Constraint-based syntax and semantics

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In this course we survey the basic aspects and results of Head-Driven Phrase Structure Grammar (HPSG), a lexically-driven framework for grammatical analysis via simultaneous constraint satisfaction that is well-developed and has led to wide-scale implemented grammars of several languages. Wherever possible, we include comparisons with competing approaches in other frameworks.

To make sure students master the technical aspects of HPSG, there will be a few short homeworks. Students with more background are welcome to write a more research oriented paper.

1 Week 1

1.1 Unification-based grammars


Readings: Pullum (2013), Müller et al. (2020, Chapter 4)

1.2 Argument structure and phrasal projection


Readings: Müller et al. (2020, Chapter 8)
2 Week 2

2.1 Argument co-indexing and argument identification
Control and raising, Anaphora and reflexivity; Argument composition

2.2 Unbounded dependencies
Local and non-local information, Gap and Slash features, Island constraints
Readings:
Bouma et al. (2001) Sag (2010), Chaves (20123), Müller et al. (2020, Chapter 13)

3 Week 3

3.1 Clausal syntax
HPSG clause type hierarchy: declaratives, imperatives, interrogatives, exclamatives, relatives

3.2 Coordination and Ellipsis
The syntax and semantics of coordination, VP ellipsis, sluicing, right node raising, gapping
Readings: Ginzburg & Sag (2001, Chapter 8), Chaves (2014)

4 Week 4

4.1 Inflection and information-based morphology

4.2 Underspecified semantics and cross-linguistic variation
Semantic underspecification in HPSG (Minimal Recursion semantics, Lexical Resource Semantics), Comparison between English and French adverbs, work on understudied languages (e.g., Tonga, Iroquoian)
5 Some background books and on-line resources

Textbooks: There are several textbooks on HPSG. Pollard & Sag (1994) is a great overview of “classic” HPSG and a detailed analysis of major syntactic phenomena. Sag et al. (2003) and Kim & Sells (2008) are rather introductory, while Levine (2017) is quite recent. Müller et al. (2020) summarizes HPSG research in all major areas of grammar. It includes overviews of analyses that have been proposed as well as the current state of the art. HPSG has led to many large-scale implemented grammars. Copestake (2002) is a good summary of some of the issues involved in implementing HPSG grammars.

Proceedings: To peruse recent and less recent research within HPSG visit: http://web.stanford.edu/group/cslipublications/cslipublications/HPSG/
To peruse recent and less recent research within LFG visit: http://web.stanford.edu/group/cslipublications/cslipublications/LFG/

Implementations: There are also several implementations of HPSG grammars:

- For a large-scale implementation of an HPSG grammar of English, see: http://www.delph-in.net/erg/
- For an alternative implementation of HPSG grammars (grammars of German, Persian, and other languages have been implemented in this system), see: https://hpsg.hu-berlin.de/Software/Trale/
- For a framework for quickly developing an implemented a grammar of an understudied language (or not yet implemented language), see: http://matrix.ling.washington.edu/index.html

References


Pollard, Carl & Ivan Sag. 1992. Anaphors in English and the scope of binding 

Pollard, Carl & Ivan Sag. 1994. *Head-driven Phrase-Structure Grammar*. Chicago, 
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Sag, Ivan, Thomas Wasow & Emily Bender. 2003. *Syntactic theory, a formal intro-
Essentially, syntax is constrained only by the lexicon (the repository of words) as well as the meaning and sound form of sentences. Semantics consists of the study of the relationships between symbols or signs such words, phrases, sentences, and discourses, and what these elements mean or stand in for: their denotations and senses. Central to semantic research in our department is the principle of semantic compositionality, a concept seemingly independently arrived at by Yāśka, the pre-Pāṇinian Indian grammarian (6th-5th c. BC); George Boole, the early 19th-c. The flexibility of syntax and semantics of constraint atoms allows us to capture entities across different theories. For instance, assuming a value $t \in D$ for representing the truth value true, Boolean. In this section, we provide a logic programming language based on a syntactic fragment of HTC. In principle, logic programming rules can be built as usual, that is, implications (usually written backwards) $\text{Head} \leftarrow \text{Body}$ where $\text{Head}$ is a disjunction of atoms and $\text{Body}$ a conjunction of literals (that is, atoms or their default negation). The syntactic approach I employ to describe discourse markers is Head-Driven Phrase Structure Grammar (HPSG) which is relevant in a theory of discourse because it provides a framework in which all levels of grammar can be integrated. Since discourse markers operate at discourse level, a well-developed discourse theory is required, in this case, I employ Segmented Discourse Representation Theory (SDRT). The first step taken in this thesis is to establish an integration of notation between HPSG and SDRT. I exemplify the approach with an analysis of anyway. This particular adverb has two main uses: