Case Grammar

- Charles J. Fillmore (1929–2014)
- case
  - not a morphological term
  - case function ~ the type of the relation between the verb and its complements
  - inspired by the valency theory by L. Tesnière

- transformations do not change the meaning
- all features that are relevant for the meaning of the sentence must be included in the deep structure
  - Chomsky’s deep structure, which operates with NPs etc. interpreted as subject etc., is not adequate
Case Grammar: subject vs. Agentive

- subject as an aspect of surface structure (subject, object etc. as surface-structure case relationships) vs. deep-structure case relationships (underlying syntactic-semantic relationships)

- (a) John broke the window.
- (b) A hammer broke the window.
- (c) John broke the window with a hammer.
- (d) *John and a hammer broke the window.
Case Grammar: proposition and modality

- some cases related to the modality constituent of the sentence, others to the proposition itself
- $S \rightarrow M(\text{odality}) \ P(\text{roposition})$
  - modalities: negation, tense, mood, aspect
  - proposition as a tenseless set of relationships involving verbs and nouns (and embedded sentences)

- Proposition consists of a verb and one or more case categories
  - $P \rightarrow V \ C1 \ ... \ Cn$
Case Grammar: cases

- cases:
  - Agentive (case of the typically animate perceived instigator of the action identified by the verb)
  - Instrumental (the inanimate force or object ...)
  - Dative
  - Factitive (result)
  - Locative (location)
  - Objective

- (a) John.\textbf{A} opened the door.
- (b) The door was opened by John.\textbf{A}.
- (c) The key.\textbf{I} opened the door.
- (d) John opened the door with the key.\textbf{I}.
- (e) John used the key.\textbf{I} to open the door.
- (f) John.\textbf{D} believed that he would win.
- (g) We persuaded John.\textbf{D} that he would win.
- (h) It was apparent to John.\textbf{D} that he would win.
- (i) Chicago.\textbf{L} is windy.
- (j) It is windy in Chicago.\textbf{L}.
Case Grammar: case frame

• *open* [___ O (l) (A)]
  • further: *turn, move, rotate*

• *kill* [___ D (l) (A)]
  • linked parentheses: at least one of the elements must be chosen
Case Grammar: tree structure

```
S
 /\     /
O M   P
 /\ /\ /\ 
K NP [V K
   /\ /\ /\ 
  d N Pass NP
   /\ /\ /\ 
  the books Past give to my brother
   /\ /\ /\ 
  Ø by John
```
FrameNet

- https://framenet.icsi.berkeley.edu/fndrupal/

- project goal
  - systematic description of relations between syntax and lexicon
  - specification and hierarchization of case frames in a lexicon

- a lexical database of English
  - more than 10,000 word senses based on more than 170,000 manually annotated sentences
  - both human- and machine readable
FrameNet: semantic frames

- **lexical units** (LUs)
  - e.g. *bake, fry*
  - evoke semantic frames

- **semantic frame**
  - a description of a type of event, relation, or entity and the participants in it
  - consisting of **frame elements** (FEs)

**Examples:**

- **semantic frame** *Apply_heat*
  - LUs of the frame: *bake, fry, boil, broil*
  - FEs: *Cook* (a person doing cooking), *Food* (food that is to be cooked), *Container* (something to hold the food while cooking) and *Heating_instrument* (a source of heat)

- **semantic frame** *Revenge*
  - FEs: *Offender, Injury, Injured_party, Avenger, Punishment*

- **semantic frame** *Placing*
FrameNet Data

Activity_start

Definition:

An Agent 

initiates the beginning of an ongoing Activity in which he will be continuously involved.

At the same time Activity-states began to grow in influence in the southern Greek mainland.

Naturally, I started to grow out of work.

FEs:

Core:

Activity [Act]  This FE identifies the Activity that an Agent starts.

Agent [Add]  This FE identifies the being that starts the intentional Activity.

Non-Core:

Semantic Type: Sentient
FrameNet Index of Lexical Units

This page is an index to alphabetical lists of the names of the lexical units (LUs).

Each LU name is followed by the part of speech, the name of the relevant frame, and its status. If a lexical unit has the status "Finished_initial" (meaning it was annotated in FN2) or "FN1_sent" (meaning annotated in FN1), it will be followed by links to the HTML files for the lexical entry and the annotated sentences. Lexical units on which work has not been completed may have only a link for the lexical entry, or no link at all. The lexical entry provides two tables with information about the LU: Frame Elements and their Syntactic Realizations; and Valence Patterns.

