Syntax II

Thursday, 29 August 2019

Review

Last class we discussed:

- What syntax does for us: combines words and phrases, specifies grammatical relations, builds hierarchical structure
- A set of syntactic rules and practiced using them
- Recursion
- Structural ambiguity
- adjuncts (always optional)

Kev 🎈
@mixtapekevin

Your rap name is young + the reason you cried last

8:33 PM · Aug 9, 2017

Young Syntax Tree

Review

Let’s diagram this sentence to see how we’re doing.

Those monkeys stole the bananas from the zookeeper before breakfast.

Learning Outcomes

By the end of class today, you'll be able to:

1. Use lexical information (subcategorization) to constrain our syntactic rules
2. Model the use of auxiliary verbs and embedded sentences in English
3. Use constituency tests to determine natural groups of words
4. Use movement to account for some kinds of related sentences

Subcategorization

We all know this, but some verbs require different sorts of phrases to follow them in English.

- She slept.
- She hit the ball.
- *She slept the ball.
- *She hit.

Why are the last two sentences bad?

Subcategorization

We all know this, but some verbs require different sorts of phrases to follow them in English.

- She slept.
- She hit the ball.
- *She slept the ball.
- *She hit.

Why are the last two sentences bad?

- *Sleep* cannot take an object.
- *Hit* must take an object.

Subcategorization

Verbs that do not take an object, like sleep, fall, die, etc are called **intransitive**.

Verbs that require an object are called **transitive** (e.g. hit, kick, see).

Verbs that require two objects are called **ditransitive** (e.g. give).

More generally, the kinds of phrases that are required to complete the meaning of a given phrase are called **complements**.

But our rules have nothing to say about this…

Subcategorization

Using the rules, S → NP VP, NP → N and VP → V, we generate the sentence, “She slept” as well as the bad sentence, “*She hit.”

How do we constrain our rules so we don’t generate sentences like *“She hit”?

Subcategorization

Using the rules, S → NP VP, NP → N and VP → V, we generate the sentence, “She slept” as well as the bad sentence, “*She hit.”

How do we constrain our rules so we don’t generate sentences like *“She hit”?

- We list the type of complement required in a word’s lexical entry.

We know that <hit> takes an NP complement, and not some other kind of complement:

- *She hit slept. (no VP complement)
- *She hit in the park. (no PP complement)
- She hit the ball. (NP complement).

Subcategorization

We know that <hit> takes an NP complement, and not some other kind of complement:

- *She hit slept. (no VP complement)
- *She hit in the park. (no PP complement)
- She hit the ball. (NP complement).

We list the type of complement that is required in the word's lexical entry. This is called **subcategorization**.

- Our entry for <hit> would look like: [V, 'to strike', /hɪt/, NP complement]

Lexicon + Rules

Now, to check our trees we must make sure that our trees conform to the PSRs we have created.

And our trees must respect subcategorization information for each word.

We'll focus on verbs only.

This is like what we discussed in morphology, where both the lexicon and our rules are necessary.

Lexicon + Rules

In morphology, lexical information prevented irregulars from undergoing regular morphological rules.

In syntax, lexical information prevents our rules from applying, too

Auxiliary Verbs

Auxiliary verbs are the little verbs (sometimes called “helping verbs”) like “be”, and “have”, as well as modal verbs (must, should, could, can, ought, etc).

At present our syntactic rules cannot account for them.

Why?

Why can’t we diagram a sentence like “She is sleeping.” ?

Auxiliary Verbs

To allow for auxiliaries, we are going to introduce a new rule:

VP → Aux VP

Now can we diagram, “She is sleeping”?

Can we diagram a sentence like “She must have been sleeping in the bed”?

An aside: Aux in AAVE

Many varieties of AAVE don't use the copula "be" in sentences like:

- "They running fast" (compare to "They're running fast")
- This is also attested in some Southern rural white dialects.

We often think of dialectical differences in terms of "accent" or vocabulary, but there are also syntactic differences between different dialects.

Also, some varieties of AAVE use an invariant "be" here that is not inflected for person/number.

- "They be running fast"
- This is a morphological difference, though. Here, "be" does not inflect, but is there as an auxiliary that communicates habitual aspect.

Embedded sentences

Our rules cannot account for sentences like:

“Ivan believes that the asteroid will hit the Earth.”

“Margaret thinks that John wastes time on the internet.”

There are certain verbs in English that take sentential complements.

Verbs like: believe, think, say, wish

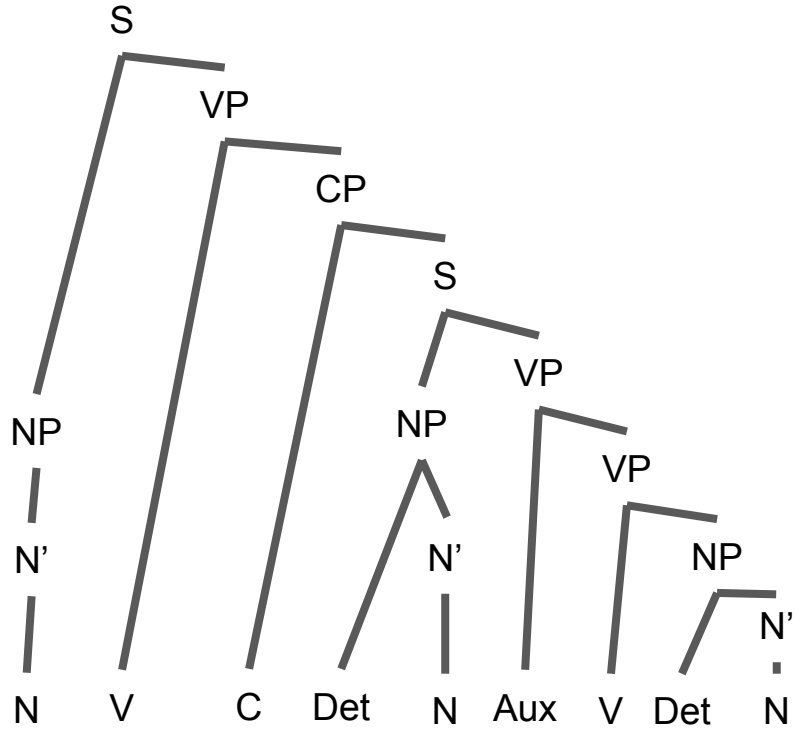
Embedded sentences

We can handle these types of verbs if we allow another new phrasal category into our syntactic rules.

- **CP**, which stands for **complementizer phrase**
- **C**, which is where words like “that”, “who”, “when” “where” go in our trees.
  - “I knew that she would answer the question.”
  - “I wondered who wrote this textbook.”
  - “I asked if ComiCon is staying in San Diego.”
  - “He asked whether I was eating vegetables.”

We need two new rules:

- VP $\rightarrow$ V CP
- CP $\rightarrow$ C S



Ivan believes that the asteroid will hit the earth

Embedded sentences

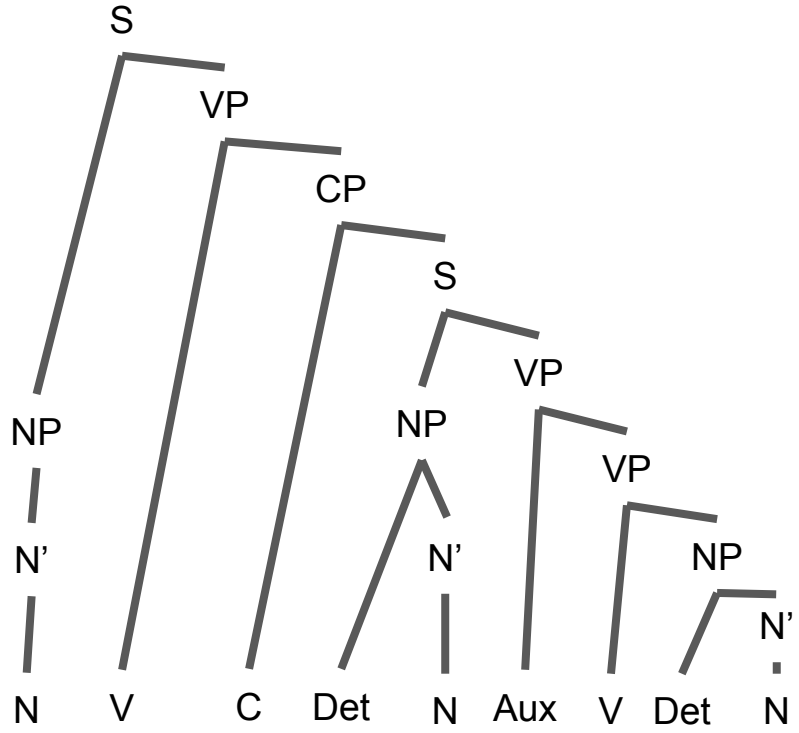
What about the sentence

“Ivan believes the asteroid will hit the Earth.”

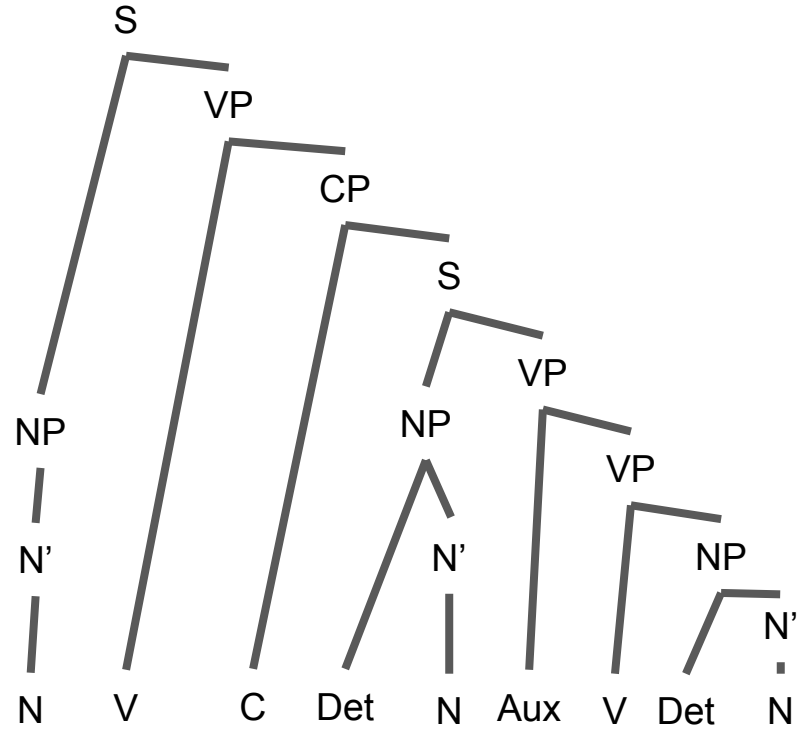
Compare to: “Ivan believes **that** the asteroid will hit the Earth.”

The second sentence doesn’t have “that” in it. What would fill the newly adopted C terminal node if “that” isn’t there?

Syntacticians (perhaps distancing myself from them) often say that C is still there and there is a null element, ∅, that isn’t pronounced.



Ivan believes that the asteroid will hit the earth



Ivan believes ∅ the asteroid will hit the earth

List of rules

S → NP VP
NP → Det N’
NP → NP PP
NP → N’
N’ → N
N’ → Adj N’
Det → NP Poss
PP → P NP
VP → V NP
VP → V PP
VP → VP PP
VP → V
XP → XP Conj XP
VP → Aux VP
VP → V CP
CP → C S

Practice

Lorde knows that I love when she hugs squirrels

Constituency

We talked earlier about how we want our syntax to group certain chunks of words together in the same way we wanted our morphology to group certain morphemes together.

There are some good ways to test whether something is a group (**constituent**), and using those will help us make sure that we're capturing what's going on.

We'll talk about 3 **constituency tests**:

substitution, coordination, and movement

Constituency Tests

Test 1: **The Substitution Test**

This test relies on the fact that groups of words that function as constituents can generally be replaced by one single word.

