

# Some Quantitative-Linguistic Hypotheses on Case

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# Outline

- 1 Introduction
  - What's in a Case?
- 2 Case and Valency
  - Functional Equivalents of Valency
  - Relations between Semantic and Syntactic Valency
- 3 Data
  - FrameNet
  - Frame-annotated Corpus
  - Extraction of Data
- 4 Results and Outlook
  - Results
  - Outlook

# Semantic, Syntactic and Morphological Case

## Linguistic levels

Semantic  
properties

Syntactic  
properties

Morphological  
properties

## Examples

MEET(PersonA, PersonB, Location ...)

The boy and the old  
lady meet.

The old lady meets  
the boy.

The boy meets with  
the old lady.

Der Junge<sub>Nom</sub> und  
die alte Frau<sub>Nom</sub>  
treffen sich<sub>reciprocal</sub>.

Die alte Frau<sub>Nom</sub>  
trifft den Jungen<sub>Acc</sub>.

Der Junge<sub>Nom</sub> trifft  
sich<sub>reflexive</sub> mit der  
alten Frau<sub>Dative</sub>.

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## Examples

MEET(PersonA, PersonB, Location ...)

two obligatory arguments (semantic cases)

The boy and the old lady meet.

The old lady meets the boy.

The boy meets with the old lady.

Der Junge<sub>Nom</sub> und die alte Frau<sub>Nom</sub> treffen sich<sub>reciprocal</sub>.

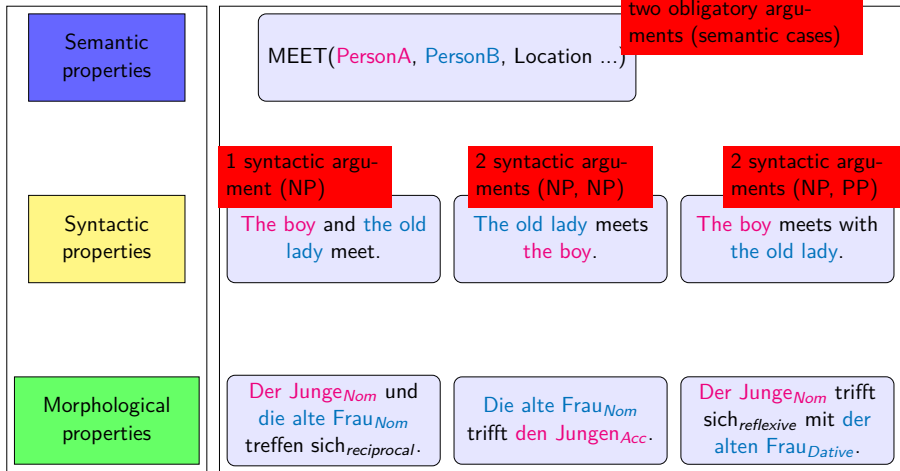
Die alte Frau<sub>Nom</sub> trifft den Jungen<sub>Acc</sub>.

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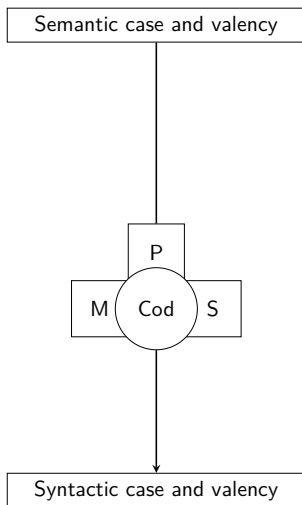
## Examples



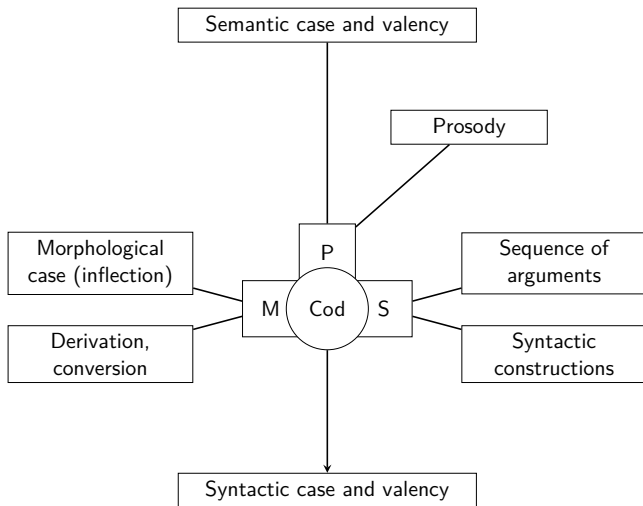
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# Functional Equivalents for Valency Coding

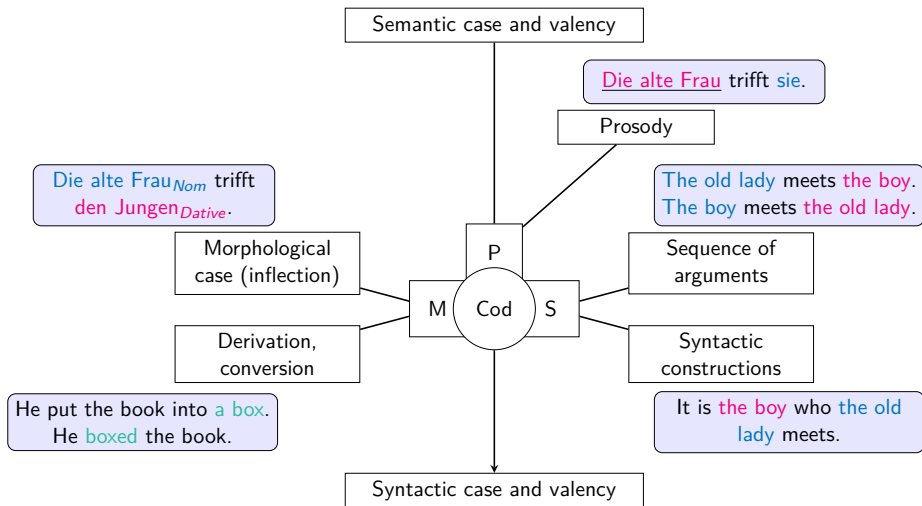


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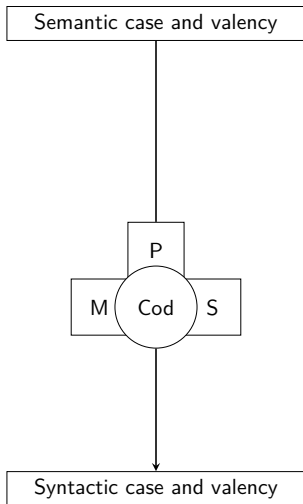




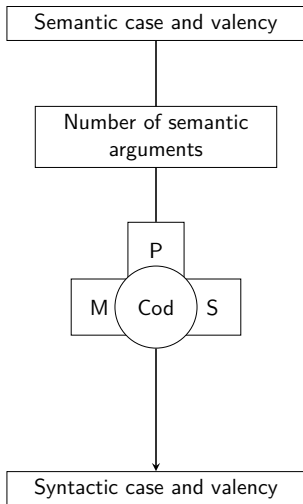
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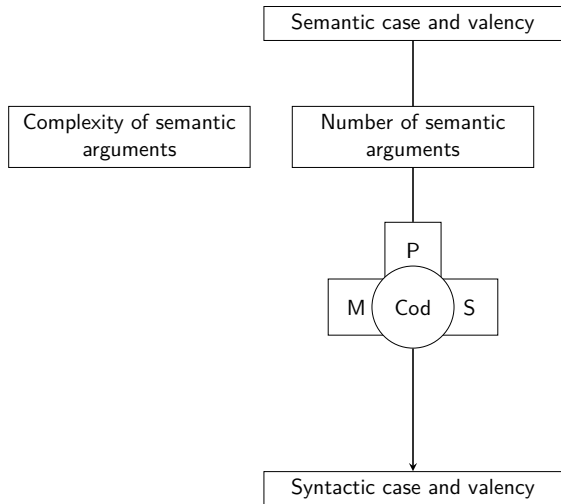
# Units of Valency



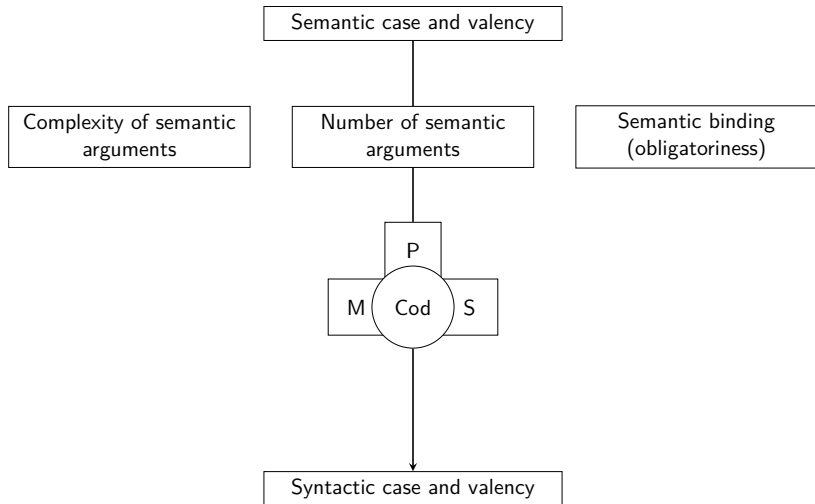
# Units of Valency



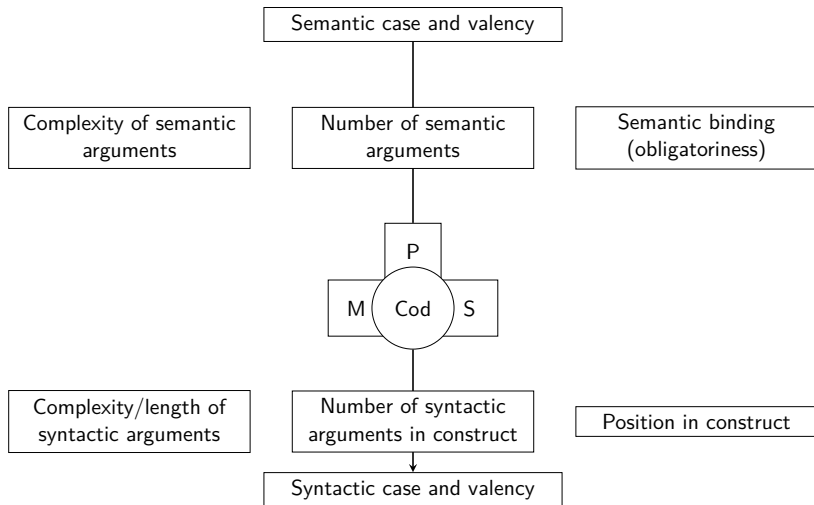
# Units of Valency



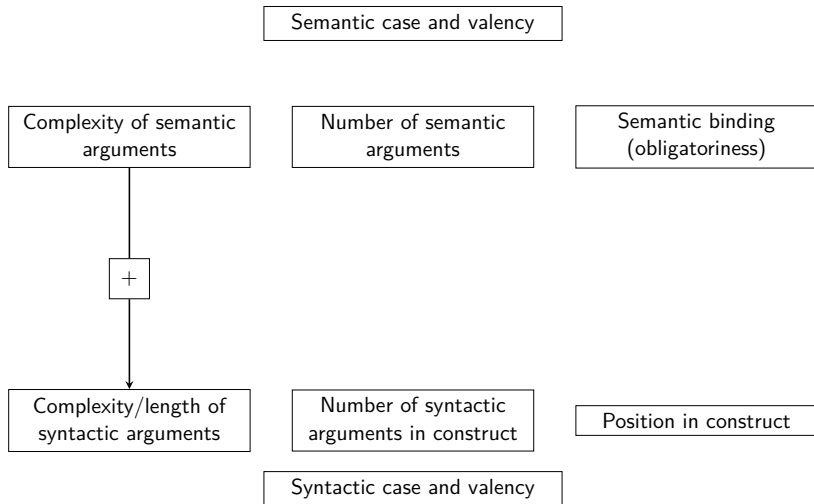
# Units of Valency



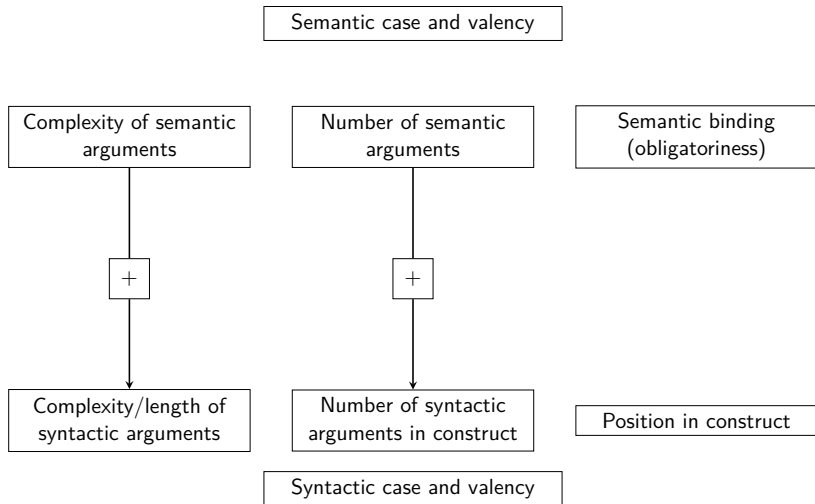
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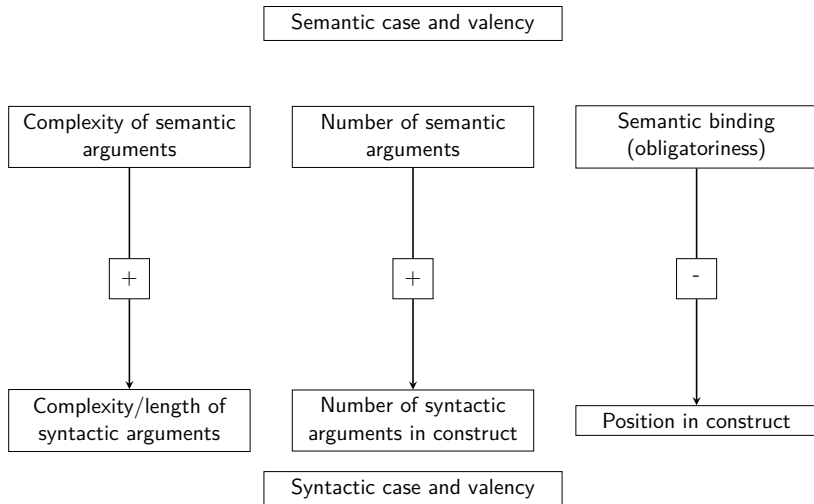


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# Units of Valency



# Argument Linking of Semantic and Syntactic Levels

- 1:1 semantic role = syntactic construction
- 0:1 no semantic role + syntactic construction [expletive *there, it*]
  - (1) a. That their time should not be wasted is important.  
b. It is important that their time should not be wasted.
- 1:0 semantic role, but no syntactic construction (null instantiation)
  - (2) a. He gave a book.  
b. She eats.  
c. He boxed the book.  
d. She ODs.

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# Argument Linking of Semantic and Syntactic Levels

- n:1 more than one semantic roles + one syntactic construction

(3) John cut her hair short.

- support verb constructions

(4) a. to make/take a decision  
