Linguistic formalism and language description

Ida Toivonen
Carleton University
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Plan

- Formalism
- Abstract representation
- Inari Saami quantity and Patrik’s feet
- Generative grammar
- Lexical Functional Grammar
- Finite State Grammars

What is Formalism?

One view of “formal system”

- a finite set of symbols
- formulas (symbols combined into strings)
- a grammar that specifies/constrains the permissible formulas
Abstract representations

- What is real linguistic data?
- Equivalence classes
- Abstract notions/categories/rules

Prosodic structure

- Mora syllable foot
- Example: anarchistic

Inari Saami quantity

- palo 'fear.Acc.SG'
- palo 'fear.Nom.SG'
- kállá 'man.Acc.SG'
- faalám 'I offer'
- käälis 'man.Nom.SG'
- fáállun 'on offer'

- palo 'fear.Acc.SG' | short V short C
- palo 'fear.Nom.SG' | short V half-long C
- kállá 'man.Acc.SG' | short V long C
- faalám 'I offer' | long V short C
- käälis 'man.Nom.SG' | long V half-long C
- fáállun 'on offer' | long V long C
Inari Saami data

How I got myself in trouble and how Patrik Bye came to the rescue with his insights.

Generative Grammar

Common underlying assumption:
The theories and analyses should be formally (mathematically) precise

What is Generative Grammar?

- Narrow definition of Generative Grammar: Chomskyan frameworks in the narrow sense: Standard Theory, EST, Principles & Parameters (GB & MP) Sometimes referred to as "transformational-generative grammar";
- More generally, Generative Grammar includes:
  - Minimalism (MP) and its predecessors
  - Lexical-Functional Grammar (LFG)
  - Relational Grammar (RG); Arc Pair Grammar
  - Head-Driven Phrase Structure Grammar (HPSG)
  - ...

“I have always understood a generative grammar to be nothing more than an explicit grammar.” (Noam Chomsky, *The Minimalist Program*, chapter 2, p. 162, footnote 1)
“Generative grammar can be regarded as a kind of confluence of long-forgotten concerns of the study of language and mind, and new understanding provided by the formal sciences.” (Noam Chomsky, *The Minimalist Program*, p. 4)

Under this definition, generative grammar can be equated with formalist theories.

Compare: *Functionalism*

Just as with Generative Grammar, scholars differ on what they mean by Functionalism.

Talmy Givón (1995) *Functionalism and Grammar*, Preface:

- “All functionalist subscribe to at least one fundamental assumption *sine qua non*, the non-autonomy postulate: that language (and grammar) can be neither described nor explained adequately as an autonomous system”

- “To understand what grammar is and how and why it comes to be this way one must make reference to the natural parameters that shape language and grammar: cognition and communication, the brain and language processing, social interaction and culture, change and variation, the brain and language processing.”

A lot of issues get tangled up in the debate that are orthogonal to the division.

- What’s universal?
- What’s innate?
- What role does syntactic phrase structure play?
- Are there transformations?
- Are abstract generalizations good? How abstract can they be?

There are differing views within Formalism and with Functionalism on these points.
Caricature of Generative Grammar

- In GG, everything moves around and there are huge tree structures filled with empty and poorly motivated material
- In GG, English grammar is assumed to be universal Grammar: all languages are underlyingly English

These are straw man arguments (although perhaps not 100% unfair). Many (most?) generativists do not make these assumptions.

Generative Grammar

- If "generative" is defined simply as formal or explicit, then the definition fits model-theoretic theories as well as generative enumerative theories (terminology from Pullum & Scholz).
- In generative-enumerative approaches, the grammar is a finite device that specifies the set of well-formed structures.
- In model-theoretic approaches, the grammar is stated as constraints, and the models of the constraints are the expressions that are described by the grammar.

Constraint-based frameworks

- Arc-Pair Grammar, some versions of Generalized Phrase Structure Grammar, Lexical-Functional Grammar, Head-driven Phrase Structure Grammar, some of Optimality Theory (Eval), Model-Theoretic Syntax

LFG & HPSG

- generative
- constraint-based
- unification-based
- non-derivational
- non-transformational
- monostratal
- declarative
Differences: HPSG & LFG

- Broad architecture:
  - LFG: multiple, distinct data structures
  - HPSG: single data structure (directed acyclic graph)
- HPSG: sort-resolved, totally well-typed
- HPSG (almost totally) head-driven

Parallel structures

- C-structure: structural relations and syntactic categories
- Functional structure: grammatical functions (SUBJ, OBJ), tense, etc.
- Morphological structure
- Phonological structure
- Argument structure (agent, theme, location, instrument...)
- Semantic structure
- Information structure
- Prosodic structure

No empty categories
- Constituent structure (phrase structure) directly models constituency, hierarchical organization, word order, syntactic categories
- No movement operations
- Mapping between c-structure and f-structure is monotonic (cannot move or delete)
- In my opinion: quite close to traditional grammar, except formally precise
C-structure

- Concrete syntax
- Varies widely across languages
- Cross-linguistic differences
- Constrained by c-structure rules
- Constrained by X-bar theory

F-structure

- Abstract syntax
- Largely invariant across languages
- Cross-linguistic similarities
- Constrained by various principles, such as Completeness, Coherence, Uniqueness

Mapping c-structure – f-structure

- The mapping from c-structure to f-structure is not one-to-one (it is one-to-many), but it is monotonic (information-preserving)

Fragments

... tiå’dám it ...
Many linguists who work on the description of endangered languages adopt LFG as their formal framework. Paul Kroeger (2007) "LFG as a framework for descriptive grammar".

- Analysis involves abstraction.
- Formal (abstract) analysis can help you understand data (e.g., Toivonen’s confusion & Bye’s feet)
- Formalism can provide you with a vocabulary for stating your generalizations
- Formalizing your generalization can make clear what predictions you make
- A precise formalization makes it easier to do cross-linguistic and cross-dialectal comparison
- A clear formal analysis renders the fruits of your hard work accessible to others.