If this is possible, then the words form a constituent

Pronouns can be used to identify NPs.

- "The woman in the blue coat from Russia will meet Yuan at the station."

  Is the underlined phrase a constituent?
  ✔️"**She** will meet Yuan at the station."

Constituency Tests

Test 1: **The Substitution Test**

A **proform** is a type of function word or expression that stands in for another word or phrase.

What proform can I use to show that “at the station” is a constituent?

- “The woman in the blue coat from Russia will meet Yuan at the station.”
- “The woman in the blue coat from Russian will meet Yuan **there**.”

Proforms

- for NPs = he, she, it, him, her, etc (pronouns)
- for VPs = do/did (so)
- for PPs = there, here, then

Constituency Tests

Test 2: **The Coordination Test**

- Only constituents of the same type can be conjoined.

We will use the coordinating conjunction *and*

“Lucy drove her car into a tree.”

- “Lucy drove her car *and* rode her bicycle into a tree.”
  - ✅“drove her car” is a constituent
- “Lucy drove her car into a tree and down the river.”
  - ✅“into a tree” is a constituent

Note: the coordination test is the most permissive of tests.

Trust a “yes” from this test if another test also gives you the same result.

Constituency Tests

Test 3: **The Movement Test**

- Words that form a constituent can be moved around as a unit (often needs a contrast to make it work)

John will leave a book on the table

- On the table John will leave a book, but on the chair he will leave a folder.
- The book John will leave on the table, but the letter he will put in the drawer.

Caveat:

- Movement isn't always the most reliable test because movement is subject to a number of constraints that are independent of constituent structure
- If something passes the Movement test, it is a constituent. If it doesn't, we don't know

Constituency

We can use our trees to define constituents, too.

Constituent: any phrase (PP, NP, VP) that forms a unit

“Petia will meet Yuan at the station.”

- Petia Yes
- Petia will meet No
- at the station Yes
- meet Yuan Yes

Practice

Diagram the following sentence: “Mary walked to the beach.”

Use all three tests to determine if the following groups are constituents:

- “Mary walked”
- “to the beach”
- “the beach”
- “walked to”

Now try these out on “Deidre and Dan knew the answer.”

Use all three tests to determine if the following groups are constituents:

- “Dan knew the answer”
- “knew the”
- “knew the answer”

Quiz

1. Is our new rule VP → V CP recursive? Why or why not?
2. How many constituents are in “John slept”?
3. How many constituents are in “John slept on the sofa”?
4. How does the lexicon interact with our syntactic rules?
5. What is the difference between an adjunct and a complement?

6. Are there any concepts from class today that you’re unclear about?

Break

Learning Outcomes

By the end of class today, you'll be able to:

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2. Model the use of auxiliary verbs and embedded sentences in English ✅
3. Use constituency tests to determine natural groups of words ✅
4. Use movement to account for some kinds of related sentences

Related sentences

Are these two sentences related? If so, how?

- “The boy is sleeping.”
- “Is the boy sleeping?”

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- “Is the boy sleeping?”

They are talking about the same situation. One is a declarative statement and the other is a yes/no question.

Related sentences

Other types of utterances also share a similar sense of relatedness.

- “Aiden will buy that book.”
- “Which book will Aiden buy?”

- “The criminal stole the jewels.”
- “The jewels were stolen by the criminal.”

We can use rules to account for the intuition that I think we share that these are very similar.

Movement

The way this has traditionally been modelled is by using two stages of syntactic structure.

In the first stage, a basic structure is established (**deep structure**)

In the second stage, you move things around (**movement**).

The end result is called the **surface structure**.

(Sounds kinda similar to phonology, right? →→→ duality of patterning)

Structure generation and transformation

Thus far we have only looked at **structure-generating** rules.

These were our basic syntactic rules.

Movement will be our first example of a **structure-changing** rule.

We have already seen some of these in phonology.

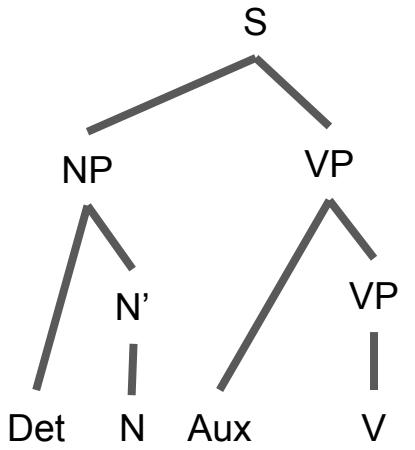
Move Aux

A very prominent type of movement (with a lot of history here at UCSD, in fact) is ***Move Aux***, which is used to account for yes/no questions like:

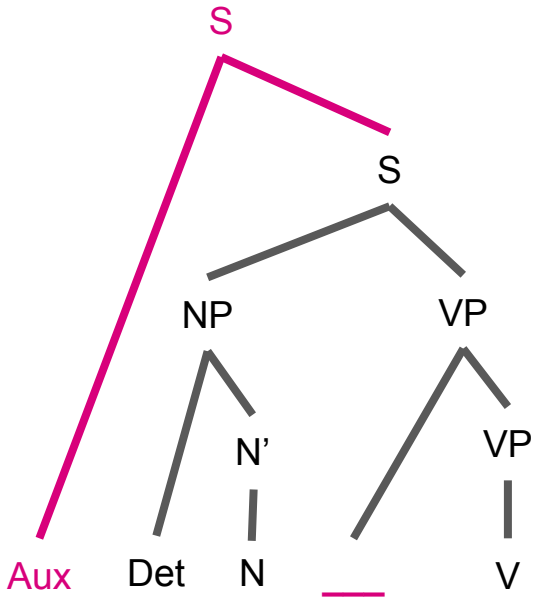
“Is the boy sleeping?” (from “The boy is sleeping.”)

“Are the girls coming?” (from “The girls are coming.”)

Move Aux



The boy is sleeping



Is the boy sleeping?