G

- German measles n (Medical_conditions) Created Lexical Entry
- Gheet n (People_by_origin) Created Lexical Entry Annotation
- g-string n (Clothing) Finished_Initial Lexical Entry Annotation
- gob v (Chatting) Created Lexical Entry Annotation
- gobble v (Communication_manner) FN1_Sent Lexical Entry Annotation
- gadget n (Gizmo) Created Lexical Entry Annotation
- gagoon n (Aggregate) Finished_Initial Lexical Entry Annotation
- gain n (Change_position_on_a_scale) Created Lexical Entry Annotation
- gain v (Change_position_on_a_scale) Finished_Initial Lexical Entry Annotation
- gain v (Getting) Finished_Initial Lexical Entry Annotation
- gain v (Change of quantity of possession) Created Lexical Entry
References:

Case Grammar:

Valency Lexicons for Czech:
  • http://ufal.mff.cuni.cz/vallex
Lexical-Functional Grammar

- developed in the late 1970’s by Joan Bresnan, Ron Kaplan
- with the goal of also serving as the grammatical basis of a computationally precise and psychologically realistic model of human language

- a generative grammar
- lexically oriented:
  - the relation between active and passive constructions is determined by a lexical process (relating passive verb forms to active forms)
  - adopted by Chomsky
- no transformational component
  - no movement
LFG: basic ideas and notions

- words of a sentence organized into constituents
  - represented by a tree (*c-structure, constituent structure*)
  - generated by rules

- two basic components of the theory
  - lexicon
  - functions (rules mapping from one item to another)

- 2 kinds of functions
  - *grammatical functions*: SUBJ, OBJ
  - *f-structure (functional structure)*: mapping between the different parts of the grammar
LFG: grammatical functions

- grammatical functions are not defined by the tree (vs. Chomsky), they are primitive notions
- every sentence has an f-structure that represents grammatical functions
- in the f-structure, a particular NP is identified as being the subject of the sentence, independent of the tree structure associated with

Attribute Value Matrix (AVM)
- attribute/function on the left, value attributed to the function on the right:
  - ex. *The professor loves phonology.*
  - \[
    \begin{array}{ccc}
    \text{SUBJ} & \text{PRED} & \text{\`professor}\,\,^7 \\
    \text{DEF} & + & \\
    \text{NUM} & \text{sng} \\
    \end{array}
  \]
  - ... PRED as the semantic head of AVM

- combination of the AVMs for all parts of a sentence gives the f-structure
- the information used in f-structures starts out in the lexical entries of the words stored in the lexicon
  - *a-structure (argument structure): verb and its arguments*
    - ~ theta grid by Chomsky
LFG: f-structure

\[
\begin{array}{l}
\text{PRED} \quad \text{`love <SUBJ, OBJ>'} \\
\text{TENSE} \quad \text{present} \\
\text{SUBJ} \quad \left[ \begin{array}{c}
\text{DEF} \quad + \\
\text{NUM} \quad \text{sgn}
\end{array} \right] \\
\text{OBJ} \quad \left[ \begin{array}{c}
\text{PRED} \quad \text{`professor'} \\
\text{PRED} \quad \text{`phonology'}
\end{array} \right]
\end{array}
\]
LFG: relation between f-structures and c-structures

C-structure:
*f ... variables*

\[
\text{NP } f_2 \quad \text{TPf}_1 \\
\quad \text{NP } f_9 \\
\quad \text{VP } f_3 \\
\quad \text{V' } f_6 \\
\quad \text{NP } f_10 \\
\quad \text{V } f_8 \quad \text{loves} \\
\quad \quad (\uparrow \text{PRED}) = 'love <...>' \\
\quad \quad (\uparrow \text{TENSE}) = \text{present} \\
\quad \quad (\uparrow \text{SUBJ NUM}) = \text{sng} \\
\quad \quad (\uparrow \text{SUBJ PERS}) = 3rd \\
\quad \quad (\uparrow \text{PRED}) = 'phonology' \\
\]

F-structure consisting of Attribute Value Matrices:

\[
f_{1r}, f_{3r}, f_{6r}, f_{8r} \\
\quad \text{PRED} \quad 'love <\text{SUBJ}, \text{OBJ}>' \\
\quad \text{TENSE} \quad \text{present} \\
\quad \text{SUBJ} \quad f_{2r}, f_{4r}, f_{5r}, f_{7r} \\
\quad \quad \text{DEF} \quad + \\
\quad \quad \text{NUM} \quad \text{sng} \\
\quad \quad \text{PRED} \quad '\text{professor}' \\
\quad \text{OBJ} \quad f_{9r}, f_{10r}, f_{11r} \quad \text{PRED} \quad '\text{phonology}'
\]
LFG: metavariables and functional equations

metavariables:
↓ ... this node
↑ ... my mother

functional equations:
↑=↓ ... all of the features I have also belong to my mother
(↑SUBJ)=↓ ... I represent the subject function of my mother
LFG: wh-movement – grammatical function FOCUS

*Which novel do you think Ann read?*
LFG: constraints on f-structures

- all f-structures must meet the constraints (a) to (c)

- (a) uniqueness
  - in a given f-structure, a particular attribute may have at most one value

- (b) completeness
  - an f-structure must contain all the governable grammatical functions that its predicate governs

- (c) coherence
  - all the governable grammatical functions in an f-structure must be governed by a local predicate

- the combination of the three constraints equals the theta criterion by Chomsky
References:

LFG: