

## Universal Phrase Structure

We discovered that our four main phrase types (NP, VP, AP, PP) all seem to share three very similar properties:

- exactly one instance of a **head**: N, V, A, or P
- up to one optional word (a **specifier**) that is specific to the head's lexical category:
  - determiner for nouns
  - adverb for verbs
  - degree word for adjectives
  - “pre-preposition” for prepositions (the textbook calls this a degree word, but the group of pre-prepositions doesn't seem to be identical to the group of degree words)
- various numbers and types of optional phrases (**complements**) that seem to be dependent on the actual word in the head, varying even within a particular lexical category

These commonalities allow us to collapse our four phrase structure rules for NP, VP, AP, and PP into a single generic phrase structure rule, alongside our rule for sentences:

$$\begin{aligned} S &\rightarrow NP VP \\ XP &\rightarrow (\text{Spec}) X (\text{Comp})^+ \end{aligned}$$

There are a few glitches in this theory (the weird behavior of APs in NP and the possibility that some phrases may allow multiple specifiers under certain circumstances), but it works very well in the general case.

There is also further evidence that XPs have extra internal structure, with the head and its complements forming a constituent (the **X'** or **X-bar** level) separate from the specifier. We won't deal with **X-bar Theory** in this class.

## Inflectional Phrases

Our generic XP phrase structure does not seem to work for S, because there is no obvious head or specifier. However, when we consider defective (modal) verbs like *will*, *might*, *can*, and *should*, we notice that they seem to act like heads in that we can only ever have one of them. Furthermore, they seem to be incompatible with tense: a sentence can have a past tense, a present tense, or a modal verb, but it can never have multiples of any of these. And as with heads, we *must* have one of these. No stand alone sentence seems grammatical without a tense or a modal verb.

This leads us to believe that tenses and modal verbs form a single lexical category, called **inflection (I)**, which projects its own phrase (IP) just like other heads do. This means that sentences are actually IPs, with I as the head, the subject NP as the specifier, and the VP as a complement. This analysis brings sentences in line with the rest of universal phrase structure (though again, there are some minor glitches: usually specifiers are single words rather than entire phrases, and they are usually optional).

We note that if the head of IP is a tense, the VP must match that tense, and if the head is a modal verb, the VP must be in bare form. This is further evidence that the IP analysis might be correct, since we have already seen before that the complements of a head are dependent on the particular choice of head.

## Subcategorization

Examining verbs like *hear*, *listen*, *eat*, and *devour*, we notice that heads can place very strict requirements on their complements. Verbs like *hear* and *devour* take an obligatory NP as their complement, while *eat* takes an optional NP, and *listen* takes an optional PP headed by *to*. We call this relationship between the head and its complements **subcategorization**, and since subcategorization isn't predictable just from the lexical category or meaning (for example, the pairs *hear/listen* and *eat/devour* are each pairs of verbs with essentially the same meaning), it must be a separate piece of information in the lexicon. We formally notate subcategorization as in the following lexical entries, where     indicates the head's position in its phrase, and the complements are listed after it (specifiers are assumed to be allowed in their usual spot, right before the head in English):

/hi: /	V	'perceive sound'	[ <u>   </u> NP ]
/lɪsn /	V	'perceive sound'	[ <u>   </u> (PP <sub>to</sub> ) ]
/ɪt /	V	'consume'	[ <u>   </u> (NP) ]
/dəvəʊ /	V	'consume'	[ <u>   </u> NP ]

Subcategorization explains how inflectional heads limit the types of VPs they can appear with:

/∅ /	I	'PAST'	[ <u>   </u> VP <sub>PAST</sub> ]
/∅ /	I	'PRES'	[ <u>   </u> VP <sub>PRES</sub> ]
/wɪl /	I	'FUT'	[ <u>   </u> VP <sub>BARE</sub> ]
/maɪ /	I	'may'	[ <u>   </u> VP <sub>BARE</sub> ]
/kæn /	I	'able to'	[ <u>   </u> VP <sub>BARE</sub> ]
/fʊd /	I	'obliged to'	[ <u>   </u> VP <sub>BARE</sub> ]

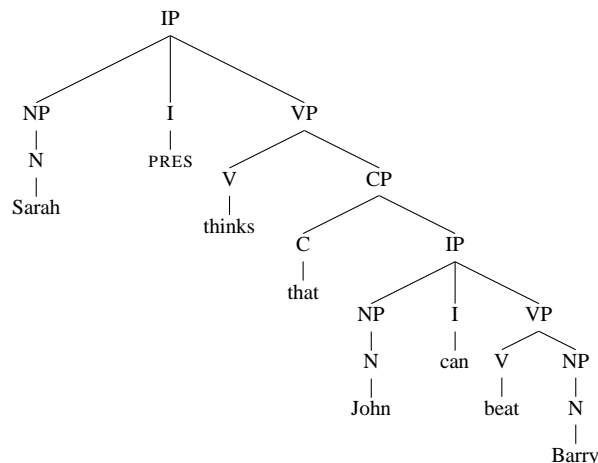
Note that subcategorization only deals with complements. Specific words require specific kinds of complements, but any noun can generally have any determiner as its specifier, any verb can generally have any adverb, etc. When there are apparent limitations on specifiers, it is usually due to some sort of semantic restriction, which is not part of the subcategorization.

## Complementizers

IPs can be embedded within other IPs, through use of a word like *that*. Because the effect of *that* is to turn an IP into a complement, we call this lexical category **complementizers**. Complementizers have their own phrase (CP), which can be used as the complement to many types of words, such as *fact*, *think*, and *aware*. The lexical entry for *that* is:

/ðæt /	C	'∅'	[ <u>   </u> IP ]
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A sample phrase structure tree for a sentence containing a CP is given below:



## Transformations

There seem to be predictable relationships between certain types of sentences. For example, *yes-no* questions look much like their declarative counterparts, just with some of the constituents in different places. We can explain this predictable relationship through a **transformation**, a type of rule that tells us what structural changes need to be made to make one sentence look like another. By assumption, we take the declarative form of a sentence to be the most basic form (the **deep structure**) that all of its variants are derived from. The sentence that results from a series of transformations is called the **surface structure**.

In order to form *yes-no* questions, we need a transformation called **Inversion** that moves the inflectional head to the front of the sentence, effectively inverting it with respect to subject NP:

DS: John can beat Barry  
 Inv: can John     beat Barry  
       ↑          |  
 SS: Can John beat Barry?

Inversion is only possible when the inflectional head is an overt word. In order to form a *yes-no* question without a modal verb, we need to use the meaningless dummy verb *do*, which acts much like a modal verb in being an inflectional head that subcategorizes for a bare VP:

/du/ I '∅' [     VP<sub>BARE</sub> ]

DS: John did beat Barry  
 Inv: did John     beat Barry  
       ↑          |  
 SS: Did John beat Barry?

We can also form more complicated question that contain **wh-words** like *who* and *what*. The resulting *wh*-questions always require Inversion to apply first, and then a transformation called **wh-Movement** moves the *wh*-word to the front of the sentence:

DS: John can beat who(m)  
 Inv: can John     beat who(m)  
       ↑          |  
 wh: who(m) can John beat      
       ↑                  |  
 SS: Who(m) can John beat?

Note in the following example that the ultimate surface structure has exactly the same word order as the deep structure, but in theory, the actual syntactic structures are different!

DS: who can beat Barry  
 Inv: can who     beat Barry  
       ↑          |  
 wh: who can     beat Barry  
       ↑          |  
 SS: Who can beat Barry?

Transformations are very powerful and can have numerous effects. For example, a transformation for forming passive sentences would need to move the object NP to the front of the sentence and delete the subject NP (or optionally, create a new PP<sub>by</sub> and move the subject NP there). Transformations may even arguably be responsible for changing the forms of certain words, as in subject-verb agreement. The theory of transformations is controversial, so we will not go into further detail here, but if you want to learn more, read the textbook or take LING 220 next semester!