Structure Generating Rules:

S → NP VP
NP → Det N’
NP → NP PP
NP → N’
N’ → N
N’ → Adj N’
Det → NP Poss
PP → P NP
VP → V NP
VP → V PP
VP → VP PP
VP → V
XP → XP Conj XP
VP → Aux VP
VP → V CP
CP → C S

Structure Changing Rules:

Move Aux?
(we need to figure out the details, write in prose)

Which Aux moves?

Consider the following sets of sentences:

- They have been singing for eight hours.
- Have they been singing for eight hours?
- *Been they have singing for eight hours?

- The one who will drive must have a license.
- Must the one who will drive have a license?
- *Will the one who drive must have a license?

- I will take the dog that is wearing the poncho
- Will I take the dog that is wearing the poncho?
- *Is I will take the dog that wearing the poncho?

Move Aux

Which is correct?

1. Make the first Aux an adjunct to S, S → Aux(first) S
2. Make the last Aux an adjunct to S, S → Aux (last) S
3. Neither of these

What should our rule be?

Move Aux

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2. Make the last Aux an adjunct to S, S → Aux (last) S
3. Neither of these

What should our rule be?

4. Make the Aux adjoined to the VP of the main clause an adjunct to S, S → Aux (main clause) S

Move Aux

There is no way to determine which Aux moves by counting.

You must build structure and then that determines which Aux moves upward in the tree.

Transformational rules are **structure-dependent**.

They cannot be modeled if syntax is not modeled with hierarchical structure.

Wh- questions

In English, there are two possible word orders for a question like:

“Which dog will she buy?”

1. “Which dog will she buy?”
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“What book did Georgio sell?”

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2. “Georgio sold what book?” (again, usually with accent on “what book”)

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Wh- questions

We can account for these two variants by movement.

We generate (2) first, and then we do two things:

1. Move Aux to adjoin to S
2. Move the NP in question to C

“Which dog will she buy?”

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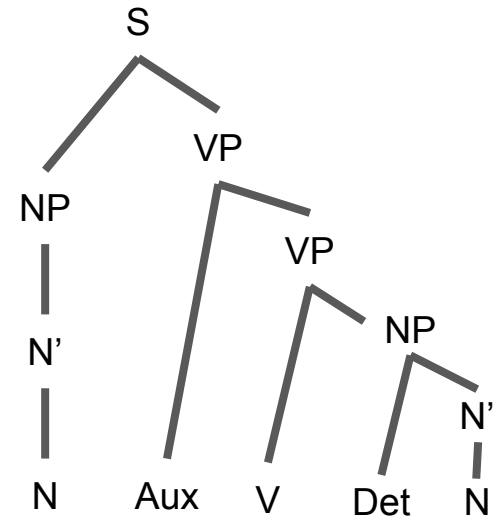
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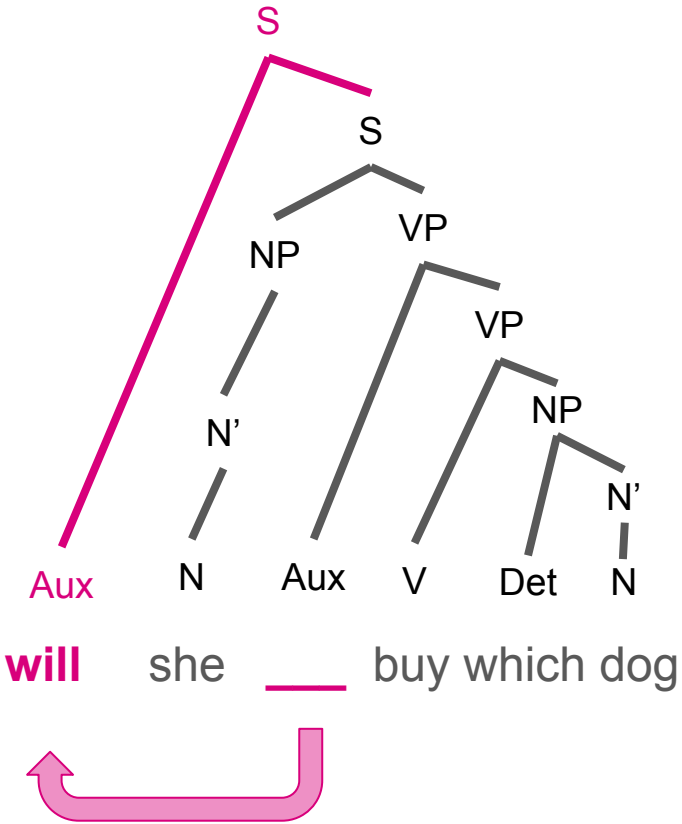
She will buy which dog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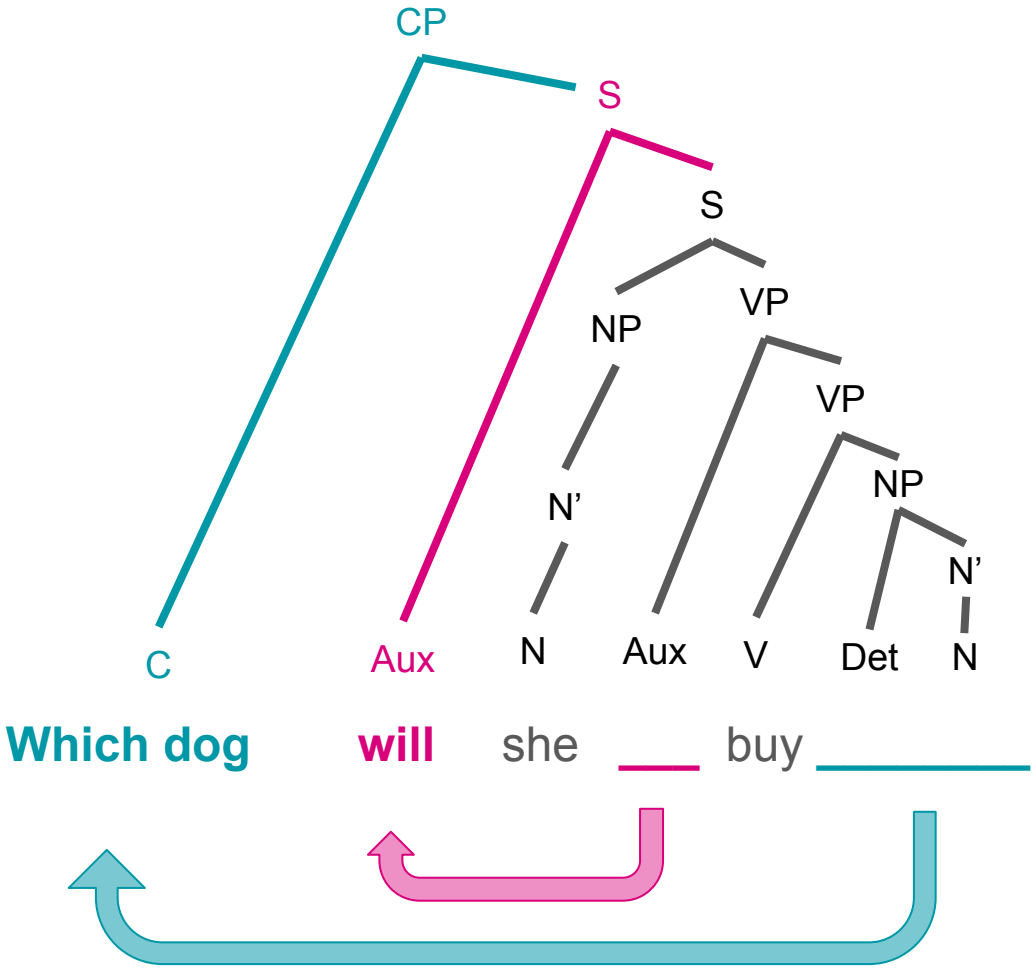
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Which dog will she ___ buy ___

An additional issue

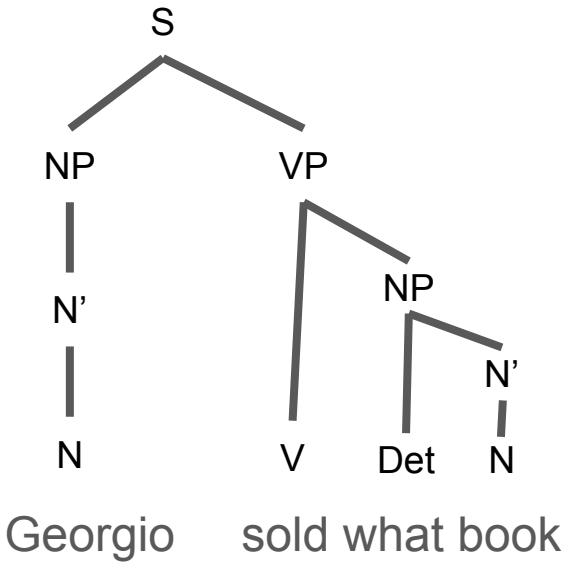
Recall, there was a second difference in the sentence below, “did”

How do we account for this?

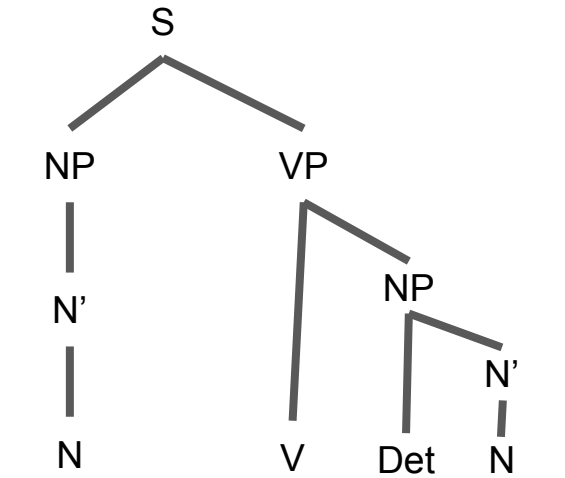
“What book did Georgio sell?”

1. “What book did Georgio sell?”
2. “Georgio sold what book?” (again, usually with accent on “what book”)

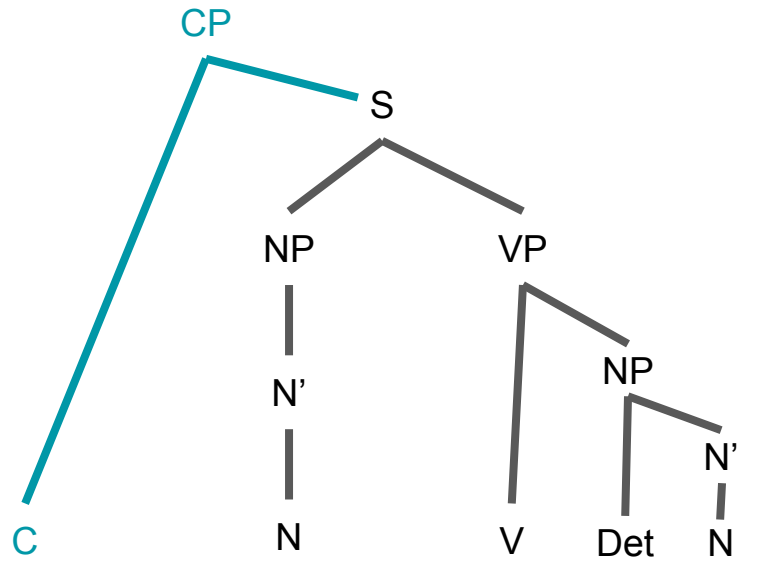
We generate the sentence in (2) as our deep structure.



But there is no Aux here. So, can we just skip the first step (Move Aux), and do the second step?



But there is no Aux here. So, can we just skip the first step (Move Aux), and do the second step? **No!**



* what book Georgio sold _____

Why doesn’t this work?

“What book did Georgio sell?”

We need to insert “did” between “what book” and “Georgio” but we can’t insert anything there. We want to append things to the ends of the structure. We don’t just stick them in the middle.

Even if we could just insert a word in the middle, *What book did Georgio sold? is not grammatical.

What's the problem?

Why were things easier with the first sentence?

"Which dog will she buy?"

1. "Which dog will she buy?"
2. "She will buy which dog?" (usually with high pitch accent on "which dog")

"What book did Georgio sell?"

1. "What book did Georgio sell?"
2. "Georgio sold what book?" (again, usually with accent on "what book")

"will" was in the first sentence, but there was no Aux in the second

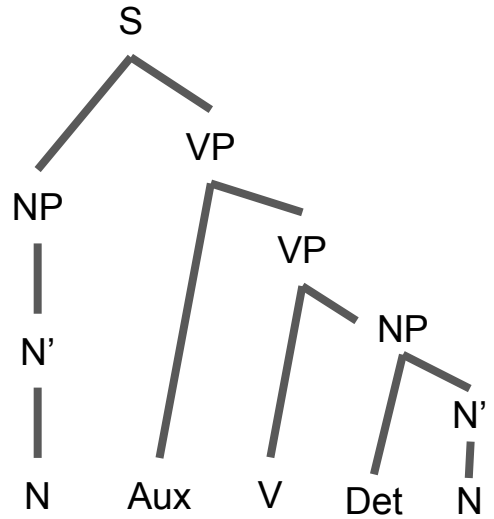
A solution: Aux is always there

What would happen if we assumed Aux was always there?

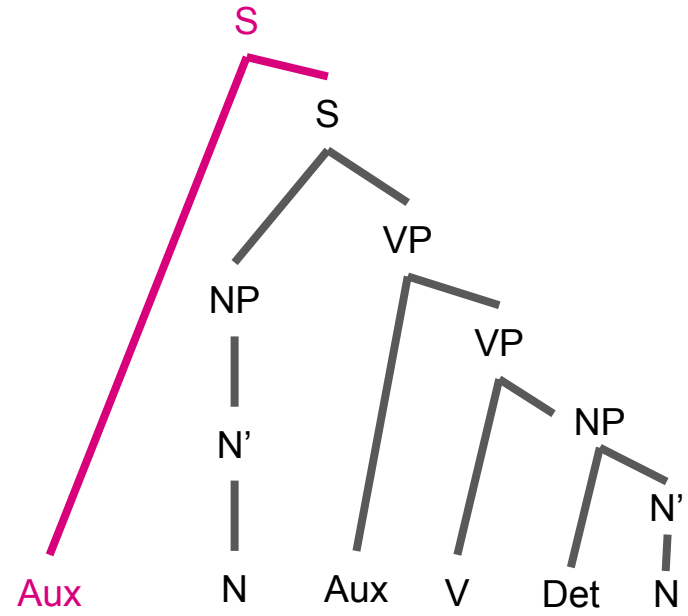
What would Aux do when words like “be”, “have”, “will” and modals aren’t present?

It would carry tense and subject-verb agreement information.

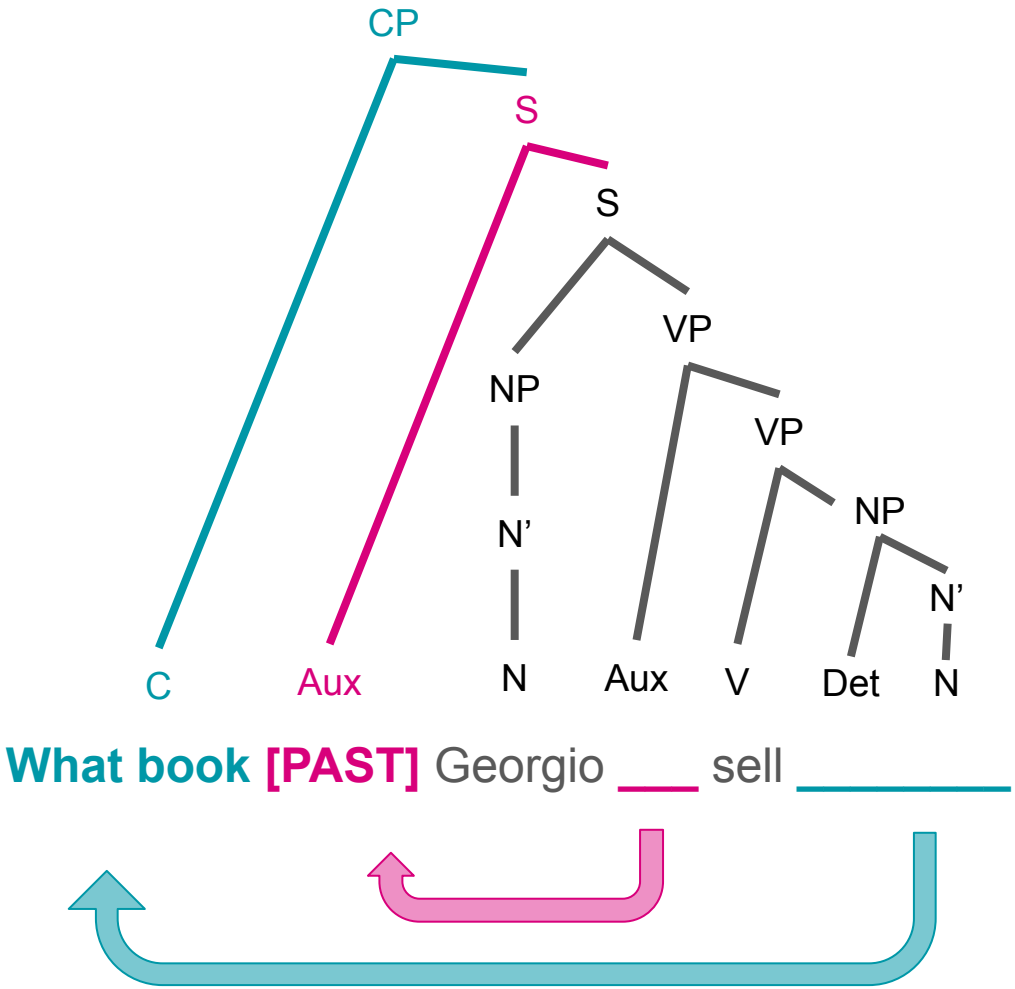
We generate this as our deep structure



Georgio [PAST] sell what book



[PAST] Georgio ___ sell what book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What book [PAST] Georgio ___ sell _____

[PAST]

The past tense affix needs to attach to some root.

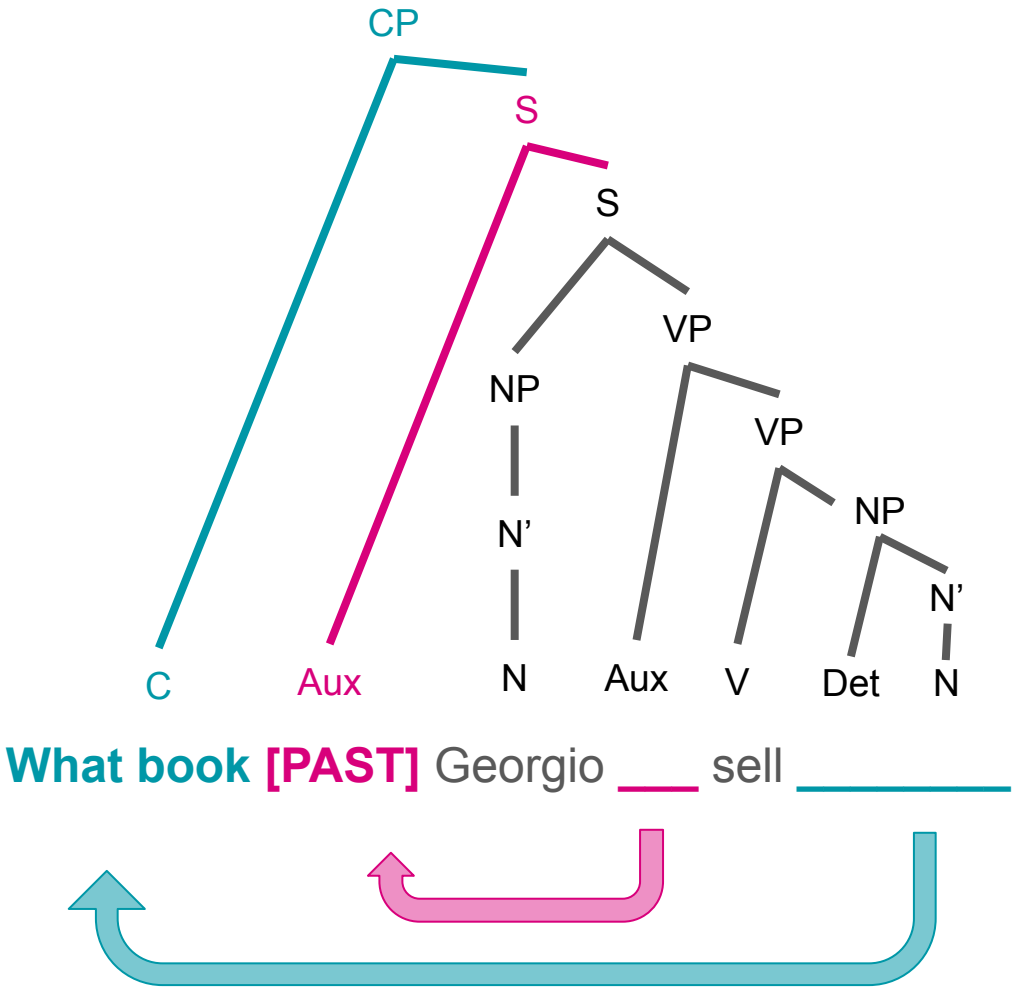
In English, tense information attaches to verbs in two ways:

1. Do-insertion
2. Affix hopping

do-insertion

In wh- questions that derive from a deep structure without an overt Aux, “do” is inserted.

This provides a verb for tense information like [PAST] to attach to.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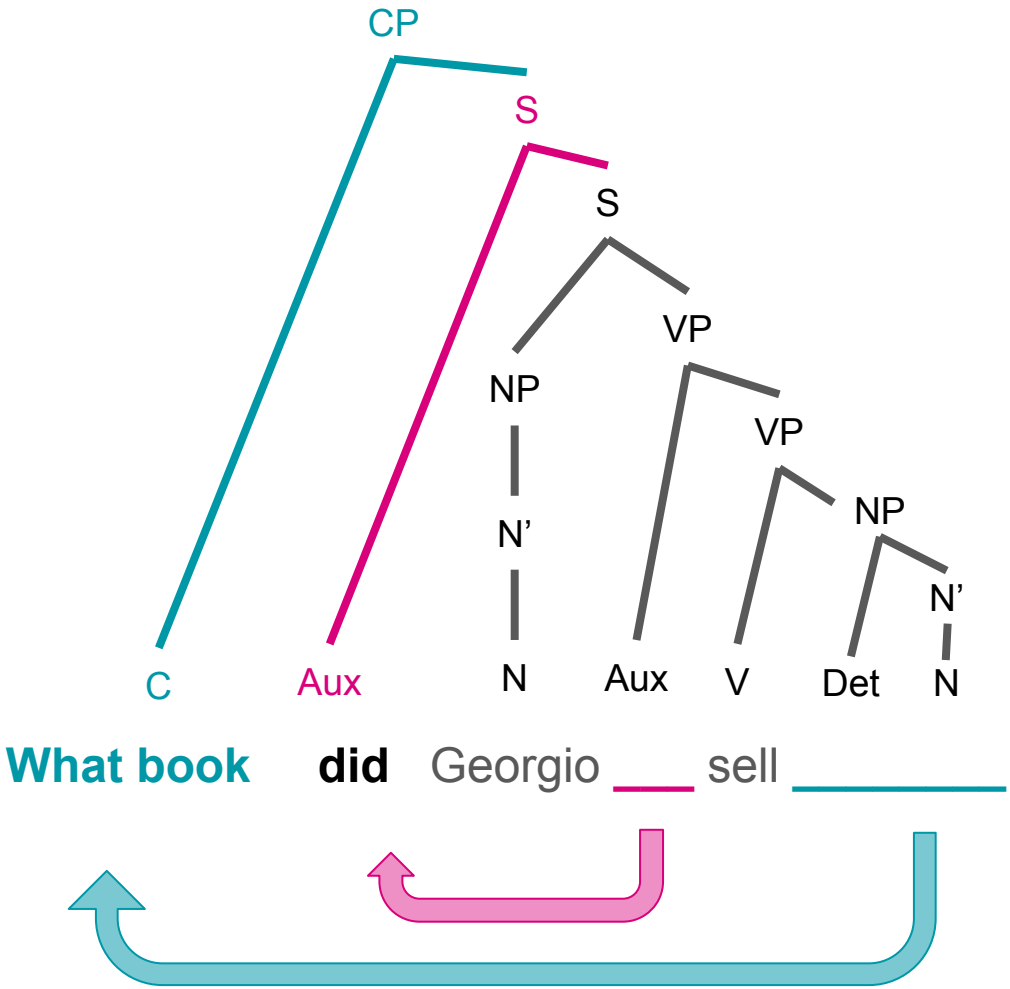
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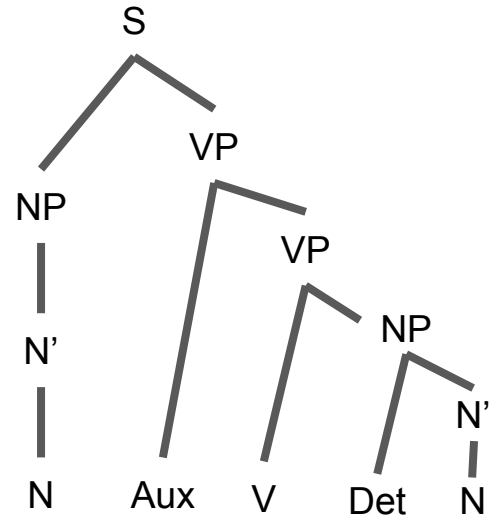
What book did Georgio ___ sell _____

