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Authors

Berwick, Robert C.
Chomsky, Noam

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'Poverty of the Stimulus' Revisited: Recent Challenges Reconsidered

Robert C. Berwick (berwick@csail.mit.edu)

Department of EECS and Brain and Cognitive Sciences, MIT, 32D-728, 77 Massachusetts Ave.
Cambridge, MA 02139 USA

Noam Chomsky (chomsky@mit.edu)

Department of Linguistics and Philosophy, MIT, 32D-840, 77 Massachusetts Ave.
Cambridge, MA 02139 USA

Abstract

A central goal of modern generative grammar has been to discover the invariant properties of language, presumably “part of the innate schematism of mind that is applied to the data of experience” and that “might reasonably be attributed to the organism itself as its contribution to the task of the acquisition of knowledge” (Chomsky, 1971). One such putative principle is the *structure dependence* of grammatical rules generally, including rules of question formation. One argument for this position, presented in Chomsky (1968), is sometimes called an ‘argument from the poverty of the stimulus’ (POS) since the sample data for selecting a correct target hypothesis does not seem rich enough without positing *a priori* the principle in question. Recently, several researchers have claimed that this POS argument can be deflected without resort to this ‘innate schematism,’ among these a string substitutability procedure (Clark & Eyraud, 2006), or a Bayesian model selection algorithm that adjudicates between regular and context-free grammars (Perfors, Tennenbaum & Regier, 2006). We demonstrate that all these recent arguments fail. We conclude that the POS argument and its support for *a priori* structure dependence holds, without qualification.

The Argument from “Poverty of the Stimulus”

One popular exposition of the POS argument (Chomsky, 1968) proceeds by positing learners presented with example sentences such as (1) below, but crucially not (2), both sentences represented phrase structure terms as illustrated. We then ask how a child might, given examples such as (1), choose between two competing rules for question formation, each rule operating via the ‘displacement’ of the auxiliary verb *is* to the front of the representation: rule (A), which is not structure-dependent but refers only to words and ignores phrase structure; and rule (B), which is structure-dependent and refers to phrase structure. We call this the ‘auxiliary fronting problem’ (AFP):

(1) [[the man] [[is] [happy]]]

(2) [[[the man [who is tall]] [[is] [happy]]]

(A) Front the first occurrence of *is*

(B) Front the structurally most prominent occurrence of *is*

Application of (A) leads to the correct result when applied to examples such as (1), but does not generalize correctly to (2), whereas (B) works properly on (2). Children and adult grammars select (B), indicating that structure dependence is part of the *a priori* schematism cited earlier.

Recent Challenges to the POS Reconsidered

Certain recent research challenges this particular argument. For example, Perfors, Tennenbaum & Regier (2006) assert that “dependence of linguistic rules on hierarchical phrase structure” could be learned “given typical child-redirected input,” thereby defusing the POS argument. But this challenge, like the others cited, is flawed. The POS argument was formulated on the assumption that hierarchical structure was the right representation. Whether it is learned or not is irrelevant. The AFP remains, because the learner faces the same competing choice between (A) and (B) as before: rules remain formulable as structure-dependent or not, independent of the claim that hierarchical structure is learned or not. Further, to the best of our knowledge no one has ever challenged the claim that hierarchical structure can be learned. It can trivially be learned – assuming that the learning system allows the choice of the simplest possible hypothesis, without resort to any complex learning method. If this is true, then these challenges have no bearing whatsoever on the AFP and the related POS argument, appearances to the contrary. Indeed, such work does not even address the AFP as originally posed, since the original formulation employs the notion ‘front,’ i.e., ‘move,’ not a part of the CFGs or alternatives used in these recent challenges. CFGs must be immensely and unnecessarily complicated to replicate such phenomena before we can even state the (A) vs. (B) choice properly. Even assuming all this, these challenges fail because they actually arrive at the wrong target result: verb (adjective, *wh*) movement is *a priori* barred in Subject relative clauses, as evidenced by a long-known and more general “island constraint”; thus there is no need and weaker empirical support for the more specific rule (B).

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