

LAD Conferences

L a b o r a t o i r e d e r e c h e r c h e s u r l e s a s y m é t r i e s d ' i n t e r f a c e s

Robert C. Berwick, MIT

All you need is Merge

Biology, computation, and language from the bottom-up

The Strong Minimalist Thesis (SMT) asks how little can be attributed to UG while still accounting for the variety of I-languages attained, relying on third factor principles. It has recently been argued that interface conditions at the conceptual-intentional (CI) side may largely fix the design properties of UG. In this talk we show that these design properties also dovetail nearly perfectly with constraints on the sensori-motor side, with, for example, the no-tampering condition (NTC), Edge labels, binary Merge, and the like all meshing with a computational model that imposes the minimal possible cost for SM. In this restricted sense, then, the entire system, from SM through to CI, is optimal.

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Professor Berwick and his research group investigate computational models of language acquisition, language processing, and language change, within the context of machine learning, modern grammatical theory, and mathematical models of dynamical systems. In the area of machine learning and language, the lab uses the minimum description length (MDL) proposal, updated to incorporate Vapnik's notion of both structural and empirical risk minimization, to induce models from naturalistic parent-child language examples such as the CHILDES corpus. They use this to test explicit hypotheses about the nature and rate of child language development within the context of current linguistic theories, and across multiple languages such as English, Dutch, French, and German.

By parameterizing Chomsky's current linguistic theory into a set of approximately two-dozen modules, the lab has implemented a Prolog system that can be rapidly switched among several dozen languages simply by substituting a new lexicon or dictionary. This computer model can be used to predict and test current linguistic theories with respect to their psycholinguistic fidelity and their logical adequacy. Further, this same model can be viewed as a formal account of both language change over time and language acquisition.

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