b. to have a conversation

(see Fillmore 2007)

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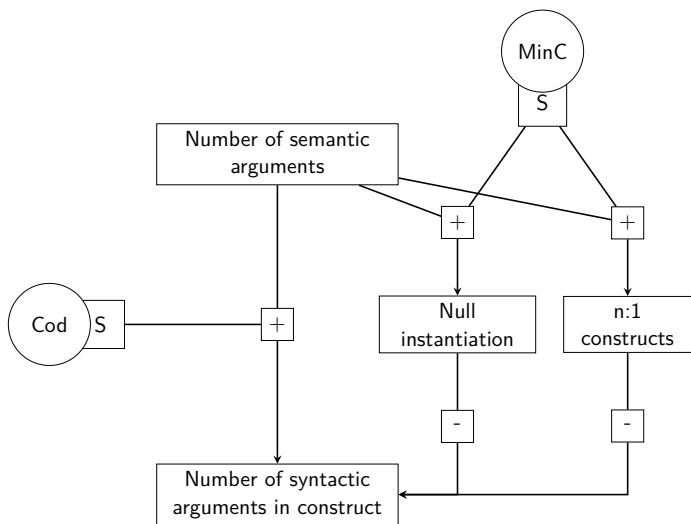
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# Number of Arguments



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  - FrameNet
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# FrameNet

- lexikographical project, founded by Charles J. Fillmore
- annotations based on large corpora
- based upon Frame Semantics - Central idea: lexical meanings are described in front of a background of coherent knowledge

In this frame a **Traveler** goes on a journey, an activity, generally planned in advance, in which the **Traveler** moves from a **Source** location to a **Goal** along a **Path** or within an **Area**. The journey can be made with a **Vehicle** and/or accompanied by **Co\_travelers** and **Baggage**. The **Duration** or **Distance** of the journey, both generally long, may also be described. Words in this frame emphasize the whole process of getting from one place to another, rather than profiling merely the beginning or the end of the journey.

# Frame Elements plus Examples

**Area [Area]** This is the **Area** in which the traveling takes place. This frame element describes the enclosed area inside which travelling, of unspecified **Source**, **Path** or **Goal** takes place.

**Goal [Goal]** The **Goal** is the location where the travelers end up.

**Path [Path]** The **Path** is the route along which the travel takes place.

**Source [Src]** The **Source** is the starting point of the trip.

**Traveler [Trav]** This is the living being which travels. Normally, the **Traveler** is expressed as an external argument.

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**Paul Pratt** **TRAVELLED** **through forty-eight countries** .

**Dana** had **TRAVELLED** **from Berlin** **to Salamanca** on an old motor bike that was to play a large part in our lives both in Spain and in England .

**I** took **the seven hour road** **JOURNEY** **to Siret** with my friend Diana .

# Core, Peripheral and Extrathematic FEs

- Core FEs: essential conceptual parts can be null-instantiated:
  - Constructional null instantiation

Days began early and ended late so  
that **maximum distances** could be  
**TRAVELLED** . **CNI**

- Definite null instantiation

As pilgrims **the children of Israel**  
**JOURNEYED** , led by the guiding hand  
of God . **DNI**

- Indefinite null instantiation

**I** used to **TRAVEL** **by bus** **a lot** ,  
so I had a season ticket . **INI**

- Incorporations
- peripheral FEs: not essential, but belong to frame
- extrathematical FEs: belong to other frames

# FrameNet Corpus

- ANC texts
- Texts from Nuclear Threat Initiative website

- approx. 33,000 word tokens

- 3,907 frame-annotated verbs

```
<sentence ID="1276271">
<text>As mapped , the track traveled directly through Helen Stewart 's Las Vegas Ranch .</text>
...
</annotationSet>
<annotationSet ID="2012409" status="MANUAL" frameName="Travel" frameID="343" luName="travel.v"
luID="5957">
<layers>
...
<layer ID="10296759" name="FE" rank="1">
<labels>
<label name="Traveler" ID="32001138" start="12" end="20" />
<label name="Area" ID="32001141" start="31" end="79" />
</labels>
</layer>
```

- Mostly more than one frames in one sentence:

Thank **you** **CNI** for **your** attention ! **DNI**

**addressee** **communicator** **perceiver** **reason** **figure**

# Semantic arguments - Null instantiation

NumArgs	NIs	Frequencies
0	0	128
1	0	109
1	1	3
2	0	1352
2	1	280
2	2	11
3	0	822
3	1	484
3	2	77
3	3	4
4	0	208
4	1	218
4	2	68
4	3	13

NumArgs	NIs	Frequencies
5	0	30
5	1	48
5	2	19
5	3	11
5	4	1
6	0	3
6	1	9
6	2	4
6	3	1
7	0	1
7	1	1
8	0	1
8	6	1

# Semantic valency - syntactic valency

FNFeS	CPFeS	Freq
2	1	4
2	2	5
3	1	1
3	2	14
3	3	8
4	2	27
4	3	8
4	4	5
5	1	1
5	2	11
5	3	3
6	2	55
6	3	14
7	1	1
7	2	104
7	3	27
7	4	5

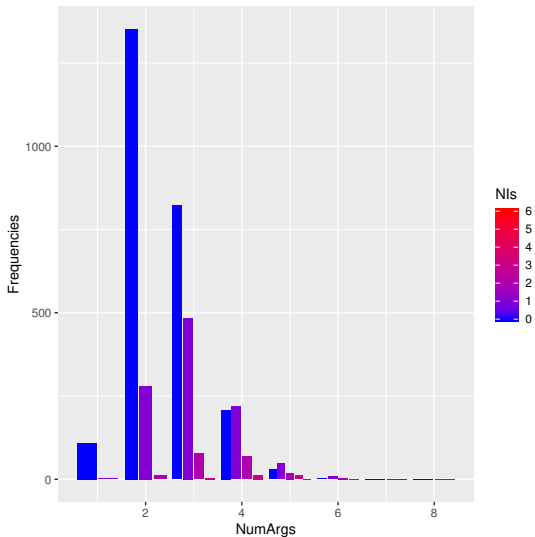
FNFeS	CPFeS	Freq
8	2	80
8	3	46
8	4	7
8	5	2
9	1	6
9	2	90
9	3	52
9	4	10
...	...	...
25	2	4
25	3	5
25	4	2
26	3	2
32	3	1
32	4	1

