# Spanish deverbal noun implementation

## A HPSG & MTT account

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Thesis subject:

# Spanish Grammar implementation in HPSG & MTT: verbless phrases

Practical goal:

## Improving « understanding capacities » of computers in human-machine dialogue

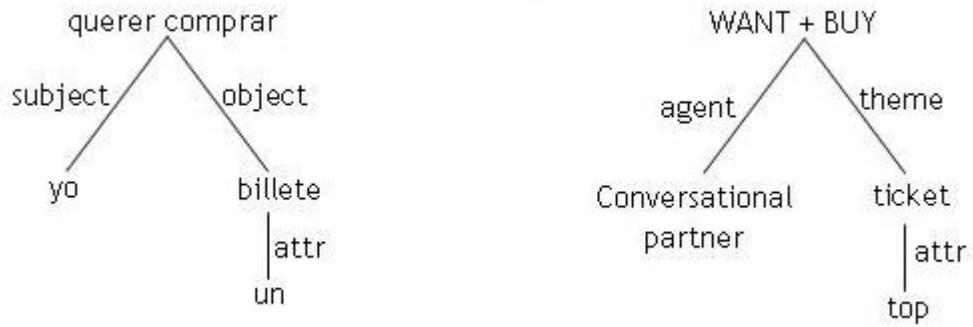
# Dialogue modeling I

- 2 components:
  - syntactic & semantic parser → « understanding »
  - knowledge libraries → pertinent answers
- Meaning - Text Theory (MTT) parser:

  Dependence grammar graph representation for
  - Syntax (language-particular)
  - Semantics (metalanguage common to all languages)

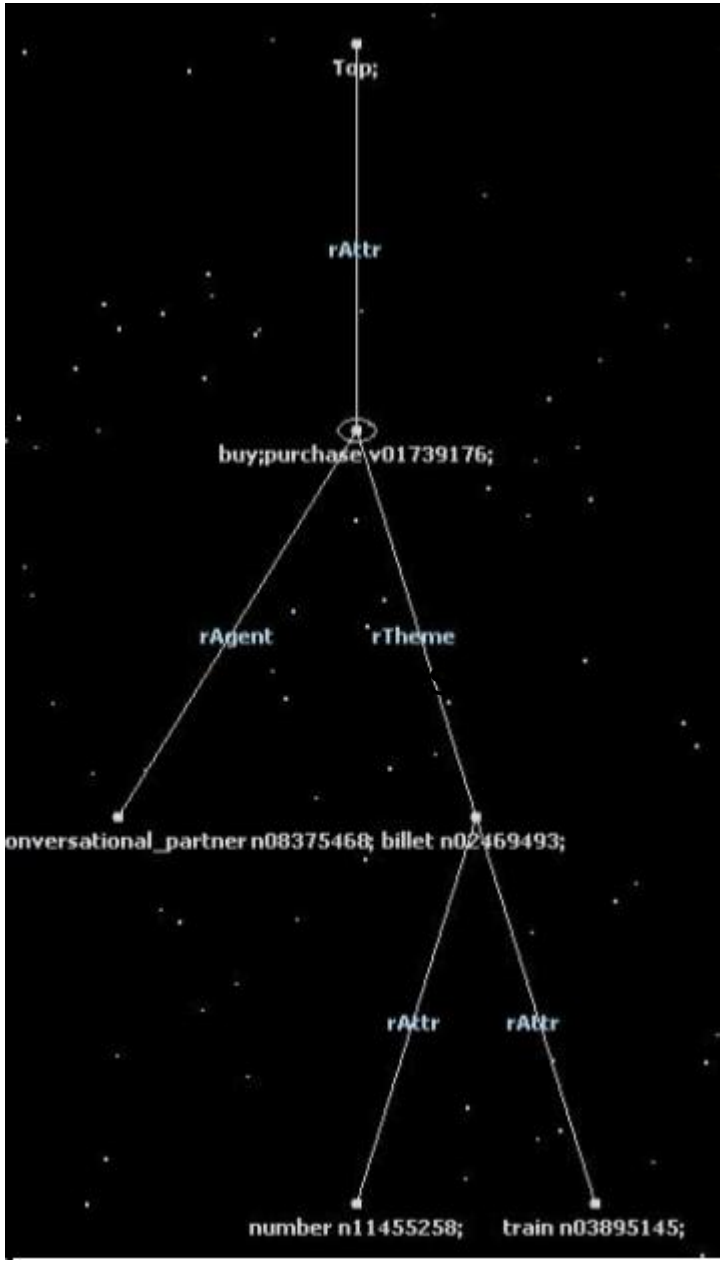
# Dialogue modeling II

- Understanding:
  - The parser  transforms user's (written) utterances into a semantic graph
  - The graph generated matches with a graph in memory
  - This graph is associated with a pertinent output answer.




*I want to buy a ticket*

Deep syntactic vs. Semantic representation




Taken from the interface *MorphOz*

# Verbless phrases not right parsing

- Un chollo esta oferta ‘A bargain this offer’
  *This offer **is** a bargain*
- ¿Cuánto el billete? ‘How much the ticket?’
  *How much does the ticket **cost**?*
- Funciona internet pero no el mail ‘internet works but not the mail’
  *Internet works but the mail **doesn’t***
- El pago de mi factura ‘The payment of my bill’
  *The payment of my bill*

# Deverbal nouns

- No subcategorising nodes

  → no dependance structure

  BUT :

- Verb not always recoverable:

  **Un chollo **es** esta oferta*

  *'A bargain **is** this offer'*

- Order constraints:

  *No el mail pero funciona internet

  'not the mail but internet works'

# Tests on corpus

*A: Y a ti ¿qué es lo que más te gusta comer?*

*'And you, what do you like to eat the most?'*

*B : a mí judías.*

*'me, beans'*

*((B: #judías a mí/ a mí me gustan las judías / las judías me gustan a mí)*

→ Syntactic constraints !

# Starting point: deverbal nouns

- *El pago de mi factura*
  'The payment **of my bill**' → **theme**

- *El pago de mi factura al banco*

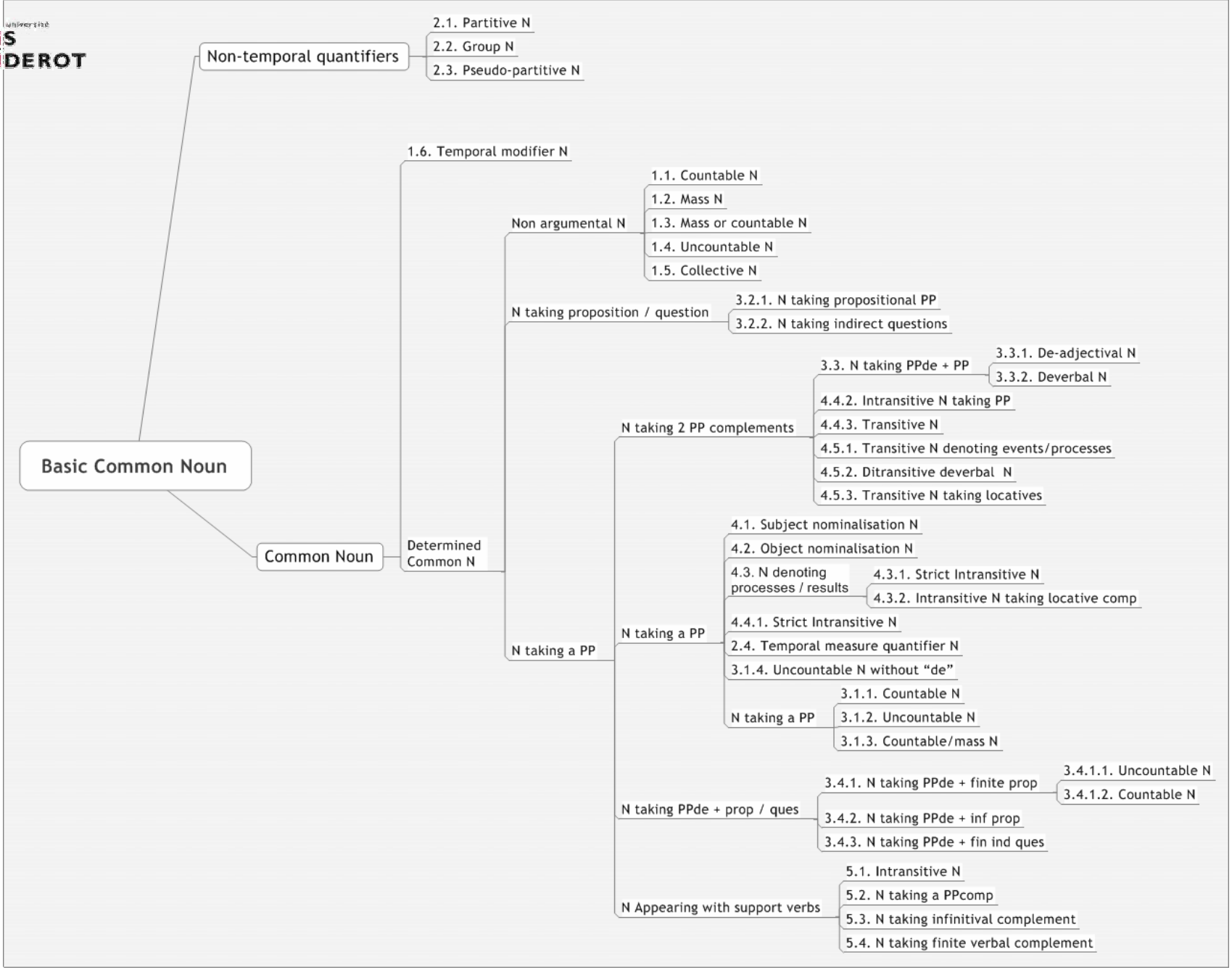
'The payment of my bill **to the bank**' → **patient**

