

CAS LX 522

Syntax I

4

Constituents
(3.1-3.4)

The structure of sentences

- 1) You will give it to her
- 2) You will give the book to your roommate
- 3) You will give the book about syntax to your roommate's sister
 - Someone doing the giving
 - Something changing hands
 - Someone receiving the thing

Sentential players

- It's like there's a "spot" for each of these players:
 - 1) ___ will give ___ to ___
- And it doesn't matter whether the "player" is described with one word, two words, or several words.

Constituents

- Each "unit" of this sort is what we'll call a *constituent*. We enclose them in brackets to indicate that the words form (and behave as) a unit.
 - 1) [You] will give [the book] to [your roommate].
- A significant property of language is that these units can be arbitrarily complicated:
 - 2) [You] will give [it] to [Ed's roommate's sister's friend]

Arbitrarily complicated

- [Ed's roommate's sister's friend]
- This has sub-units within it:
 - [[Marge]'s friend]
 - [[Ed's roommate's sister]'s friend]
- And within that:
 - [[[Marge]'s sister]'s friend]
 - [[[[Ed's roommate]'s sister]'s friend]
 - [[[[[Ed]'s roommate]'s sister]'s friend]
- In general, it looks like wherever a name can go, so can [name's noun].

[name's noun]

- Wherever a name can go, so can [name's noun].
 - 1) I gave the book to Homer.
 - 2) I gave the book to Bart's father.
 - 3) I gave the book to Lisa's brother's father.
- This replacement rule is *recursive*. The thing we are replacing is also contained in the thing we replaced it with.

Groups of groups of groups

- Sentences are made of *grouped* words. These groups can be contained in other groups, arbitrarily deep. A group of this kind: a *constituent*.
- Constituents can contain constituents that can contain constituents, etc.—The structure of a sentence is *hierarchical*.
- Constituents behave as a unit...

Constituents

- Functioning as a unit...
 - The students did their syntax assignment.
 - The students did the crossword puzzle.
 - John did the crossword puzzle.
 - The crossword puzzle is what John did.
 - *Crossword puzzle is what John did the.
 - John likes the crossword puzzle.
 - John likes the jigsaw puzzle.
 - John likes the theater.

Finding constituents

- How do we find constituents in a sentence? For many of them, we can guess, but a guess isn't evidence.
- The *structure* of a sentence has consequences.
- To find the constituents (to determine the structure) we test for the consequences.

Constituency tests

- Replacement test
- Fragment test
- Ellipsis
- Clefting
- Movement test

Replacement test

- A constituent is a group of words which function as a unit. If you can *replace* part of the sentence with another constituent (the smallest constituent being a single word), this tells us that the replaced section of the sentence is a constituent.
- This isn't foolproof, but it usually works if you try to keep the meaning as close as possible.

Replacement test

- 1) The students left.
 - 2) **They** left.
- *The students* is a constituent.
 - 1) The students will eat the sandwiches.
 - 2) **They** will eat the sandwiches.
 - 3) The students will eat **them**.
 - 4) The students will **dine**.
 - [The students] will [eat [the sandwiches]].

Sentence fragment test

- Generally, only constituents can be used in the fragmentary response to a question.
 - Who will eat the sandwiches?
 - **The students.** ***Students will eat the.**
 - What will the students do?
 - **Eat the sandwiches.** ***Eat the.**
 - What will the students eat?
 - **The sandwiches.**
- [The students] will [eat [the sandwiches]].

Ellipsis test

- If you can *elide* a string, it qualifies as a constituent.
 - Ellipsis is really deletion of a string from a sentence. Sometimes this is “repaired” by using the verb *do*, something which we will seek to explain at a later point.
- The professors will eat the sandwiches, and then..
- The students will.
- The students will eat the cookies, and then...
- *The professors will sandwiches.

WARNING: Passing a constituency test constitutes evidence for a constituent. Failing a constituency test tells you little—there may be other reasons for the ungrammaticality.

Movement (topicalization) test

- Sometimes you can “move” a string of words to the front of a sentence (then generally interpreted as the topic of the sentence). When you can, you’ve found a constituent.
 - The sandwiches, the students will eat _.
 - Eat the sandwiches, the students will _.
 - The students, they will eat the sandwiches.
 - *Students will, the eat the sandwiches.
 - *Students, the will eat the sandwiches
 - Failing a constituency test isn’t evidence *against* constituency!

Clefting test

- Like the movement test, if you can fit your string into the frame *it be X that S* (where you move the string X from inside S), X is a constituent.
 - It’s the sandwiches that the students will eat _.
 - It’s the students that _ will eat the sandwiches.
 - It’s eat the sandwiches that the students will (do) _.
 - *It’s students eat that the _ will the sandwiches.
 - *It’s eat the that the students will _ sandwiches.

Finding constituents

- Tests: Replacement, (ellipsis,) movement, clefting, fragment.
- Some to try:
 - Two African swallows can carry a coconut.
 - A cat was walking down the street.
 - A creature was stirring up trouble.
 - Flying planes can be dangerous.

And all through the house...

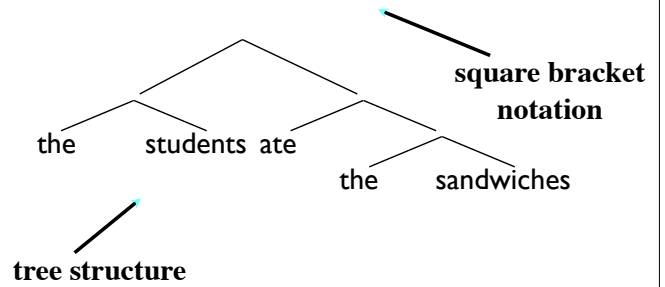


Bonus: the breakdown.



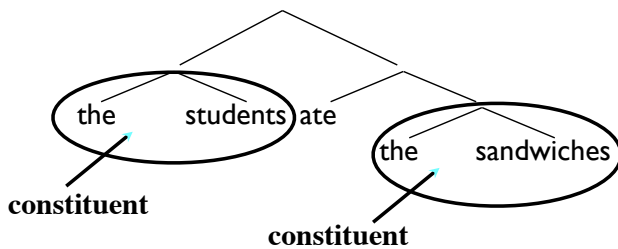
Trees, hierarchy, and constituency

- [The students] [ate [the sandwiches]]



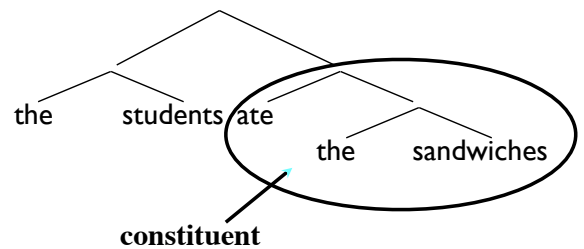
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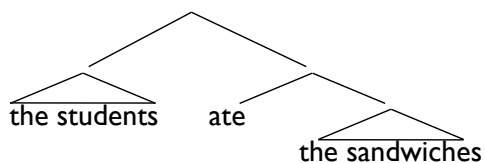
Trees, hierarchy, and constituency

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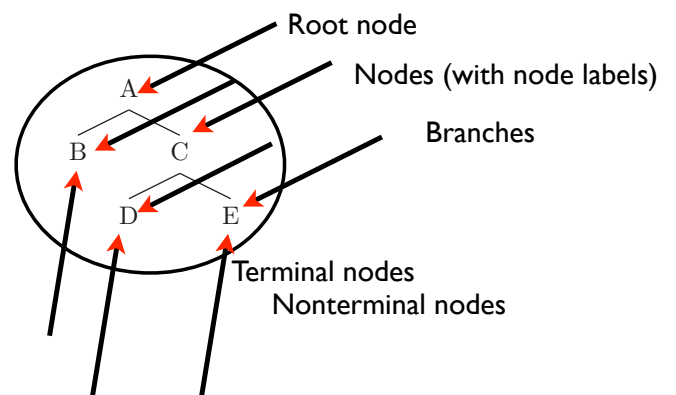


The triangle

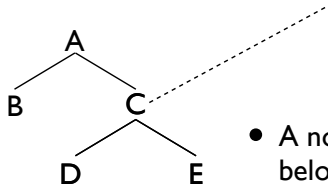
- Sometimes, when the internal constituency is unknown or unimportant to the current discussion, a triangle is used instead.



Trees

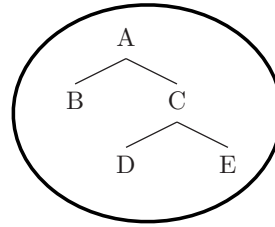


Tree relations



- A node X **dominates** nodes below it on the tree; these are the nodes which would be pulled along if you grabbed the node X and pulled it off of the page.
- Acts as a unit. Is a constituent.

Tree relations



- A node X *immediately dominates* a node Y iff X dominates Y and is connected by only one branch. Or, X is mother of Y.
- Nodes X and Y that share the same mother are sister nodes.

Verbs and substitution

- One of the ways we know a verb is a verb (category) is by observing that it can substitute for other verbs.
 - 1) Pat likes to sing. Pat likes to drive.
 - 2) Pat bought a book. *Pat bought (a) sing.
 - 3) Pat likes to eat sandwiches.
 - 4) *Pat unpleasant to eat sandwiches.
- So is *eat sandwiches* a verb?
- Well, kind of, yes.
- It's a constituent, a phrase, that has the properties a verb does. *A verb phrase*.

The making of a phrase

- We're trying to characterize our knowledge of syntactic structure.
- Our grammatical knowledge is a system (we can judge new sentences).
- All things being equal, a theory in which the system is simpler (needed fewer assumptions) is to be preferred over a theory that entails more complex one.

The making of a phrase

- In that spirit, we know that a phrase differs from a word in that it *contains* words (or other phrases).
- We've seen that when words are combined into a phrase, the phrase inherits the properties of one of the things we combined. (The phrase has a head).
- Suppose: a **phrase** can arise from **merging** two words together, with one taking priority. In a way, attaching one word to another.

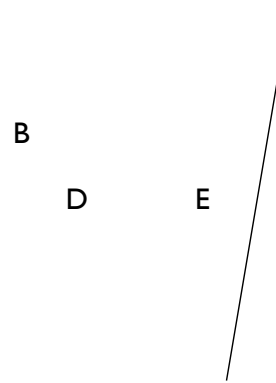
The making of a phrase

- What will Pat do?
 - sing
 - eat sandwiches
- What does Pat like?
 - to eat sandwiches
 - to sing
- [to [eat sandwiches]]
- So, a phrase can also arise from combining *to* and a verb phrase, to make a bigger phrase.

Merge

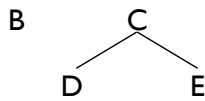
- So, let's go for the simplest theory of structure we can (and only move away from it if the simplest theory won't work)
- A phrase is a syntactic object formed by combining (*merging*) two syntactic objects, with the properties inherited from one of them (the *head* of the phrase).
- A word is a syntactic object.

Merge, in the abstract



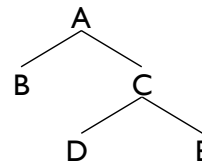
- A good way to think about this is that we have a number of syntactic objects lying around on a workbench of sorts.
- We use the operation Merge to assemble them together into one syntactic object.

Merge, in the abstract



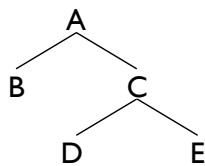
- We combine D and E using Merge to form a combined syntactic object.
- We need to call our new object something, so we call it C.
- C is now a syntactic object (containing D & E).
- D and E are now “off the table”—we can't Merge D with anything because it's inside C. (“Merge only combines objects at their root nodes”).

