'Poverty of the Stimulus' Revisited: Recent Challenges Reconsidered

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Introduction: The "Poverty of the Stimulus"

A central goal of modern generative grammar has been to discover the invariant properties of language, principles 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,' including a string substitutability procedure (Clark & Eyraud, 2006) and a Bayesian model selection algorithm that adjudicates between regular and context-free grammars (Perfors, Tennenbaum & Regier, 2006). In this paper we demonstrate that all these recent arguments fail; pinpoint why these failures occur; and illustrate that the POS argument and its associated syntactic reflexes are more subtle and general than seems to have been appreciated in this and other recent work.

The Argument from "Poverty of the Stimulus"

One popular exposition of the POS argument (Chomsky, 1968) proceeds by imagining that a child is presented with example sentences such as (1) below, but not (2), both sentences represented in terms of phrase structure as illustrated. We then ask how a child might, given such examples, 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: a so-called 'linear' rule (A), which is <u>not</u> structure-dependent but makes reference only to words, ignoring the phrase structure, and rule (B), which <u>is</u> 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) leads to the correct generalization. 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

Some recent research challenges this particular AFP-grounded POS 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 exactly as before, because the learner faces the same choice between (A) and (B): rules may still be formulated as structure-dependent or not, which remains unaffected by the claim that hierarchical structure is learned. Independently of this, to the best of our knowledge no one has ever challenged that hierarchical structure can be learned. In fact this property 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 the recent challenges have no bearing whatsoever on the AFP and the related POS argument, appearances to the contrary. As we will discuss, such work does not even address the original AFP posed in the first place. Further, even if such work did solve the AFP, it would arrive at the wrong answer, due to the overly narrow range of empirical linguistic data considered. We conclude that the POS argument and its support for *a priori* structure dependence stands.

References

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