PROTOLANGUAGE POSSIBILITIES IN A CONSTRUCTION GRAMMAR FRAMEWORK

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Identifying possible stages of protolanguage critically depends on the underlying nature of language. Theories of language differ in evolvability, and in whether they permit protolanguage stages. In this presentation, I will study the protolanguage potential and evolvability of Construction Grammar. Postulating that CG is a biologically real description of language, its evolvability through a sequence of intermediate protolanguages is investigated.

1. Introduction

Protolanguages are postulated intermediate stages in language evolution. Unless one postulates a saltational origin for language, against which there are solid arguments (e.g. Tallerman 2014), one or more intermediate protolanguage stages are required. In order to be evolvable in a Darwinian framework, a protolanguage must be an improvement on earlier communication systems[a], and in order to say something interesting about language evolution it must lack enough language features to be distinct from full human language. Identifying possible protolanguage stages in language evolution becomes an exercise in decomposing language into separable features that can be added sequentially (cf. Johansson 2006, Jackendoff & Wittenberg 2014). This exercise critically depends on the underlying nature of language, on which there is little consensus among linguists (Jackendoff 2010). Language theories vary widely in evolvability, with e.g. Minimalism (Chomsky 1995) being effectively unevolvable (Kinsella 2009), rendering it irrelevant in the context of language evolution.

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[a] It is assumed here, as argued by e.g. Johansson (2014), that language evolved for communicative purposes.

2. Construction Grammar

I will here investigate the protolanguage potential and evolvability of Construction Grammar (e.g. Goldberg 2006, Langacker 2005). Construction Grammar is a general label for theories of language in which knowledge of language is based on knowledge of *constructions*, form-function pairings that can be more abstract and general language templates than the basic form-function pairings commonly found in the lexicon of most theories of language. Also syntactic knowledge is carried by the constructions, thus removing the need for a separate set of syntactic rules.

Various flavors of Construction Grammar exist, that are structurally similar as grammars, but differ in their underlying assumptions about the nature and structure of our knowledge of language (Langacker 2005). One notable difference is whether it is postulated that grammatical categories exist independent of (and prior to) constructions, which has some impact on evolvability. Some examples of Construction Grammar include Radical Construction Grammar (Croft 2009), Usage-based Construction Grammar (Tomasello 2003), and Fluid Construction Grammar (Steels 2011). For now, I will leave aside these differences, as my primary goal here is to investigate whether Construction Grammar as a generic framework can be suitable for the study of language evolution.

Construction Grammar is used in evolutionary linguistics mainly for modelling the cultural evolution of grammar, with Fluid Construction Grammar extensively employed as it is, by design, amenable to computational modelling of modifiable grammars (e.g. Steels 2011). Biological evolution of language in a Construction Grammar context has received less attention, with Hurford (2012) a notable exception.

Postulating that Construction Grammar is a biologically real description of language, its evolvability through a sequence of intermediate protolanguages can be investigated. By a description being "biologically real", I mean that its theoretical concepts have a direct correspondance to structures and neural events in the language faculty of people.[b]

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[b] It is perhaps more common to use "psychologically real" in this sense. But in the context of the biological evolution of the language faculty, I think "biologically" is more appropriate.

In a generic Construction Grammar, constructions can be of several different types. Goldberg (2009) provides some examples: "partially or fully filled words, idioms, and general linguistic patterns", all the way up to the "basic sentence patterns of a language" (p . 94). The cognitive and computational requirements of these different types of constructions vary considerably, and they can be ordered in a hierarchy of increasingly demanding types:

1. The simplest constructions are those that are nothing but a static one-to-one mapping between form and meaning, with no empty slots or other complications. Ordinary words belong here, as do filled idioms. These constructions are basically the same as the lexicon entries in many other theories of language.
2. Constructions with gaps, to be filled with words (unspecified, or pragmatically/semantically specified). Partial idioms belong here, and likewise some morphology.
3. Constructions that are categorized into constituent classes, and with gaps labelled with the constituent class(es) that may fill it. Whether this is really separate from the preceding point depends in part on the status grammatical categories are assigned, which differs between Construction Grammar varieties.
4. Generalizations across similar constructions, leading to a hierarchy of constructions, with inheritance of features between levels in the hierarchy.
5. Fully generalized abstract constructions, with no filled slots (passive, ditransitive, etc.).

Computationally, a central point is whether (and which) constructions allow recursive filling of gaps, so that a hierachical sentence structure can be built. Type 1 and 2 above typically don't allow this, whereas type 3 and upwards do.

3. Evolving a Construction Grammar

A Construction Grammar does not necessarily need all the types of constructions listed above. This opens up the possibility of evolving a Construction Grammar-based language faculty in several steps, making one type after another available. The order is constrained to be the one in the list above, as each type is a subset of the next type in the list.

Whether this is a possible evolutionary sequence for the human language faculty depends on whether each step corresponds to a viable protolanguage.

In the list below I go through the various steps (with recursive gap-filling added as a step of its own), and consider protolanguage possibilities during each step.

1. Extensible lexicon with static one-to-one mappings between form and meaning, with no empty slots. Already constructions at this level enables a range of possible protolanguages, roughly corresponding to the first group of protolanguages in Jackendoff & Wittenberg (2014).
   a. One-word stage.
   b. Pragmatically juxtaposed words with no grammatical connection, similar to the protolanguage of Bickerton (2014).
   c. Holistic learning of common juxtapositions – filled idioms.
        i. Links from juxtaposition entry to its components?
   d. A holophrastic protolanguage would also fit here, but for other reasons I do not regard this as a likely option (cf. Tallerman 2009).
2. Constructions with gaps.
   a. Generalizing over juxtapositions with one component in common would naturally lead to constructions with gaps – partially filled idioms. Similar to pivot grammar in language ontogeny. Permits a more memory-efficient way of storing a given repertoire of expressions, and likely facilitates language acquisition as well.
3. Categorized constructions and gaps.
   a. Similar to previous step, but grammar partially replaces pragmatics. Computational improvement.
4. Recursive gap-filling.
   a. Sentences with hierarchical structure. Opens up new expressive possibilities with more complex sentences that can still be parsed.
5. Inheritance hierarchy.
   a. Similar to previous step, but more open-ended and powerful. Computational improvement.
6. Fully generalized abstract constructions, with no filled slots (passive, ditransitive, etc.).
   a. Full modern language.

The details of the sequence are speculative, but it is clear that Construction Grammar naturally provides numerous possibilities for protolanguages. Most of the steps are likely to be evolutionarily small and arguably provide language improvements, either communicatively or computationally, that may be adaptively relevant.

The second step, going from "constructions" that are filled and static, to constructions with gaps, may be non-trivial, and is likely to be a key evolutionary step. Non-human primates do have some general capacity for generalizations (Hurford 2007), but even language-trained apes show little if any evidence of the type of linguistic generalizations required here, despite appropriate patterned input.

The Construction Grammar itself does not specify the language even at the abstract level of Chomskyan UG. Within the broad limits of what can be stored as constructions of different types, at different stages, and what can be handled computationally in construction parsing, languages may evolve culturally quite freely. This provides scope for biological/cultural coevolution, and grammaticalization processes (cf. Heine & Kuteva 2007) come naturally at the later stages.

In summary, Construction Grammar appears to be a very promising framework for further evolutionary studies.

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