- They subcategorise for PPs having the same semantics as the arguments selected by their verbal counterparts:

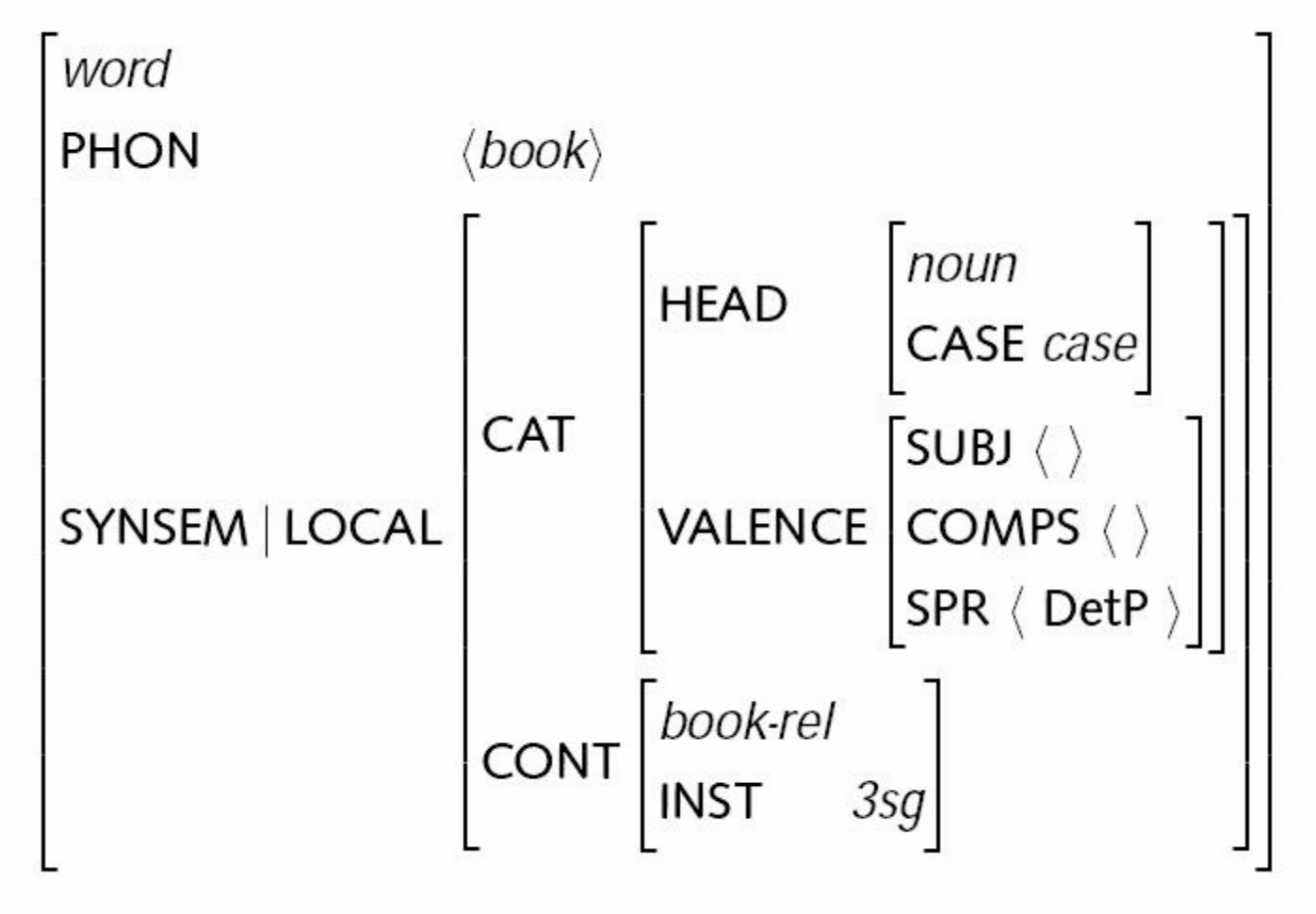
I *pay <u>a bill</u> <u>to the bank</u>*

