SMPL Meanings: Towards Explanatory Adequacy

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Pietroski (2018) argues that human linguistic meanings are instructions for how to generate distinctive concepts via simple operations that don't include Function Application or Lambda Abstraction. The positive proposal is based on three more specific hypotheses.

(**H1**) Lexical concepts can be monadic or dyadic. All the other *generable* concepts are monadic.

(**H2**) The core operations are variable-free analogs of *predicate-conjunction* and ∃*-closure*.

(**H3**) There is also a *very limited* operation of *abstraction*, corresponding to relative clause formation.

Pietroski argues that the proposed combinatorics can handle the usual range of textbook constructions in semantics. Icard & Moss (2023) show that a suitably precise version of the system is weaker than familiar alternatives, but logically interesting: (**H1**) and (**H2**) characterize a concept-generator that supports a sound and complete syllogistic logic; reasoning in this system is no harder, computationally, than reasoning in propositional logic; given the primitive notions, no concept equivalent to predicate-negation can be defined; the unattested "4th corner," of the traditional square of opposition, is also undefinable. Adding (**H3**) yields a more expressive system that can still be described in context-free terms; though strikingly, the generable monadic concepts are equivalent to those that would be generated by first-order logic (in ways that have no context-free description).

This suggests that even if the proposed combinatorics is not one that humans actually employ, it's worth thinking about the possibility of minds that generate concepts in this *computationally spare* way that is *in the ballpark of descriptive adequacy* for human meanings; cp. Chomsky (1957, 1959). It was useful to ask how human grammars—procedures that generate linguistic expressions—differ from context-free rewrite systems (cp. Post 1943) *without* exploiting the "shuffling" power of context-sensitive rules like "CB ➔ CX," much less the full power of a Turing Machine. We can likewise ask how human procedures that generate linguistically expressible concepts differ from a simple context-free procedure that is powerful enough to be in the ballpark *without* exploiting familiar resources that overgenerate wildly, much less full the power of a Turing Machine (cp. Church 1941).

Chomsky (1957). *Syntactic Structures*.
Chomsky (1959). On Certain Properties of Formal Grammars.
Church (1941). *The Calculi of Lambda Conversion*.
Icard & Moss (forthcoming). A Simple Logic of Concepts. *Journal of Philosophical Logic*.
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Post (1943). Formal Reductions of the General Combinatorial Decision Problem. *Am. Journal of Math*.