How Do We Identify Constituents?

Tallerman: Chapter 5
Discovering the Structure of Sentences

• Evidence of structure in sentences
  – Structural ambiguity
    • Black cab drivers went on strike yesterday
      – Black [cab drivers] went on strike.
      – [Black cab] drivers went on strike.
    • The boy and the girl’s uncle stayed to dinner.
      – [The boy and the girl]’s uncle stayed.
      – The boy and [the girl]’s uncle stayed.
    • Sometimes intonation distinguishes the two readings.
– Constituent
  • A group of words that forms a phrase in a sentence

– Constituent Structure
  • A particular grouping of words

– A sequence of words which form a constituent in one environment, need not in another
  • The students wondered how simple textbooks could be obtained.
  • The students wondered how simple textbooks could be.

– We need to manipulate the sentence to discover constituency, using formal constituency tests.
  • The students wondered how they could be obtained.
  • The students wondered how simple they could be.
• **Some syntactic tests for constituent structure**
  
  – **Sentence fragment test**
  
  • A string of words that can be a sentence fragment must be a constituent.
    
    – But *whose uncle* stayed to dinner?
      
      » *The boy and the girl’s.*  (one person stayed)
      
      » *The girl’s.*  (two people stayed)
    
    – The boy and *who* stayed to dinner?
      
      » *The girl’s uncle.*
    
    – *Who* stayed to dinner?
      
      » *The boy and the girl’s uncle.*
  
  • [[The boy and the girl’s] uncle]
  
  • [ [The boy] and [ [the girl’s] uncle]]
– Using constituency tests we can discover if two apparently similar sentences have the same structure.

• Sue lost that book with the blue cover.
  Sue left that book with her best friend.
  \[N \rightleftharpoons V \rightleftharpoons D \rightleftharpoons N \rightleftharpoons P \rightleftharpoons D \rightleftharpoons A \rightleftharpoons N\]

• What did she lose?
  – [That book with the blue cover.]

• What did she leave?
  – [That book]
  *That book with her best friend

– To claim a difference in syntactic structure, we must show contrast in syntactic behavior; we must show a grammaticality clash.
– **Cleft test**

- The string of words in the “focus position” of a cleft sentence must be a constituent.
  - It was [that book with the blue cover] that Sue lost.
  - *It was that book with her best friend that Sue left.

- **It** + COPULA + FOCUS + RELATIVE CLAUSE

- **M:** I want to ask this question: Why is this agreement so bad? I ask you.
- **G:** Because our whole intention was to bring some form of democracy there; our intention was to make the Sandinistas cry uncle. *It is the CONTRAS who have cried uncle.* [McLaughlin Group: 3/25/88].
– It was [that book] that Sue left with her best friend.
– It was [with her best friend] that Sue left the book.

• Sue lost [that book with the blue cover]
• Sue left [that book] [with her best friend]

• Irish
  – Bhí an fear ag péinteáil cathaoir.
    Was the man PROG paint chair
    ‘The man was painting a chair.’
  – Is é [an fear] a bhí ag péieáil cathaoir.
    Is he the man who was PROG paint chair
    ‘It’s the man who was painting a chair.’
- **Basque**
  - Premizúa orrerî mutillarî emon-dótze.
    Prize that:DATIVE boy:DATIVE give-AUX
    ‘They have given the prize to that boy.
  - [orreri mutillarî] dâ premizúa emón dotzé-na
    that:DATIVE boy:DATIVE is prize give AUX-that
    ‘It’s to that boy that they have given the prize.’

- **Coordination test**
  - Sequences of words which are constituents can be coordinated (or ‘conjoined’) with one another, provided that they are of the same syntactic category.
    - Sue lost [that book with the blue cover] and [that notebook with the pink cover]
    - *Sue left that book with her best friend and that notebook with her mother.
• XP and XP
  – Sue left [that book] and [that notebook] with her best friend.
  – Sue left that book [with her best friend] and [with her mother]

• Sue lost [that book with the blue cover]
• Sue left [that book] [with her best friend].

– Grammaticality judgments
  • Intuitions about which sentences are possible and which aren’t.
  • The fact that speakers share these judgments shows that we have unconscious knowledge of constituent structure.
• Constituent Structure Trees

- (Sue) left that book with the blue cover

- (Sue) left that book with her best friend
- We represent the structure of sentences with tree diagrams
  - Upside down trees, with root at the top
  - Branches descend from the root.
- Adjuncts are attached to the tree at a different level than complements
  - Adjuncts are not required to make the sentence meaningful.
- Both trees are drawn as constituents: VP
  - Sue did what?
    - Lost that book with the blue cover.
    - Left that book with her best friend.
– My sister wrote down her address.
  My sister lived down this road.
  D N V P D N

– Cleft test:
  • *It was down her address that my sister wrote.
  • It was [down this road] that my sister lived.

