Asymmetry and Interface Conditions

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We aim at exploring further the three factors that according to Chomsky (2004, 2007) enter into the growth of language in the individual, and in particular the independent principles of efficient computation (Hauser, Chomsky & Fitch 2002).

We discuss the interaction of grammar specific properties with external computational/processing properties, and its effect at the interfaces. More specifically, we consider the role of asymmetry in optimization and language design, and its consequences for interface legibility. We focus on functional projections and the role of asymmetry in their generation and parsing. We show how asymmetry preserving interface conditions contribute to their tractability.

Any grammatical relation must be grounded in biology/genetics. Most likely linguistic relations are properties of neural circuits sub-serving language, either hardwired in or resulting from an operation of the circuits (Jenkins 2000, 2004). Assuming that Merge and Agree are the natural laws of the language faculty, the question arise whether these laws, like the more general natural laws, are best stated in terms of symmetrical or asymmetrical relations. We take these laws to be asymmetric (Di Sciullo 2005, Di Sciullo and Isac 2007), without discarding the possibility that symmetry is available in communication systems in place before the emergence of syntax, viz., the language faculty in the narrow sense. In biology, an asymmetric system might arise from a symmetric precursor, and if this asymmetric system is more robust it will be genetically fixed in the genome.

Asymmetry-breaking has been shown to account for a variety of phenomena in genetics (Hornos and Hornos 1993), biology/physiology (Galaburda, Sanides, and Geschwind 1978; Trevisan, Cooper, Goller, et Mindlin 2007), and physics (Anderson 1994, Brading and Castellani 2003). It is likely that the robustness/stability brought about by asymmetric relations is part of the conditions that make the interfaces optimally legible by the external systems. Robustness is a property of a system, organism or design making it capable of coping well with variations in its environment with minimal damage, alteration or loss of functionality. In Genetics, mutational robustness describes the extent to which an organism phenotype remains constant in spite of mutation. In computer science, an algorithm is robust if it continues to operate despite abnormalities in input, calculation.

We discuss data from historical linguistics and micro-variation substantiating the thesis that asymmetric relations are necessary part of the interface conditions. They contribute to optimization of language design and legibility by the external systems.