Merge, in the abstract



- Since C is now a syntactic object, we can combine C with the other syntactic object, B, to form a new syntactic object we'll call A.
- Now, all we're left with is the single syntactic object A.

Merge, in the abstract



- When two objects are Merged, one of them is the **head**, the most important one.
- The head determines the properties of the constituent— that is, the features of the head **project** to become the features of the whole combined object.

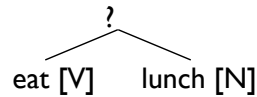
Trees and constituency

- Pat will eat lunch.
- Pat will dine.

eat [V] lunch [N]

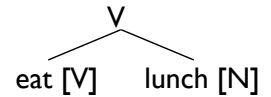
Trees and constituency

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Trees and constituency

- Pat will eat lunch.
- Pat will dine.



So how do we know which is the head?

- When we Merge two things, one is the head, and determines the properties of the resulting syntactic object.
- The next thing we'll turn to is the question of how the syntactic system knows which is the head.

This is a proposition

- Let's try to ground this a bit more now, to make it clearer what problems we're *solving* here.
- A primary—and perhaps the most important—type of sentence is that which represents a proposition.
- A proposition is the kind of thing that can be true or false (basically).

Truth and Verbs

- 1) Michael swam.
- *Michael* : refers to an individual; it is a name, a label. It is complete.
 - *Swam* : describes an action that can be undertaken by someone, or a property that someone can have. Someone. *Swam* can't be true—it needs an individual, then it can be true (or false).

Predicates and arguments

- Suppose the construction of a proposition to be the end result of a (common kind of) sentence construction.
- 1) Michael swam
- *Swam* needs an individual to be true or false. Fortunately, *Michael* is an individual. So, combining *swam* (predicate) and *Michael* (argument) gives us a proposition, that can be true or false.

Verbs and participants

- Intransitive (1-place):
Sleep
 - 1) Bill slept.
 - 2) *Bill slept the book.
- Transitive (2-place):
Hit
 - 3) *Bill hit.
 - 4) Bill hit the pillow.
- Ditransitive (3-place):
Put
 - 5) *Bill put.
 - 6) *Bill put the book.
 - 7) Bill put the book on the table.
- Weather (0-place):
Rain
 - 8) It rained.

Verbs and arguments

- The “participants” in an event denoted by the verb are the arguments of that verb.
- Some verbs require one argument, some require two arguments, some require three arguments, some require none.
- Intuitively, the number of arguments is the number of things that a verb needs in order to make a proposition (something that can be either true or false).

Predicates

- We will call verbs the predicates. They define properties of and/or relations between the arguments.
 - 1) Bill hit the ball
 - ▶ There was a hitting, Bill did the hitting, the ball was affected by the hitting.
- Different arguments have different roles in the event. (e.g., The hitter, the hittee)

Thematic relations

- The thematic relation that the argument has to the verb—the role it plays in the event—will prove useful in describing the behaviors of different classes of verb.
- One thematic relation is agent of an action, like *Bill* in:
 - 1) Bill kicked the ball.

Common thematic relations

- Agent: initiator or doer in the event
- Theme/Patient: affected by the event, or undergoes the action
 - 1) Sue kicked the ball.
- Experiencer: feel or perceive the event
 - 3) Pat likes pizza.
- Proposition: a statement, can be true/false.
 - 3) Bill said that he likes pizza.

Common thematic relations

- Goal:
 - 1) Chris ran to Copley Square.
 - 2) Pat gave the book to Tracy. (Recipient)
 - 3) Mary took a pencil from the pile.
- Instrument:
 - 4) Ed ate the burrito with a plastic spork.
- Benefactive:
 - 5) Pat cooked dinner for Chris.
- Location:
 - 6) Betsy sits under the tree on Wednesdays.