Affix hopping

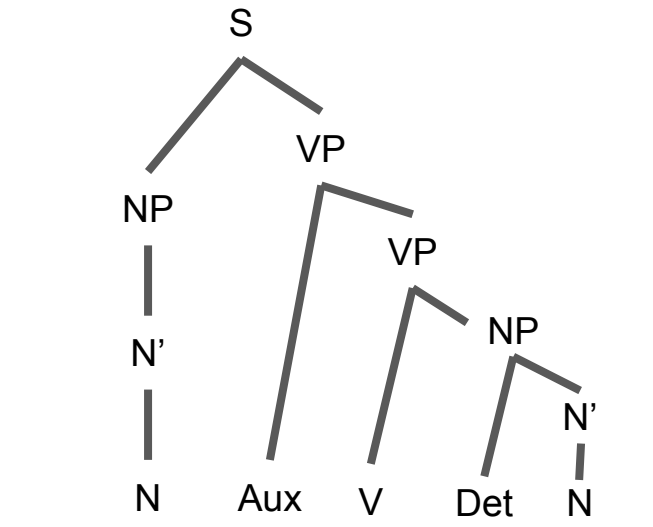
“do” is inserted in some wh- questions; in other sentences, though, the tense affix hops downward in the tree to attach to the verb

“Georgio sold that book.”

We generate this as our deep structure



Georgio [PAST] sell that book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Affix hopping

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> “Georgio sold that book.”

If tense information isn’t separated from the actual verb, then we cannot account for the fact that when “do” is inserted, it takes on the tense of the verb that we were generating in the deep structure.

We have to separate tense from the verb itself.

Quiz

1. The conditions on Move Aux are good evidence for what?
2. If the sentences from English and French are generated with the same deep structure, how do the rules that modify that structure (e.g. movement) differ? Hint: we just learned that Aux is always there.

English					**French**				
N	Adv	V	D	N	N	V	Adv	D	N
Mary	never	reads	the	newspaper.	Marie	lit	jamais	le	journal

"Mary never reads the newspaper."

3. Are there any things from syntax that are still unclear?

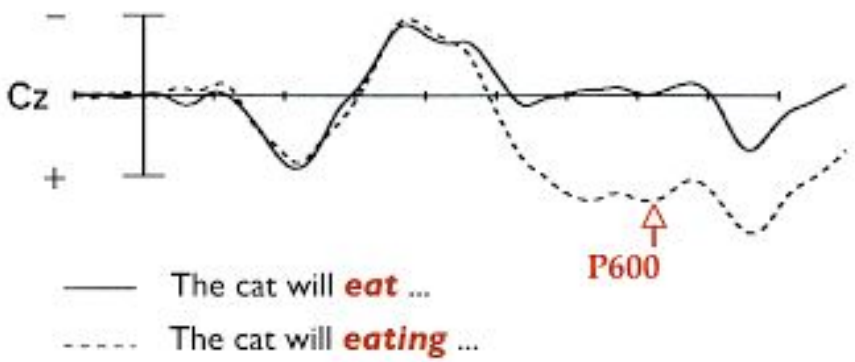
What happens when things go awry?

Your brain freaks out.

When a sentence violations syntactic rules, like:

1. The cat will eat anything.
2. *The cat will eating anything.

P600 is a positive voltage change in the brain about 600 ms after a syntactic error.



What happens when things go awry?

The previous sentence involved an ungrammatical word inflection, but a P600 may also occur from grammatical sentences being **parsed** (interpreted) incorrectly.

Some famous examples:

> “The horse raced past the barn fell.”
>
> “The complex houses married and single soldiers and their families.”
>
> “The old man the boat.”

What happens when things go awry?

“The horse raced past the barn fell.”

- “The horse that was raced past the barn fell.”
  compare to: “The car that was driven past the barn crashed.”
  and “The car driven past the barn crashed.”

“The complex houses married and single soldiers and their families.”

- “The complex” is a NP here, and “houses” is a verb.

“The old man the boat.”

- “old” is a noun here (English can derive nouns from adjectives without any affix, e.g. “the rich”), and “man” is a verb.

Woman, 36, abandoned in dumpster as a baby searches for the person who saved her life