# Deverbal noun typology

- 1. Subject nominalisation nouns (*traductor*, 'translator')
- 2. Object nominalisation nouns (*invento*, 'invention')
- 3. Nouns denoting processes / results
  - 3.1. Strict Intransitive nouns (*muerte*, 'death')
  - 3.2. Intransitive nouns taking locative complements (*salto*, 'jump')
- 4. Nouns denoting results
  - 4.1. Strict intransitive nouns (*gruñido*, 'grumbling')
  - 4.2. Intransitive nouns taking PPs (*lucha*, 'fight')
  - 4.3. Transitive nouns (*descubrimiento*, 'discovery')
- 5. Transitive nouns denoting events / processes
  - 5.1. Transitive nouns (*construcción*, 'construction')
  - 5.1. Ditransitive nouns (*envío*, 'sending')
  - 5.2. Transitive nouns taking locatives (*colocación*, 'placing')


Basic Common Noun
Non-temporal quantifiers
2.1. Partitive N
2.2. Group N
2.3. Pseudo-partitive N
Common Noun
Determined Common N
1.6. Temporal modifier N
Non argumental N
1.1. Countable N
1.2. Mass N
1.3. Mass or countable N
1.4. Uncountable N
1.5. Collective N
N taking proposition / question
3.2.1. N taking propositional PP
3.2.2. N taking indirect questions
N taking a PP
N taking 2 PP complements
3.3. N taking PPde + PP
3.3.1. De-adjectival N
3.3.2. Deverbal N
4.4.2. Intransitive N taking PP
4.4.3. Transitive N
4.5.1. Transitive N denoting events/processes
4.5.2. Ditransitive deverbal N
4.5.3. Transitive N taking locatives
N taking a PP
4.1. Subject nominalisation N
4.2. Object nominalisation N
4.3. N denoting processes / results
4.3.1. Strict Intransitive N
4.3.2. Intransitive N taking locative comp
4.4.1. Strict Intransitive N
2.4. Temporal measure quantifier N
3.1.4. Uncountable N without “de”
N taking a PP
3.1.1. Countable N
3.1.2. Uncountable N
3.1.3. Countable/mass N
N taking PPde + prop / ques
3.4.1. N taking PPde + finite prop
3.4.1.1. Uncountable N
3.4.1.2. Countable N
3.4.2. N taking PPde + inf prop
3.4.3. N taking PPde + fin ind ques
N Appearing with support verbs
5.1. Intransitive N
5.2. N taking a PPcomp
5.3. N taking infinitival complement
5.4. N taking finite verbal complement

# HPSG sign structure




Head-driven Phrase Structure Grammar

# HPSG treatement

- Lexical rule transforms verbs into nouns

conserving their information about subcategorisation & the semantics of their arguments

- Relationship with light verbs: frame alternations

→ lexical rules

*Regalar – dar un regalo*

To offer – ‘give a gift’

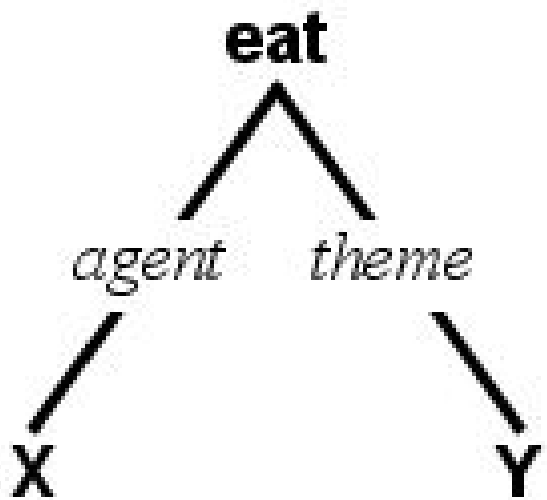
# MTT

- Similar sign structure
- Massive use of constraining features
- Information about lexical semantics & semantic roles as relationships beween words
- Implementated as PUG: *polarised unification grammar*
- Used in industrial applications: human-machine dialogue

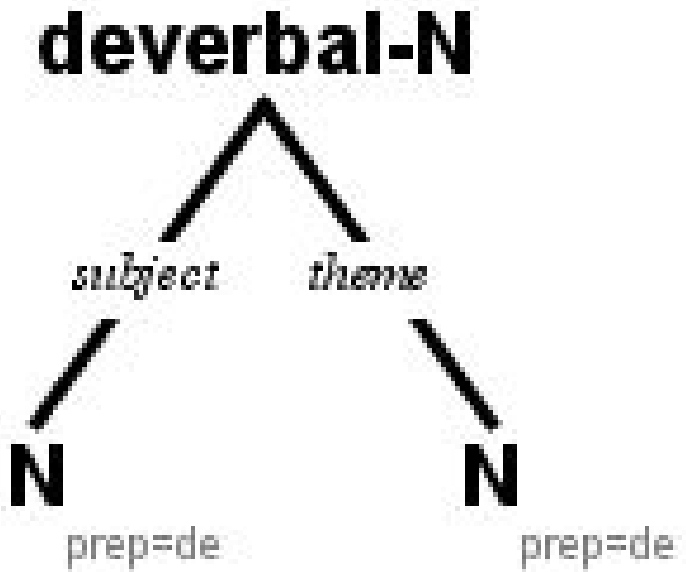
Meaning-Text Theory

# GUP (MTT implementation)

```
<rule>
   <title> EAT </title>
   <tree>
      <node lex="EAT" cat="V" p_voice=- p_mood=->
          <sem cont="eat">
               <arg n="1" id="[x]"/>
               <arg n="2" id="[y]"/>
          </sem>
      </node>
    <tree fct="subj"; sem=”agent”>
      <node cat="N">
          <sem id="[x]"/>
           </node>
    </tree>
    <tree fct="dobj; sem=”theme”" opt=+>
           <node cat="N">
           <sem id="[y]">
        </node>
    </tree>
   </tree>
</rule>
```



# 2 syntactic representations, 1 semantics




The payment of my bill to the bank

→

I want to pay my bill to the bank

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