colleague Townsend and I have put it: we understand everything twice, via distinct computational routes. One route is largely statistically driven, the other provides complementary structural analyses. I then re-interpret that model as a model of first language acquisition, and give examples of the influence of how each computational route sets constraint on the structure of attested languages.

1. Every language must exhibit a statistically and structurally dominant canonical form, with both surface and deep properties (E.g., in English, almost every surface structure is “NP, Verb(agreeing with NP) XP”; and in almost every one of those the first NP is the agent of the verb: these features are necessary to drive early stages of the statistical component of acquisition. This explains an alleged configurational constraint on grammar, namely, the Extended Projection Principle (EPP) (every sentence must

have a subject (implicit in pro drop languages, such as Italian)): thus the EPP is not a part of linguistic architecture, but an outcome of learning constraints on attested languages.

2. Part of the conundrum requiring analysis by synthesis is that in syntactic analyses, trees are built “upward” from more embedded components with movement creating integrated embedding constituents: every grammar involving movement (or copying) has this property, from Categorical Grammar to Minimalism. I propose an explanation based on "coaptation" of representational principles of vision, relating to species specific recognition. In particular, I show experimentally that perception of real “upward” movement (from a more to less embedded portion of a scene) is easier than of "downward" movement. I then argue that this upward hierarchical organization of vision is related to how species recognize the motion of conspecifics. Finally, I may relate this to recent studies of conspecific recognition in the superior temporal sulcus. The logical result is related to the sociolinguistic commonplace that an essential role of language is group recognition.