– (My sister) wrote down her address

– (My sister) lived down this road
– (My sister) lived down this road

– We include the amount of detail that we need for a given purpose.
– Nested brackets can also give this detail:
  • [ down [this road] ]
Labeled Tree Diagrams and Relationships Within the Tree

• It is more common to use labeled brackets or labeled tree diagrams.

• \([_{PP} \ [_{P \ down} \ [_{NP \ this \ road} \ ]] \]

```
          PP
         /   \\
        P     NP
       /\     /\
      down  this road
```

```
          PP
         /   \\
        P     NP
       /\     /\
      down  D  N
     /\    /\  /\
   this road
```
Branches

Category labels

Node
  • Phrasal nodes
  • Lexical nodes
  • Words

Immediately dominates

Mother

Daughters

Dominates

A set of elements forms a constituent in a tree diagram if and only if there is a single node that dominates just these elements, and no other items.
Developing Detailed Tree Diagrams

• Applying some constituent structure tests
  – These fishermen switched on the shipping forecasts.
  – These fishermen relied on the shipping forecast.

  – *switched on* is a **phrasal verb**:  
    • \([v \text{ switch on}]\)

  – *relied on* is a **prepositional verb**:  
    • \([v \text{ rely} [\text{PP on…}]\]

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– The preposition of a transitive phrasal verb can alternatively follow the direct object NP:
  • These fishermen switched the shipping forecast on.

– Other transitive phrasal verbs:
  • Turn over, tear down, pick up, put out, break up
    – I’d pick that snake up.
    – They tore that old place down.

– The PP modifier right can only co-occur with the preposition after the NP, indicating that the one immediately after the verb is a bare P.
  – I’ll pick that snake right up.
  – *I’ll pick right up that snake.
  – They tore that old place right down.
  – *They tore right down that old place.
– Prepositional verbs take an obligatory PP complement headed by a particular preposition
  • *rely for, *rely over, *rely under

– The preposition cannot be placed after the NP:
  • *The fishermen relied the shipping forecasts on.

– Other prepositional verbs
  • talk about, glance at, depend on, look after
these fishermen switched on the shipping forecast
these fishermen relied on the shipping forecast
The NP VP split of S reflects the split between subject and predicate of a sentence.
  • Here ‘predicate’ refers to a constituent consisting of the verb and all its modifier--complements and adjuncts.
  • In another usage, ‘predicate’ just refers to the verb (or to the predicate adjective or noun in languages without copulas).

We need to use constituency tests to prove the existence of each constituent in the tree.
  • Sentence Fragment Test
    – Who switched on the shipping forecasts?
      » [NP These fishermen]
    – Who relied on the shipping forecasts?
      » [NP These fishermen]
    – What did the fishermen do?
      » [VP switched on the fishing forecast]
    – What did the fishermen do?
      » [VP relied on the shipping forecast]
• Coordination test
  – \([_{NP} \text{These fishermen}] \text{ and } \_[_{NP} \text{those yachtsmen}] \text{ switched on the shipping forecast.}\]
  – \([_{NP} \text{These fishermen}] \text{ and } \_[_{NP} \text{those yachtsmen}] \text{ relied on the shipping forecast.}\]
  – \(\text{The fishermen } \_[_{VP} \text{switched on the shipping forecast}] \text{ and } \_[_{VP} \text{answered their cell phones}.}\]
  – \(\text{The fishermen } \_[_{VP} \text{relied on the shipping forecast}] \text{ and } \_[_{VP} \text{answered their cell phones}.]\)

• Cleft test
  – \(\text{It was } \_[_{NP} \text{these fishermen}] \text{ who switched on the shipping forecast.}\]
  – \(\text{It was } \_[_{NP} \text{these fishermen}] \text{ who relied on the shipping forecast.}\]

• Most dialects of English don’t allow clefting of the VP:
  – *it’s switch on the shipping forecast that these fishermen did.
  – *it’s rely on the shipping forecast that these fishermen did.
• However other languages do allow it, e.g. Irish (and Irish English)
  – Bhí an fear ag péinteáil cathaoir
    was the man PROG paint chair
    ‘The man was painting a chair.’
  – Is [VP ag péinteáil cathaoir] a bhí an fear.
    Is PROG paint chair that was the man
    ‘*It’s painting a chair that the man was.

  – Sometimes a test won’t work for some language-specific or construction-specific reason. We must then rely on other tests.
• **Pro-form test**
  – Any string of words that can be replaced by an appropriate pro-form must be a constituent.

  – **Pro-NP they**
    » \([_NP \textbf{They}] \text{ switched on the shipping forecast.}\)
    » \([_NP \textbf{They}] \text{ relied on the shipping forecast.}\)

  – **Pro-VP do so**
    » These fishermen \([_VP \text{ switched on the shipping forecast}], \) and those yachtmen \([_VP \textbf{did so}] \text{ too.}\)
    » These fishermen \([_VP \text{ relied on the shipping forecast}], \) and those yachtmen \([_VP \textbf{did so}] \text{ too.}\)
• Ellipsis test
  – The omitted part of the sentence must be a constituent.

