Module A of

*Syntactic Structures and Compositional Semantics*

Week 1
Getting to know each other

- Provenance and previous degree
- Why did you choose this MA?
- Why are you interested in human language?
- What do you expect to learn in this MA?

- First: create a common background.
- Main aim of this module: Being able to see the structure of a given sentence, i.e. its hierarchical organization, and some of the fundamental processes that take place in it.
Warm up: Syntax

• What is syntax?

• Make a sentence out of the following list/string of words:

  • suitcase John’s his found friend

  • vicino porta il aprì la del chiave fratello la con
Results: Sentences

• John’s friend found his suitcase
• His friend found John’s suitcase

• Il fratello del vicino aprì la porta con la chiave
• Il fratello aprì la porta con la chiave del vicino
• Il vicino aprì la porta con la chiave del fratello
Syntactic Structures

• Sentences are made up of organized sets of words (and affixes).

• Words combine. The basic operation building sentences is a combinatorial **MERGE** operation that gives rise to
  
  • **Syntactic Structures**

• Words are organized in
  
  • **Structures not Strings**
  
  • **Syntax has a fundamentally hierarchical organization**
Syntactic Structures

• The organization of syntax is
  • Hierarchical
• It is not
  • Linear
• Structures

• ... despite the fact that, in oral languages, we pronounce (and write) one word after the other
Recursive merge of two elements

• Syntactic structures emerge from the recursive application of an elementary operation which consists of combining/merging two elements, thus forming another unit of a higher level
MERGE

α

β
Iterating MERGE

• $a + b$

• $c + [a \ b]$

(binary branching: $\wedge$)
Notations:
Trees (vertical). Square brackets (horizontal)

- \( q \)
  \[
  \begin{array}{c}
  a \\
  \hline
  b
  \end{array}
  \]

- \([q \ a \ b]\)
Toward syntactic structures: some terminology

• **Head** = Word (or less than a word, such as e.g. an affix) that drives the operation Merge (External Merge)

• **Phrase** = The unit created by Merge; hence typically more than one word (sometimes referred to as projection of the head)

• **Complement** = Position of the phrase that combines with the head in the first application of Merge

• **Specifier** = Position of the phrase that combines in a further application of Merge

• Given two applications of Merge driven by the same head X the following general schema of a phrase is obtained (for a head-initial language such as e.g. English or Italian)
The phrase: XP

- Traditional standard schema of a phrase (so called X’-schema)

\[
\begin{array}{c}
\text{XP} \\
\downarrow \\
\text{ZP (Spec)} \\
\downarrow \\
X & \text{YP (Complement)}
\end{array}
\]

- The *label* of the phrase is given by the head driving the Merge operation. The label is XP in the phrase above. X is in fact the closest head to the phrasal level.

- **Spec and Complement are (always) Phrasal positions.**
The head of the phrase

• E.g.
• D + N >> the boy

• D + (A) + N >> the tall boy

Selection: D + nominal >> (A+) N = NP
The head of the phrase

• Label of the phrase is provided by the closest head:

```
X(P)
  \---
     X
     \---
       Y(P)
       \---
         Y
         \---
           WP
```

• We assume here the standard schema, with X the closest labeling head of the resulting phrase.

```
XP
  \---
     ZP (Spec)
     \---
       X
       \---
         YP (Complement)
```
Heads and phrases

• The Head-Complement relation:

• OV vs VO

VO >> X YP  OV >> YP X  
X=V

Where the two linear orders are not simply the mirror image of each other. See Kayne 2018 for recent discussion: one order is derived from the other.
Head-Complement order. Universal base order.

• As it is always the case in natural languages there are **NOT** purely linear constraints. See later on the property called ‘structure dependency’: → rules apply on structures not on the linear string.

• Linear order is the **reflex** of the syntactic hierarchy.

• I.e. Higher in the syntactic structure yields **PRECEDENCE** in linear order.

• So, given VO – OV, the difference cannot just be a linear difference as below:

```
  V  O
  O  V
```
Head-Complement order. Universal base order.

• The derived order appears to be: O V, with O moved to a higher position in the syntactic hierarchy (the syntactic tree).

\[ \begin{array}{c}
\text{V} \\
\text{O}
\end{array} \]  
\[ \begin{array}{c}
\text{V} \\
\text{DP (O)}
\end{array} \]

• Higher = c-commanding (different from dominating). See later for definition of c-command.

• As in Kayne’s definitions, the relations are computed w.r.t. to the terminal nodes, i.e. the head of the phrases.

• Hence V higher than O (c-commands) in the V O order (higher terminal node of the VO phrase). Cfr. DP in previous slide and above
Some General *Background* considerations

The language faculty: The I-language perspective

**UG: Universal Grammar**

- The language faculty is a human cognitive capacity which is made visible by the natural *instinctive* capacity to acquire any language by any child.
- Call **UG** the explicit model of the human language capacity, internal to the mind/brain.
- Current neuroimaging techniques show the activity of the language faculty online in different tasks, both in babies, children and adults (cfr. *Brain, Language and Learning* conference, just held at the department last week)
- For the linguist access to UG is indirect:
  - through language description
  - through language comparison
  - through the study of forms of different types of linguistic data: from language acquisition to language pathology
- The speaker ‘knows’ a lot about his/her language, but does not know ‘why’ and ‘how’. A kind of knowledge that is not accessible to introspection.
- Data can also be obtained experimentally, an issue we will mainly focus on in the second year course (Morphosyntax and experimental studies on language, Belletti), also addressed in the (new) first year (optional) course (Experimental methods in linguistics, Bocci).
- Invariable and variable properties.
Rules

• Rules as internal computational mechanisms, not as explicit regulating instructions (as in normative grammars).

• Neuroimaging evidence on the different status of the two types of rules: explicit instructions can be learned, but they do not activate the language areas of our brain even if they refer to words/linguistic entities (unless they reflect the internal mechanisms).

• Moro et al. (2001) >> impossible rules
An impossible rule

Put the negation as the \textit{third} element of the string

- Linguistic computations do not operate by counting the elements of the linguistic string
An impossible rule

i. John is not tired
ii. John did not understand
iii. Children do not play golf

iv. John’s friend is not tired
v. John’s friend from England did not understand
vi. Small children do not play golf
An impossible rule

i. ** John’s friend not is tired

ii. ** John’s friend not from England did understand

iii. ** Small children not do play golf

iv. The head of the department is not tired

v. ** The head not of the department is tired
The fundamental empirical observation: Language acquisition

- Data
- LAD
- Competence

- UG = model of LAD (Language Acquisition Device)
- Language = Natural Language
Natural Language & Language Faculty

• A combination of sound and meaning (Aristotle)

• A computational mechanism/a generative procedure that sends instructions for the interpretation to the interface systems, systems that are also internal to the mind/brain, but external to the faculty of language in a narrow sense (Chomsky):

• Sensory motor system (sounds, but also signs as in sign languages*)
• Conceptual- Intentional system (meaning*)

*Meaning can also be expressed and externalized through signs
The basic property of human language

• “...a finite computational system yielding an infinity of expressions, each of which has a definite interpretation in the semantic-pragmatic and sensorimotor systems (informally, thought and sound)” (Berwick & Chomsky, 2016)

• We typically both produce and comprehend expressions that we have probably never said or heard before. We make - in the formal sense above – a creative use of our faculty of language.

• Infinity is the consequence of the recursive nature of merge seen earlier.

• Universal Grammar/UG: The theory of this biologically given system.
UG: The internal and the external dimension

- UG is formulated in terms of rules and principles as a model of the

  **Invariable common properties of human languages**

- How can language variation be accounted for?

  **The parametric approach**

- Description through different linguistic data mentioned earlier
  (external dimension, the different languages) lead to the formulation
  of the parameters (the internal dimension, the speaker’s internal
  grammar)
UG and Parameters

- Parameters:
  - Properties with respect to which UG is flexible
  - Ex: - The order parameter/head parameter
    - The null subject parameter
  - Parameters and acquisition
The head parameter

• The Head Parameter:

VO → Head initial
(e.g. English, Italian, ...)

OV → Head final
(e.g. Classical Latin, Japanese, Turkish...; ....German in subordinate clauses, mixed determined head by head).

• How would you describe your native language w.r.t. the head parameter?
Some examples

(a) Caesar [omnem agrum Picenum] percurrit
   O V

(b) Cesare percorre [tutto il territorio dei Piceni]
   V O

   Cesar goes through the entire land of the Piceni

(c) ...dass Peter [das Buch] gelesen hat
   O V

(d) ... che Pietro ha letto [il libro]
   V O

(f) ... that Peter has read [the book]
   V O

(g) John-ga Mary-o butta
   (John Mary hit)
   O V

(h) John-ga Mary-ni hon-o yatta
   (John to Mary book gave)

(i) Mit Peter (P-initial)
   (with Peter)
   P O
UG and Parameters

• Parameters to be stated in the vocabulary of UG/Linguistic Theory, i.e. in terms of the primitive ingredients of the computational system of the language faculty.

• Parameters are not phenomena, but formal properties that manifest themselves in linguistic phenomena. Their value may differ in different languages (whence: + or -).

• Language variation occurs within limits: The limits are found in the mechanisms and principles through which UG is put into work, where UG is in fact the internal grammar of any speaker. Variation does not/cannot exceed the limits of UG.

• For instance: no human language has no hierarchical organization of the units composing its expressions. This is not a domain of variation.
Parameters

• We recognize an area of parametric variation through the observation of syntactic phenomena.

• Detour on null-subject parameter.

• Take two languages. Keep the relevant structures as minimally different as possible. Check the behavior of the two languages investigated. (Experimental approach).

• E.g.: Minimal pairs English vs Italian (Exercise)
Null-subject

• English

• Q: Did Mary go out?
• A: No, she just came back

• Mary says that she wants to talk with John

• Mary says that she would like to talk with John, but others don’t want to even consider the idea of meeting with him

• Italian

• Q: Maria è uscita?
• A: No, pro è appena tornata

• Maria dice che pro vuole parlare con Gianni

• Maria dice che lei vorrebbe parlare con Gianni, ma altri non vogliono neppure considerare l’idea di incontrarlo
Lexical vs Functional Heads

• Parameters: different values / properties/features of the so called functional lexicon.

• A fundamental distinction:

• **Lexical heads (descriptive content):**
  
  N  V  A

• **Functional heads (grammatical content):**

  D  P  C  T ......

(the distinction may not always be clear cut, it is a fundamental distinction nevertheless)
Functional vs Lexical
Il Lonfo
The functional architecture of the clause

Il Lonfo non vaterca né gluisce
e molto raramente barigatta,
ma quando soffia il bego a bisce bisce
sdilena un poco e gnagio s'archipatta.

E' frusco il Lonfo! E' pieno di lupigna
arrafferia malversa e sofolenta!
Se cionfi ti sbiduglia e ti arrupigna
se lugri ti botalla e ti criventa.

Eppure il vecchio Lonfo ammargelluto
che bete e zugghia e fonca nei trombazzi
fa lègica busìa, fa gisbuto;

e quasi quasi in segno di sberdazzi
gli affarferesti un gniffo. Ma lui zuto
t' alloppa, ti sberneccchia; e tu l'accazzi

Fosco Maraini (La Gnosì delle Fanfole, 1994)
Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And the mome raths outgrabe.

Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!

He took his vorpal sword in hand:
Long time the manxome foe he sought
So rested he by the Tumtum tree,
And stood awhile in thought.

And as in uffish thought he stood,
The Jabberwock, with eyes of flame,
Came whiffling through the tulgey wood,
And burbled as it came!

One, two! One, two! And through and through
The vorpal blade went snicker-snack!
He left it dead, and with its head
He went galumphing back.

And hast thou slain the Jabberwock?
Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!
He chortled in his joy.

Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And the mome raths outgrabe.

---

Jabberwocky, Lewis Carroll (Through the looking glass)
Back to the hierarchical organization of syntax: The **Structure dependency** of syntactic processes

- Syntactic processes are *‘structure dependent’*. The crucial manifestation of the hierarchical organization of syntax.

- Syntactic computations apply **on structures, not on the linear sequence of elements**

- The elements that are involved in syntactic computations are always constituents in the syntactic tree, i.e. they are either heads or phrases.
Structure dependency

• The man who is here is a doctor
• Is the man who is here – a doctor?
• *Is the man who – here is a doctor?

• Are eagles that fly – swimming?
• [Eagles [that fly]] are swimming

• [Eagles [that are swimming]] fly
• *Are eagles that – swimming fly?
• (Do eagles that are swimming fly?)

• The relevant distance is not linear but structural  (Chomsky 2013 more recent rediscussion)
• Reconsider in this respect the discussion on the impossible rules.
Structure dependency

The man who is here is a doctor
Structure dependency

Probably the man who will talk to the girl will go out of the room
Phrases

• Each phrase has a **HEAD**:

```
NP | VP | PP | AP | DP
---|----|----|----|----
N  | V  | P  | A  | D  
```

• The head is either a lexical word (e.g. N), or a functional word (e.g. D), or an affix/feature (expressing some grammatical property/value, e.g. Tense, Number...)

D

• If $X = V$ in the general schema of a phrase, an argument structure is associated with it, composed of roles/interpretations that are carried by nominal arguments in the syntactic structure (Th-roles, [$\theta_1$, $\theta_2$, $\theta_3$])

• In languages with Determiners, a noun phrase can appear in a sentence only if it is introduced by a determiner (generic plurals and mass nouns aside):

  • La/una/quella ragazza comprò il/un/quel libro
  • The/one/that girl bought the/a/that book
  • *Ragazza comprò libro
  • *Girl bought book

• Another crucial parameter: The language has (overt) determiners/D, or not.
• D: head of a phrase whose complement is an NP (simplifying; other functional heads are also present within the DP)
The NP

\[(\text{very}) \text{ interesting approach to the problem}
(\text{very}) \text{ famous author of the book}\]
The DP

The famous author of the book took an interesting approach to the problem.