# Outline

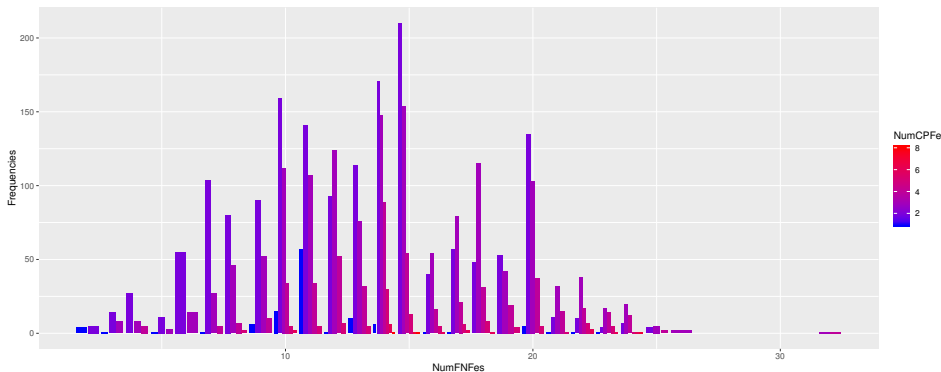
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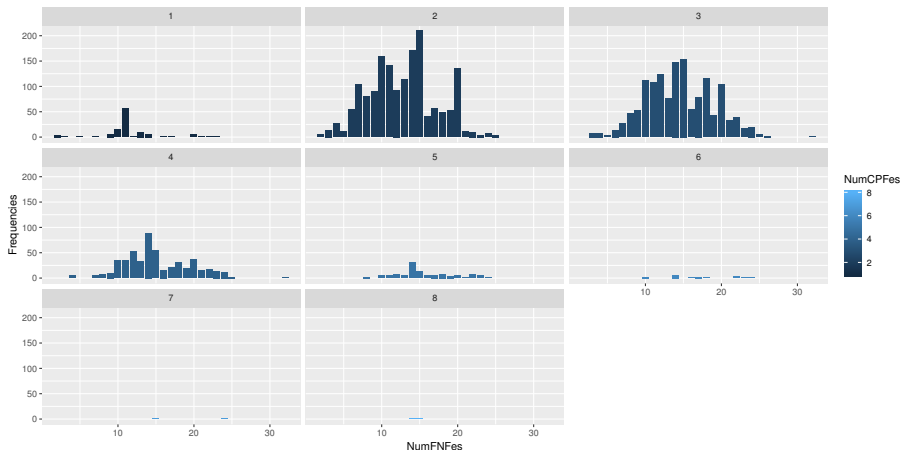
# Semantic arguments - Null instantiation



# Semantic valency vs Syntactic valency I



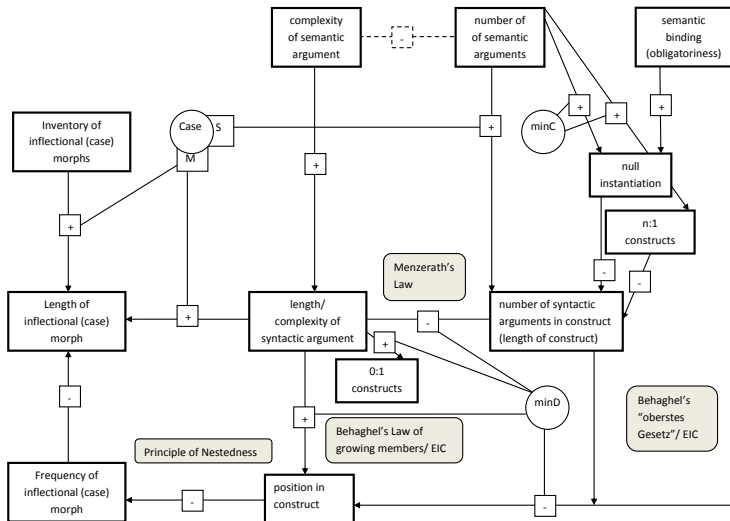
# Semantic valency vs Syntactic valency II



# Summary

- The more semantic arguments, the larger is the effect of using null instantiations (omissions).
- The more semantic arguments, the larger is the effect of omitting peripheral arguments.
- Size of semantic cases leads to shortening syntactic case realization.
- The frequencies of the FE patterns in texts are stable.

# A Synopsis of Case



Thank you CNI for your attention ! DNI

addressee communicator perceiver reason figure

## Some References

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