

Lec17: Dependency Representation

HUL 242

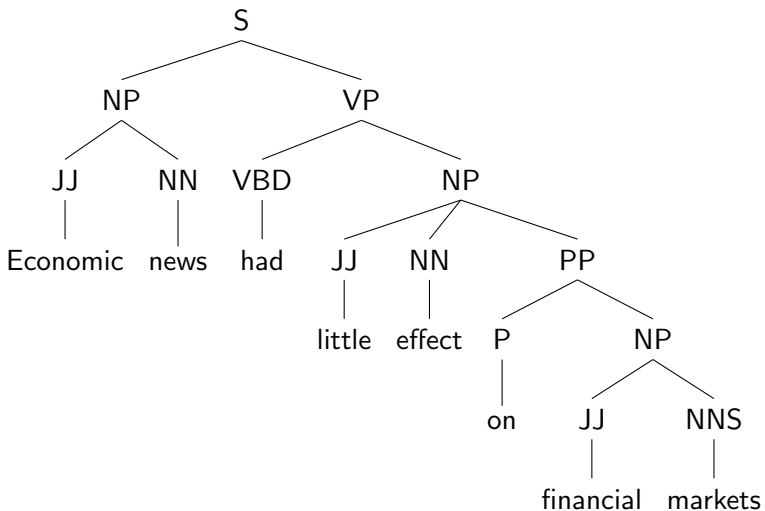
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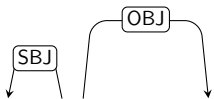
Recap

- X-bar schema and representation
- Treebanks
- Dependency representation (this class)

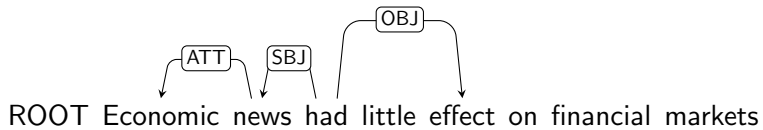
Coming up..

- Discourse relations (beyond the sentence)
- Language Acquisition (L1 and L2)
- Language and Society

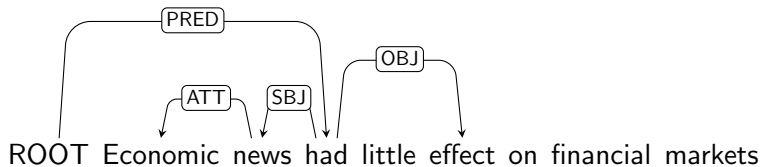


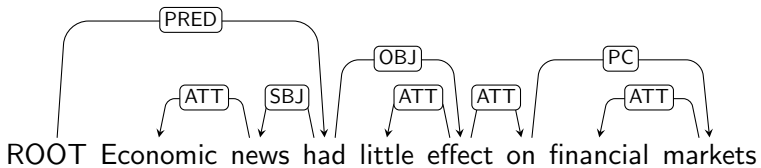


ROOT Economic news had little effect on financial markets



Example





SBJ: subject

OBJ: object

ATT: Attribute

PC=Prepositional Complement

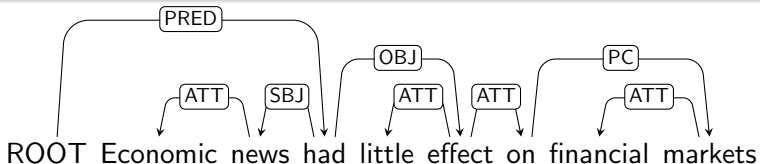
Properties

Every word (node) has an incoming edge: complete syntactic structure

Root node is used to link the head of the sentence (verb)

Every word has at least one syntactic head

Hierarchical syntactic structure (no loops in the structure)



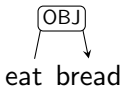
Dependency representation

Syntactic structure= "words linked by binary, asymmetrical relations known as dependency relations"

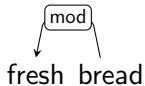
Dependency relations are usually **labelled**

Types of dependencies

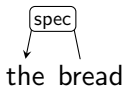
- Head-argument



- Head-modifier



- Head-specifier


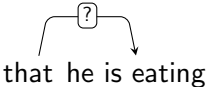
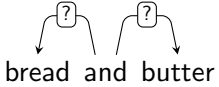


Classify the dependencies


State whether head-modifier, head-argument or head-specifier

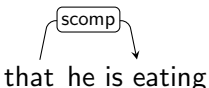
- She knows that the trick is old
- frantic search
- many items
- He ran the race many times

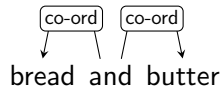
What about these dependencies?

- Auxiliary and verbal head 
- complementizer and sentence 
- co-ordination 

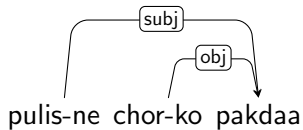
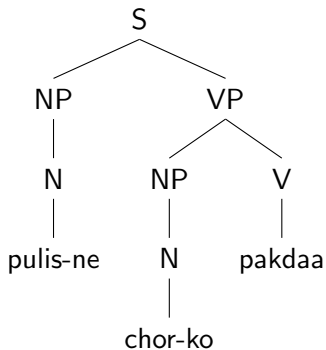
What about these dependencies?

- Auxiliary and verbal head
- 
- ```
graph TD; vg[vg] --> will[will]; vg --> eat[eat];
```

- complementizer and sentence
- 
- ```
graph TD; scomp[scomp] --> that[that]; scomp --> eating[eating];
```

- co-ordination
- 
- ```
graph TD; co-ord1[co-ord] --> bread[bread]; co-ord2[co-ord] --> butter[butter];
```

## Phrase structure and Dependency



## Comparison

|                          | <b>Dependency</b> structure | <b>Phrase</b> structure                   |
|--------------------------|-----------------------------|-------------------------------------------|
| Subj/Obj Relations       | Directly represented        | Via structural configuration (sisterhood) |
| Word Grouping            | None                        | Into phrases (constituents)               |
| Terminal/Non-terminals   | None                        | Explicitly represented (NP, N' etc)       |
| Head-dependent relations | Explicit via directed arcs  | Not represented                           |
| Crossing Arcs            | Possible                    | Not Possible                              |

## Examples

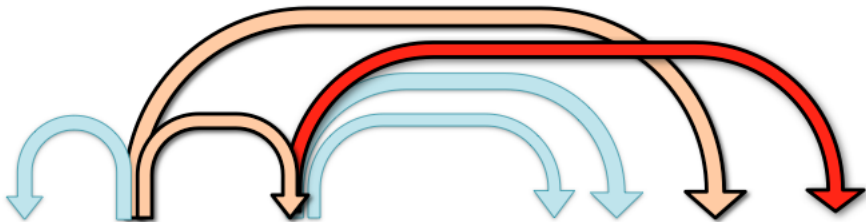
vaha ladkaa [jo ro raha hai] meraa bhai hai

vaha ladkaa meraa bhai hai [jo ro raha hai]





## Trees with crossing branches



# Projectivity

A CFG assumes that there will be non-crossing arcs, i.e. tree is *projective*

But dependency allows for **non-projective** structures i.e. structures with crossing arcs

## Non-projective tree

A hearing is scheduled on the issue today