  – VP ellipsis
    » These fishermen should \([_{\text{VP}} \text{switch on the shipping forecast}], \) and those yachtsmen should \([_{\text{VP}} ]\) too.
    » These fishermen didn’t \([_{\text{VP}} \text{rely on the shipping forecast}], \) but those yachtsmen did \([_{\text{VP}} ]\) for sure

  – Not all constituents can be omitted
    » *These fishermen didn’t rely \([_{\text{NP}} \text{the shipping forecasts}], \) but those yachtsmen did rely \([_{\text{NP}} ]\) for sure.
    » *These fishermen didn’t rely \([_{\text{PP}} \text{on the shipping forecasts}], \) but those yachtsmen did rely \([_{\text{PP}} ]\) for sure.
    » The complement of V or P in these cases is obligatory.
• **Movement test**
  
  – A sequence of words must be a constituent in order to be moved.:  
  
  – NP preposing (topicalization):
    » A:  I know the fishermen switched off their personal stereos, but what did they do with regard to the shipping forecast?
    » B:  **The shipping forecast**, the fishermen switched on.
  
  – VP preposing:
    » I said the fishermen would switch on the shipping forecast, and **switch on the shipping forecast** they did.
– We need to show ungrammatical as well as grammatical sentences to prove that two sentences have different structure:

• **Sentence Fragment test**
  – What did the fishermen rely on?
    » \([_{pp} \text{On the shipping forecast}]\)
  – What did the fishermen switch on?
    » *On the shipping forecast.*

• **Cleft test**
  – It was \([_{pp} \text{on the shipping forecast}]\) that the fishermen usually relied.
  – *It was on the shipping forecast* that the fishermen switched
• **Coordination test**
  – The fishermen relied \([_{pp} \text{ on the shipping forecast}]\) and \([_{pp} \text{ on their years of experience}]\).
  – *The fishermen switched \textbf{on the shipping forecast} and \textbf{on their personal stereos}.

• **Ellipsis test:** Gapping
  – These fishermen \([_{V} \text{ switched on}]\) the shipping forecast and those yachtsmen \([_{V} \text{ }]\) their personal stereos.
  – These fishermen \([_{V} \textbf{relied}]\) on the shipping forecast and those yachtsmen \([_{V} \text{ }]\) on their personal stereos.
  – *These fishermen \textbf{relied} on the shipping forecast and those yachtsmen their personal stereos.

• **P-Movement test**
  – The fishermen \textbf{switched} the shipping forecast \textbf{on}.
  – *The fishermen \textbf{relied} the shipping forecast \textbf{on}.
the fishermen switched the shipping forecast on
• Coordinate structures in the tree
  – Sequences of words which are constituents can be coordinated with one another, provided they are of the same syntactic category.
  – Coordinating conjunctions: *and, but, or, nor*
  – The coordinated conjuncts form a constituent of the same type.
  – Schema for coordination: \( \alpha \) can stand for any category.

\[
\begin{array}{c}
\alpha \\
\alpha \quad \text{CONJ} \quad \alpha
\end{array}
\]
John and Mary sang and danced.
Sue left.
Note: Kim is [NP a brilliant lawyer] and [AP very proud of it]
• **An introduction to the bar notation**
  – The head noun together with its complement forms a constituent smaller than an NP.
    • I admired $[\text{NP the director’s treatment of the issues}]$
    • I admired $[\text{NP the director’s treatment of the issues}]$ and $[\text{NP her sensitivity to the problems}]$
    • I admired $[\text{NP the director’s treatment of the issues and sensitivity to the problems}]$
• I admired [the director’s [N’, treatment of the issues] and [N’, sensitivity to the problems] ] ]

– Lexical head noun: N⁰, ‘N-zero’
– Intermediate nominal phrase: N’, ‘N-bar’

– N’ Pro-form one:
  • [NP This [N’, treatment of the issues]] is better than [NP that [N’, one]]
• Tests for complement versus adjunct
  – Pro-N’ one test
    • I like the student with short hair.   Adjunct
    • I like the student of chemistry.     Complement

    • [NP The [N, [N student]] with long hair] is smarter than the one with short hair.
    • *[NP The [N, [N student] of physics]] is smarter than the one of chemistry.

    • The pro-N’ one must replace a whole N’, not just the head noun.
– Pro-VP *do so* test

- John worked **at the office**. Adjunct
- John laughed **at the clown**. Complement

- John **worked** at the office, and Sue **did so** at her house.
- *John **laughed** at the clown, and Sue **did so** at the giraffe.*

- *Do so* must replace a whole VP, not just a part of one.
– VP Pseudocleft test

• What Sue did at her house was **work**.
• *What Sue did at the giraffe was laugh.*

• Only a whole VP, not just part of one, can move to the focus position of a pseudocleft and be replaced by *do*.
• Only an adjunct can be “left behind” in a VP pseudocleft.
– Schema for adjunction:
  • $\alpha$ is a head or a projection of a head, $\beta$ is the adjunct: