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Introduction to Syntax

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Preface

This textbook is an introduction to syntax as viewed by Generative Grammar. It grew out of the desire to provide *Introduction to Syntax* students with lecture materials that are more substantial and systematic than slides and handouts and which are, furthermore, freely available, making this initial foray into the scientific study of the syntax of natural languages more equitable.

Using this book

This book reflects my dialogic pedagogy. The reader will encounter invitations to actively participate in the reasoning and analysis developed in each chapter. They are in the form of exercises placed in strategic parts of these chapters. The reader is strongly encouraged to pause and solve these exercises before they continue reading. While this means that reading this textbook may take longer, actively engaging with its content allows the reader to have first-hand experience in syntactic analysis.

In addition, several tools are provided to help the reader retain the topics covered as well as organize them. Practice exercises are included throughout each chapter, allowing the reader to use concepts they just learned and, thus, more easily retain them. All chapters conclude with prompts for the reader to make their own summary of the chapter. Along with the *Glossary* that concludes each chapter, these prompts provide a useful list of the important concepts that the reader must master before proceeding to the next chapter.

These learning tools are symbol-coded. '💬' denotes an invitation for the reader to participate in the reasoning. Make sure to complete these exercises before you continue reading. '✒' denotes practice exercises. Finally, '📂' denotes the active retrieval at the end of each chapter, which collects the most important concepts of that chapter.

Finally, this textbook contains margin notes with definitions needed for the understanding of the main text. The side margin can also be used for notes.

I hope this textbook will be helpful to the reader as they take their first steps into the fascinating study of the syntax of natural languages.

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Chapter 1

Introduction to Generative Grammar

1.1 Knowledge of language

Consider the sentence in (1a) and an interrogative counterpart of it in (1b). In both (1a) and (1b), the verb is *buy* and *Solfrid* is interpreted as the buyer. The sentences differ only in the phrase that is interpreted as the thing that is bought: *an encyclopedia* in (1a) and the interrogative word *what* in (1b).

(1) a. Solfrid has bought **an encyclopedia**.
b. **What** has Solfrid __ bought __?

There is also another conspicuous difference between (1a) and (1b), the position of the object of the verb (i.e. the thing that Solfrid has bought): it follows the verb in (1a), but it precedes the rest of the sentence in (1b). There is, thus, a correlation between whether or not a phrase is interrogative and the position that it occupies in a sentence.

There is a clear semantic relatedness between (1a) and (1b) that an analysis of these sentences should capture: after all, both sentences encode some buying event that took place in the past and which Solfrid is the agent of. In addition, it would be odd if the correlation noted above between the position where an object appears and whether or not it is interrogative were a mere accident. How can an analysis capture not only the fact that (1a) and (1b) are semantically related but also the observable linear order differences between the two sentences?

We could hypothesize that the aforementioned correlation is in fact an instance of causation: because the object in (1b) is interrogative, it must be pronounced in the beginning of the sentence. An analysis embodying this view could then formulate the following rule to account for the formation of interrogative sentences in English such as (1b):

(2) Place the leftmost verb V of the sentence in the beginning of the sentence. Subsequently, place an interrogative phrase Q to the immediate left of V.

The application of this rule can be illustrated by the steps in (3). This analysis also assumes that *what* is initially in the same position where a non-interrogative

object would appear (i.e. following the verb, as in (1b)). This captures the semantic relatedness between (1a) and (1b).

(3) i. Solfrid has bought what? $\xrightarrow{\text{place leftmost } V \text{ in the beginning of sentence}}$
ii. **Has** Solfrid __ bought what? $\xrightarrow{\text{place } Q \text{ to the left of } V}$
iii. **What** has Solfrid __ bought __?

For convenience, '__' marks the position that a word or phrase initially occupies, prior to being displaced.

We can apply our tentative rule (2) to a sentence with a *subordinate* or *embedded* clause too, i.e. a clause that is selected by a verb in an enclosing clause—in (4), the subordinate clause [*that Solfrid has bought what*] is selected by the verb *say*, analogously to *say a word*, where *say* selects a nominal expression (viz. *a word*), instead of a clause.

(4) i. Seb will say [that Solfrid has bought what]? $\xrightarrow{\text{place leftmost } V \text{ in the beginning of sentence}}$
ii. **Will** Seb __ say [that Solfrid has bought what]? $\xrightarrow{\text{place } Q \text{ to the left of } V}$
iii. **What** will Seb __ say [that Solfrid has bought __]?

The result is a well-formed sentence of English, just like (1b).

Now, what if we tried to apply the same rule to an interrogative version of (5)?

(5) [That Solfrid has bought **an encyclopedia**] will surprise Seb.

First, we replace *an encyclopedia* in (5) with the interrogative phrase *what* before we apply the hypothetical rule (2), just as in (3). The result is as follows:

(6) i. [That Solfrid has bought what] will surprise Seb? $\xrightarrow{\text{place leftmost } V \text{ in the beginning of sentence}}$
ii. **Has** [that Solfrid __ bought what] will surprise Seb? $\xrightarrow{\text{place } Q \text{ to the left of } V}$
iii. * **What** has [that Solfrid __ bought __] will surprise Seb?

We followed our rule to the letter, but the result in (6) is *not* considered a well-formed sentence by native speakers of English, unlike what happens in (3) and (4). Such a construction is called an **ungrammatical** sentence. Conversely, well-formed sentences are called **grammatical**—for example, (3) and (4) are grammatical sentences of English. By convention, a star '*' is used before a sentence to indicate that is ungrammatical.

Speakers of English have quite robust intuition about the ungrammaticality of (6).[1] This intuition is more general, since all the sentences below are judged equally ungrammatical:

(7) a. * Who do you like the book [that __ wrote]?
b. * Who do you wonder [whether __ wrote *Crying in H Mart*]?
c. * Who did you invite [__ and Faatu]?
d. * Who will you be happy [if __ comes to the party]?

[1] We will use English examples for convenience, but the same basically holds crosslinguistically.

e. * What do you think [who bought __ at the market yesterday]?

But where does this knowledge come from? What does the rule (2) work in (3) and (4), but not in (6)?

1.1.1 The Language Faculty

In principle, we could formulate a few hypotheses to answer this question, for example:

- We learn language through formal education.
- We learn language by copying the linguistic behavior of individuals around us.

While seemingly plausible, these hypotheses are not consistent with language acquisition facts. First, unfortunately, not everyone has access to formal education. Nonetheless, all individuals acquire at least one language, more than one if they are raised in a multicultural environment, for instance, a multilingual country or an immigrant household. Second, language behavior is complex and creative, so it is incompatible with simply copying previous behavior.

Linguistic creativity permeates our everyday use of language. 'Creativity' here is not limited to the artistic use of language in e.g. literature. Rather, it refers to the fact that we are able to utter sentences that we have never heard or seen before. Likewise, we are able to interpret sentences that we are hearing or seeing for the first time. For example, it is highly unlikely that you have encountered the sentence (8), but you are still able to judge it as a possible grammatical sentence in English.

(8) Mary adopted a lilac striped crested gecko from the shelter a few doors down from the turreted castle.

In fact, not only can you interpret such a sentence, because of the creativity that underlies any language, you would also be able to utter it. If language knowledge simply consisted in copying behavior, these facts could not be accounted for.

Furthermore, another objection that can be raised against this theory, is that we do not have access to **negative data**, i.e. sentences that are judged ungrammatical by negative speakers or signers. Nonetheless, we have robust intuitions about them, as we concluded in our discussion of (6) and (7). Barred accidents or errors, no one ever utters an ungrammatical sentence. Yet, when we encounter one, as we did in the previous section, we have no problem identifying it as an impossible construction. Once again, if the linguistic knowledge each of us has were the result of copying, intuitions about negative data could not be explain.

By the same token, when children are acquiring language, the linguistic stimuli available to them is limited and fragmentary. The ability to speak or sign a language that is the end result of this process far surpasses this input. This is demonstrated both by the aforementioned creative use of everyday language and by our ability to evaluate negative data: none of these types of linguistic information are part of the input that a child has access to when they are acquiring a language. **Poverty of stimulus** is the observation that acknowledges this insurmountable asymmetry and which underscores the fact that the poverty of the linguistic stimuli a child has access to does not any way hinder their ability to

acquire a language and use it creatively—in the above-mentioned broader sense of 'creative.'

In order to reconcile the disparity between the poverty of the stimulus and the linguistic knowledge acquired, **Noam Chomsky** proposed that human beings are innately endowed with a **Language Faculty**. In other words, we are born with an inherent capacity for language. Since we are born with such a capacity, we do not have to learn language from scratch, nor do we have to rely on mimicking the linguistic behavior of adults surrounding us. It is this faculty which underlies the robust intuition mentioned above about which sentences are grammatical and which are not, irrespective of formal education. The Language Faculty is also referred to as *Universal Grammar*, a term that emphasizes that language is a faculty shared by individuals of the human species. **Generative Grammar** is the name of the theory proposed by Chomsky to account for it. This is the framework assumed throughout this textbook. In other words, this book is an introduction to syntax viewed as a component of the linguistic knowledge that any individual of the human species is endowed with.

In this book we will focus on syntax, but the Language Faculty underpins our knowledge at all levels of linguistic analysis, i.e. phonology, morphology, syntax, and semantics/pragmatics.[2] Here is an example from morphology. Suppose a new verb appears in English, *borg*, the act of folding something into the shape of an origami star. Using a form of this verb, how would you fill the gaps below?

(9) a. Pradeep ___ the napkins yesterday.
b. This paper is too thick. It is not ___.
c. The ___ of napkins is a tedious activity.

You probably filled the gaps in (9a), (9b), and (9c) with the forms *borg-ed*, *borg-able*, and *borg-ing*, respectively. Remarkably, *borg* is a made-up verb. Yet, we have the intuition of which inflection to use (i.e. *-ed* in the past (9a)) and how to derive new words from it (i.e. an adjective (9b) or a noun (9c)).

The same is true of syntax.

Is the sentence below grammatical or ungrammatical? If it is ungrammatical, how would you fix it?

(10) Martha borged quickly the napkin.

Recall from the Preface that '' indicates an invitation for the reader to actively engage in the reasoning developed in each chapter. The answer to the question is right below it, but the reader can try to answer tackle it on their own before proceeding with the reading.

You probably judged this sentence ungrammatical (see the * in (10), repeated in (11a)) and fixed it by changing the position of *quickly* (11b):

(11) a. * Martha borged **quickly** the napkins.
b. Martha borged the napkins **quickly**.

The sentences in (11) are again formed with *borg*, a made-up word, so they cannot be sentences that you encountered before. Nonetheless, you were still able to judge (11a) as ungrammatical and to formulate the corrected version in (11b)

[2] To reiterate, English is used here for convenience. We can reproduce the experiments below in any language.

Besides illustrating morphological and syntactic competence, the examples (9) and (11) demonstrate that our linguistic knowledge cannot be the result of teaching or imitation, as already discussed above. First, to reiterate, the above-mentioned sentences are formed with made-up words. You have never been exposed to them at school or at home and yet, you have clear intuitions about their grammaticality. Second, this intuition also involves ungrammatical sentences such as (11a). This is negative data. The data we are exposed to as children acquiring language does *not* include ungrammatical sentences. As such, this type of knowledge is not something we can learn or imitate.

Moreover, experiments based on nonce words like *borg* also indicate that **frequency** cannot be a decisive factor in language acquisition either. We could plausibly think that the more we are exposed to words, phrases, and linguistic patterns, the easier it would be for us to learn and, then, use them. Nevertheless, because words like *borg* are made-up, the frequency of the sentences that contain them is *zero*. As such, the fact that any English speaker knows that (11a) is ungrammatical, while (11b) is grammatical cannot be due to the frequency of how many times we have encountered these sentences.[3]

Finally, focusing on the knowledge that we have of negative data, we could hypothesize that such knowledge actually corresponds to the fact that ungrammatical sentences cannot be interpreted because of their meaning. For instance, consider the sentences in (7), repeated in (12). According to this hypothesis, these sentencese are judged ungrammatical because no meaning can be inferred from them.

(12) a. * Who do you like the book [that __ wrote]?
b. * Who do you wonder [whether __ wrote *Crying in H Mart*]?
c. * Who did you invite [__ and Faatu]?
d. * Who will you be happy [if __ comes to the party]?
e. * What do you think [who bought __ at the market yesterday]?

However, the ungrammaticality of these sentences cannot be attributed to semantic reasons, since they *do* convey a meaning. (1b), repeated below, could be paraphrased as in (13b).

(13) a. What has Solfrid __ bought __?
b. 'What is the thing x such that Solfrid has bought x?'

Following the same model, a sentence such as (12a) is paraphrased as in (14b).

(14) a. * Who do you like the book [that __ wrote]?
b. 'Who is the person x such that you like the book that x wrote?'

[3] Of course, the frequency of ungrammatical sentences, whether or not they contain nonce words, is also zero.

Exercise

What is the meaning of the remaining sentences in (12)? (12b) is done as an additional model.

(15) a. * Who do you wonder [whether __ wrote *Crying in H Mart*]?

b. 'Who is the person x such that you wonder whether x wrote *Crying in H Mart*?'

The sentences in (12) have a very clear meaning, so their ungrammaticality cannot be explained away semantically.

Several hypotheses can be formulated in order to explain the knowledge that each individual has of the language(s) they are a native speaker or signer of. However, they cannot withstand scrutiny when we consider the fact that our everyday use of language is creative and, moreover, that we have robust judgments about negative data. Conversely, the theory that we are innately endowed with a Language Faculty can explain these defining properties of our linguistic knowledge.

1.1.2 Principles and Parameters

According to Chomsky's proposal, human beings are endowed with a Language Faculty. Because this is an inborn ability, we do not have to acquire it from external sources, such as formal education or the linguistic behavior of other individuals. Nonetheless, linguistic input is crucial for language acquisition, for two reasons. First, even though we are endowed with a Language Faculty, we need appropriate stimuli to develop it, in the same way that light input is necessary for us to develop our vision. Second, the linguistic stimuli we are exposed to during language acquisition determines which particular language or languages we will acquire.

This sensitivity to the environment defuses potential criticism that Chomsky's Language Faculty could face. One could reasonably ask: if this faculty is shared among all human beings, does Generative Grammar predict that there should be just one language? In other words, given Universal Grammar, does Generative Grammar predict that there should be one single universal language? The answer is *no*: the theory proposes that the Language Faculty contains two types of rules, **Principles** and **Parameters**.

Definition 1

Principles are rules that any language should obey.

Definition 2

Parameters are rules that any languages should obey, but the Universal Grammar specifies a limited number of options for parametric rules to be complied with.

Across different languages, nominal expressions like proper names cannot have the same referent as a pronoun that occurs before it in a sentence:

(16) * She$_1$ supported Faatu$_1$.

The subscripted index in (16) indicates that *she* and *Faatu*, both subscripted with '1', are to be interpreted as having the same referent, i.e. as picking out the same individual in the discourse context. In other words, the indices in (16) denote that this sentence should be interpreted as *Faatu supported Faatu*—in other words, *Faatu* is interpreted as both the supporter and the entity receiving support. However, as the * indicates, this sentence is ungrammatical with this interpretation.

This string is only grammatical if *she* refers to a person other than Faatu. Compare (16) with (17), a grammatical example because *she* and *Faatu* are not coindexed (i.e. do not have the same referent):

(17) She$_1$ supported Faatu$_2$.

The different indices in (17) now indicate that Faatu is receiving support and the supporter is someone else that is salient in the context. For example, if the whole utterance were *Hey, remember Anna? She supported Faatu*, the pronoun *she* would be interpreted as *Anna*.

Consider now Mongolian.[4] In (18), the pronoun *ter* 'she.NOM' is coindexed with *Čemeg* and the result is ungrammatical.

(18) *Mongolian* (Mongolic)

* Ter$_1$ Čemeg$_1$-in nom-ig ura-san.
she.NOM Čemeg-GEN book-ACC tear-PST
Intended: 'She$_1$ tore Čemeg$_1$'s book.'

Data in a language different from the metalanguage (i.e. in the language used for communication, in this case, English) usually has three lines: original data, followed by word-by-word or morpheme-by-morpheme gloss and, finally, an appropriate translation in the metalanguage.

Even though Mongolian is completely unrelated from English, the sentence in (18) is as ungrammatical as (16).

The impossibility of crossreference that we see in both (16) and (18) is an example of a *universal principle*: it is a rule shared by all languages which determines the interpretive possibilities of nominal expressions such as the pronouns *she* and *ter* and the proper names *Faatu* and *Čemeg*. Because it is a universal principle, it is shared by any language, even languages that are typologically and geographically distant, such as English and Mongolian.

Parameters, in turn, are also rules that any language exhibits, but the Universal Grammar in this case makes available some options for them to be complied with. Two examples of Parameters are as follows:

[4] Abbreviations: ACC = accusative, GEN = genitive, INTERR = interrogative, NOM = nominative, PST = past.

- Position of the head: final or initial
- Position of interrogative phrases: pronounced in the beginning of the sentence or pronounced in the same position of its non-interrogative counterpart

We will examine each in turn.

In English, the verb precedes the object. In (19a), for instance, the verb *write* precedes its object *a letter*. Likewise, a preposition precedes its object. In (19b), *for* precedes *him*.

(19) a. The boy is writing a letter. *head-initial*
b. They made millet soup [for him].

English is classified as a **head-initial** language: a word such as a verb or preposition precede the nominal expression that they select.

In Adyghe, on the other hand, the verb (viz. *jetxə* 'is.writing' in (20a)) follows its object (viz. *pisme-r* 'letter-ABS'). Likewise, the preposition *paje* 'for' in (20b) follows its object *aš* 'him.'[5]

(20) *Adyghe* (Northwest Caucasian)

a. ç̆'ale-m pisme-r jetxə *head-final*
boy-ERG letter-ABS is.writing
'The boy is writing a letter.'

b. [aš paje] hantχwəps aʁehazərəʁ
him for millet.soup made
'They made millet soup for him.'

Adyghe is classified as a **head-final** language: a word such as a verb or preposition follows the nominal expression that they select.

The position of the head is **parameterized**: languages vary in whether they position words such as verbs and prepositions before or after the object they select. Languages have one of two options to choose from, creating cross-linguistic variation between head-initial languages (e.g. English, Brazilian Portuguese, Wolof, French, Spanish, etc) and head-final languages (e.g. Adyghe, Mongolian, German, Japanese, etc). The type of language a child acquires depends on the language spoken or signed around them during the process of language acquisition.

Languages can also vary regarding the position of interrogative phrases. We saw in the beginning of this chapter that, in English, interrogative phrases are pronounced at the beginning of the clause:

(21) a. Solfrid has bought **an encyclopedia**.
b. **What** did Solfrid buy __?

Contrastively, in Hindi, interrogative phrases occur in exactly the same position where their non-interrogative counterpart occurs:[6]

(22) *Hindi* (Indo-Aryan)

[5]Abbreviations: ABS = absolutive, ERG = ergative.
[6]Abbreviation: ERG = ergative.

a. raam-ne **kelaa** khaayaa.
   Ram-ERG banana ate
   'Ram ate a banana.'

b. raam-ne **kyaa ciiz** khaayaa?
   Ram-ERG what thing ate
   'What did Ram eat?'

In English, a head-initial language, the verb precedes a non-interrogative object (21a), while an interrogative object is pronounced all the way in the beginning of the sentence (21b). However, in Hindi, another head-final language, both non-interrogative (22a) and interrogative (22b) objects precede the verb.

English and Hindi illustrate the fact that the position of interrogative phrases such as *what* and *kyaa ciiz* 'what thing' is also parameterized: languages vary with respect to the position where interrogative constituents occur—they are pronounced either in the beginning of the sentence or in the same position as their non-interrogative counterpart. English, French, and Q'anjob'al are examples of languages of the first type, while Hindi, Mongolian, and Mandarin are examples of the latter.

According to Generative Grammar, underlying our linguistic knowledge is a Universal Grammar that allows us not to rely exclusively on external stimuli in order to acquire a language and which explains why the knowledge acquired surpasses by far the input a child is exposed to. However, this theory is not falsified by the fact that there are hundreds if not thousands of different natural languages across the world: the Universal Grammar we are inherently endowed with contains both Principles and Parameters, the latter of which captures how languages can vary.

It is important to emphasize that Parameters, just like Principles, are also given by the Universal Grammar. Furthermore, the range of options for a parameter to be set is also provided by the Universal Grammar. For example, a language can be head-initial or head-final—there is no other option. Thus, not only does Generative Grammar predict possible ways in which languages can vary, it also states that variation is not random, since parametric options are also given by the Universal Grammar, thus restricting the possible ways languages can differ from each other.

Universal principles were exemplified by a rule that regulates the coindexation possibilities of nominal expressions. (16), repeated below as (23) was used to illustrate this principle.

(23) * She$_1$ supported Faatu$_1$.

To conclude this section, the reader is invited to reflect about how an ungrammatical sentence like (23) can be used as an additional argument against the claim that our ability to evaluate negative data is reduced to the impossibility of interpreting an ungrammatical sentence (i.e. reduced to a semantic restriction).

Bear in mind that the string in (23) has a grammatical counterpart (viz. the contra-indexed (17))—recall the paraphraseability of certain ungrammatical interrogative sentences (14).

1.2 An example of syntactic investigation

We just examined the main tenets of Generative Grammar. The goal of a syntactician working within this framework is to formulate a theory of grammar that accounts for the linguistic knowledge we have, including knowledge about ungrammatical sentences. There are different methods to obtain linguistic data and reason about it, for example:

- Gather and analyze corpora, i.e. a compilation of written texts or transcribed utterances and dialogues
- Design experiments (e.g. eye-tracking)
- Construct data and test them with native consultants

Let us see how the latter works by examining how one could go about an analysis of the **distribution** and interpretation of *anaphors*, also called *reflexives*. This section aims to exemplify in broad strokes how a linguist working under a Generative framework could investigate some syntactic phenomenon. A later chapter will provide a detailed theory of the distribution of anaphors.

The *distribution* of x is the set of contexts or environments where x occurs.

We saw before that a proper name such as *Faatu* cannot have the same interpretation as a pronoun that precedes it:

(24) * She$_1$ supported Faatu$_1$.

An anaphor is another type of nominal element that imposes a set of restrictions on what other expressions it can be coindexed with, though these restrictions are very different from what a proper name requires. The anaphors in English are: *myself*, *itself*, *herself*, *yourselves*, etc.

To start, contrast the sentences in (25).

(25) a. Faatu$_1$ supported herself$_1$.
b. * It seems to have rained on herself.
c. * Faatu$_1$ supported herself$_2$.

Recall that the subscripted indices denote correference.

In (25a), *Faatu* and the anaphor *herself* are both subscripted with '1.' In other words, (25a) is interpreted as *Faatu supported Faatu*. In (25b), *herself* is not coindexed with anything in the sentence. Finally, in (25c), we see the same string as that in (25a), though *Faatu* and *herself* now have different indices (viz. '1' and '2,' respectively). Unlike (25a), (25c) *cannot* be paraphrased as *Faatu supported Faatu*—in (25a), *Faatu* both gives and receives support, while in (25c), *Faatu* is the supporter of someone else.

In (25a), as mentioned, the anaphor *herself* is coindexed with the *Faatu* and the sentence is grammatical. Conversely, in (25b), there is nothing that *herself* is coindexed with and this sentence is ungrammatical. By comparing (25a) and (25b), thus, we can conclude that there must be another nominal expression that an anaphor is coindexed with. Moreover, by comparing (25a) and (25c), we can also conclude that, if there is another preceding nominal expression, it is not possible for the anaphor *not* to be coindexed with it: in (25c), the anaphor is not coindexed with *Faatu* and the result is ungrammatical.

Based on these conclusions, we can then formulate the following hypothesis to account for the conditions that must be met in order for an anaphor to be legitimate in a sentence:

(26) There must be another nominal expression in the sentence that an anaphor is coindexed with.

Let's test this hypothesis against the following data:

(27) a. Faatu$_1$ believes herself$_1$ to have angered the wrong person.
b. * Seb believes herself$_1$ to have angered Faatu$_1$.

In (27b), there is another nominal expression that the anaphor *herself* coindexed with, as required by (26). As such, this hypothesis predicts that (27b) should be grammatical, contrary to fact!

There is a clear observable difference between (27a) and (27b): in (27a), *Faatu* precedes the anaphor, but in (27b), the relative order between them is reversed. In order to accommodate this fact, we could reformulate (26) so as to incorporate a linear order component in our working theory:

(28) There must be another nominal expression in the sentence that an anaphor is coindexed with and which *precedes* the anaphor.

(28) now explains the difference between (27a) and (27b) because only in (27a) does *Faatu* precede *herself*.

Now it is time to put the latest hypothesis (28) to the test. Compare the sentences below:

(29) a. [Faatu's father]$_1$ supported himself$_1$.
b. * [Faatu$_1$'s father] supported herself$_1$.

In (29), the square brackets indicate which part of a complex nominal expression is being indexed. In (29a), the whole phrase [*Faatu's father*] is subscripted with '1,' while in (29b), it is only *Faatu* that is so subscripted, *Faatu* being contained in the larger bracketed phrase. Therefore, in (29a), the anaphor *himself* is coindexed with

the nominal expression that denotes a male individual who is a parent to Faatu, while in (29b), the anaphor *herself* is coindexed with the entity whose name is *Faatu*.

In (29a), all conditions specified by (28) are complied with: there is a nominal expression that the anaphor *himself* is coindexed with (viz., [*Faatu's father*]) and, furthermore, that nominal expression precedes the anaphor. For that reason, (28) predicts that (29a) should be grammatical and this is indeed th case. However, in (29b), all conditions specified by (28) are *also* complied with: there is a nominal expression that the anaphor *herself* is coindexed with (viz., *Faatu*) and, furthermore, that nominal expression precedes the anaphor. As it stands, (28) predicts that (29b) should be grammatical, which is not borne out by facts.

A prediction is *borne out* by facts when it is corroborated by them (and not borne out by facts when it is not corroborated by them).

How could we account for the difference between (29a) and (29b)? We will find out in a few chapter, when we examine a component of the grammar called *Binding Theory*. This component is responsible for regulating the interpretation of different types of nominal expressions such as proper names (e.g. *Faatu*), anaphors (e.g. *herself*), as well as pronouns (e.g. *she*). For now, it suffices that we notice a crucial difference between (29a) and (29b). As mentioned in both sentences, *Faatu* is contained within the larger nominal expression [*Faatu's father*]. The entire nominal expression [*Faatu's father*] is in an appropriate position for the anaphor to be coreferent with it, but *Faatu* alone is not. Informally, this can be represented as in (30), where the lines connect nominal expressions that are interpreted as picking out the same referent, in replacement of the subscripted indices used so far.

(30) a. [Faatu's father] supported himself.

b. [Faatu's father] supported herself.

What is important to retain now are the steps in the reasoning. We compared sentences that were almost identical, except for one property. For instance, (27a) and (27b) are identical and only differ in the position of the nominal expression *herself* is coindexed with. This allowed us to probe into the relevance of that nominal expression preceding the anaphor or not. Importantly, we formulated hypotheses to account for each sentence investigated and tested each one of them against new relevant data. We then reformulated our hypotheses to render them empirically adequate regarding the new data.

Two sentences that are almost identical, except for one property are called **minimal pairs**. A set of minimal different sentences forms a **paradigm**.

This course is an exploration of the syntactic component of natural languages couched within a Generative framework. We will apply these steps of scientific reasoning to investigate different components of grammar and the rules that underpin them. Ultimately, the goal is to provide you with a solid foundation on syntactic theory, so that you can investigate any syntactic phenomenon on your own and contribute to our understanding of how the Universal Grammar works.

1.3 Summary

According to Generative Grammar, we are born with a **Language Faculty**, i.e. an innate capacity for language. It explains why we have an infinite capacity for lan-

guage, even though we are exposed to a very much finite linguistic input as babies. This is particularly clear when we consider that we have robust intuitions about sentences that we have never encountered before and even sentences formed out of novel words.

The Language Faculty is comprised of two types of rules. **Principles** are rules that any language has, while **Parameters** are rules that all languages also have, but with variable realization. The existence of these two types of rules explains why we do not have to rely exclusively on external stimulus in order to acquire a language. Parameters, additionally, allow the theory to capture the fact that languages exhibit a great degree of variation, though within limits.

A syntactician aims to model the ability of a speaker or signer of any natural language to utter an unlimited number of sentences and to interpret sentences they may have never encountered before. A syntactic investigation can proceed in a variety of different ways, using different sources of data, including eliciting data with native consultants. At every step of the way, we formulate generalizations about the data and then hypotheses about why the data behaves they way it does. These hypotheses are tested against new sets of data and revised accordingly.

Remember: the *Active Retrieval* is intended to help you recall and retain the fundamental concepts of each chapter.

1.3.1 Active retrieval

- How do Principles differ from Parameters?

- Does the fact that there are hundreds, if not thousands, of different natural languages contradict the theory that there is a Universal Grammar?

- What is the relevance of negative data to Universal grammar?

- Could frequency be a determining factor in language acquisition?

Chapter 2

The hierarchical structure of sentences

2.1 Overview

In the previous chapter, we were trying to model how English speakers form interrogative sentences and formulated the tentative rule repeated in (1).

(1) Place the leftmost verb *V* of the sentence in the beginning of the sentence. Subsequently, place an interrogative phrase *Q* to the immediate left of *V*.

This rule incorrectly yielded the string in (2).

(2) * What has [that Solfrid __ bought __] will surprise Seb?

The problem with rule (1) is that it is stated in terms of **linear** order: notice the terms *leftmost*, *beginning*, and *immediate left*.

The same is true of one of our hypotheses about the distribution of anaphors: (3) includes the word *precedes*.

(3) There must be another nominal expression in the sentence that an anaphor is coindexed with and which precedes the anaphor.

To recall, this hypothesis failed to account for the ill-formedness of sentences such as (4).

(4) * [Faatu$_1$'s father] supported herself$_1$.

More precisely, in (4), there is a nominal expression that the anaphor *herself* is coindexed with and which also precedes it (namely, *Faatu*), but the sentence is still ungrammatical, contrary to what (3) predicts.

In this chapter, we will see that, even though sentences are produced by uttering one word after another, there is more to a sentence than just linear order. More precisely, sentences are organized in terms of **constituents**, organized **hierarchically**. This is why tentative rules like (1) and (3) fail: they are based on linear order and not on hierarchical structure and the syntax of natural languages is only sensitive to the latter.

The claim that sentences are hierarchical structures can be demonstrated by the application of **constituency diagnostics** such as topicalization and fragment answers.

2.2 Hierarchical structure

The reader may be familiar with Lego blocks, which you can build an endless number of different shapes with. You may be familiar specifically with sets that you can build different figures with (say, a toucan and a butterfly), but from the *same* blocks. This possibility is also found in natural languages: we can use the same building blocks, but, depending on how we arrange them and on the order in which we put these blocks together, we can end up with altogether different sentences (analogously to how a toucan is altogether different from a butterfly). For instance, let's say that our building blocks are the words *black*, *bird*, and *house*. From the very same set of words, we can build two different expressions:

(5) a. [black+[bird+house]]
b. [[black+bird]+house]

Before you keep reading the chapter, think about what (5a–5b) mean. Intuitively, if two words are surrounded by square brackets, they have been combined first. The result then combined with the remaining word, and the final output is then enclosed by the outermost brackets.

In (5a), *bird* and *house* merge first. The result is an expression that denotes a type of box that can be used as a bird's nest or, literally, a bird's house. Subsequently, *birdhouse* merges with *black*, so that this adjective indicates the color of the bird's house–nothing is said about the color of the bird. Conversely, in (5b), *black* and *bird* merge first. The result is an expression that denotes a particular type of bird. *Blackbird* then merges with *house*, which denotes a box that can be used as a nest specifically for blackbirds specifically. In this case, nothing is said about the color of the house.

This chapter is not about morphological ambiguity such as the one in (5a–5b), but, if you would like extra practice, think about the possible meanings of *unscented baby wipes*.

This chapter shows that the possibility of deriving a different outcome from the very same set of units holds of syntax as well, thus demonstrating that sentences produced by the grammar of natural languages are underlyingly complex structures.

2.2.1 Structural ambiguity

When we utter a sentence, one word follows another, in a linear string. Nonetheless, there is evidence that the syntax of natural languages operates in terms of **hierarchical structure**: words are grouped together into constituents that exclude other parts of the sentence.

Claire → watched → the → movie → with → Ryan Reynolds

Figure 2.1: Sentences are realized as a *linear string of words*…

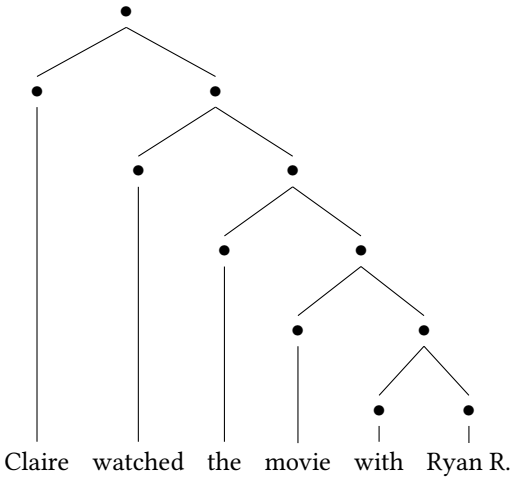


Figure 2.2: … but underlying them is a *hierarchical organization*.

Is there evidence for the claim that, underlying the linear realization of a sentence, is a hierarchical structure? Support for this claim is provided by the interpretive effects of arranging the same words and phrases in a different way, so that the same string of words corresponds to different underlying structures, each with its own interpretation.

The sentence *Claire watched the movie with Ryan Reynolds* is ambiguous. Can you paraphrase the two possible readings of this sentence?

The two possible readings of this sentence are as follows:

(6) i. 'Claire watched the movie starring Ryan Reynolds.'
ii. 'Claire watched the movie in Ryan Reynolds' company.'

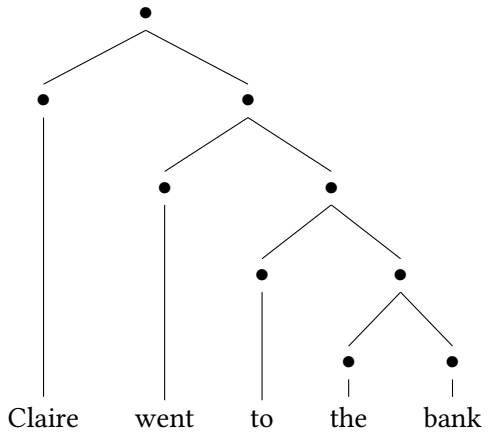
A sentence such as *Claire went to the bank* is also ambiguous:

(7) i. 'Claire went to a financial institution (e.g. to deposit a check).'
ii. 'Claire went to the bank alongside the river.'

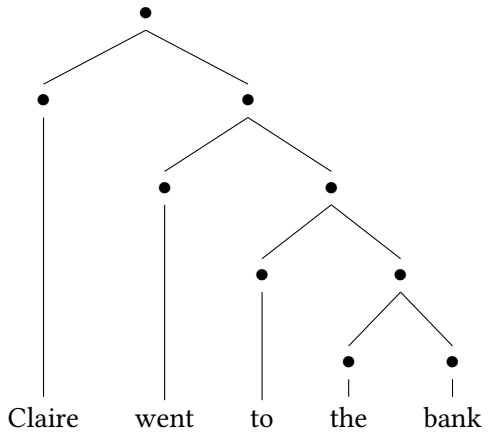
But the ambiguity in this case has a different cause. The sentence has one structure and one basic meaning, i.e. Claire went somewhere. The two readings arise as a consequence of *accidental homophony*: there are two separate words *bank*, each with its own meaning, but coincidentally with the same form. One word denotes a particular type of financial institution (7i) and the other, the land alongside some body of water such as a river (7ii).

Schematically:

(8) i. 'Claire went to a financial institution (e.g. to deposit a check).'



ii. 'Claire went to the bank alongside the river.'



Accidental homophony is sometimes disambiguated in spelling (given a language that is represented by some writing system). For example, in English, *sea* and *see* are spelled differently, even though both are pronounced as [siː]. The same holds for [aɪ skriːm fɔːr aɪs kriːm] 'I scream for ice cream.' These mismatches between spelling and phonetic realization make it clear that homophony happens when two separate and independent forms coincidentally or accidentally have the same exponence. In the case of *bank*, there is no mismatch between orthography and phonetic realization, but it is still the case that bank as a financial institution and bank as the border of a river are independent words.

Accidental homophony can be analogized to doppelgängers, i.e. when two or more completely different individuals happen to have similar superficial appearances.

Exercise

Explain the humorous effect of the following joke:

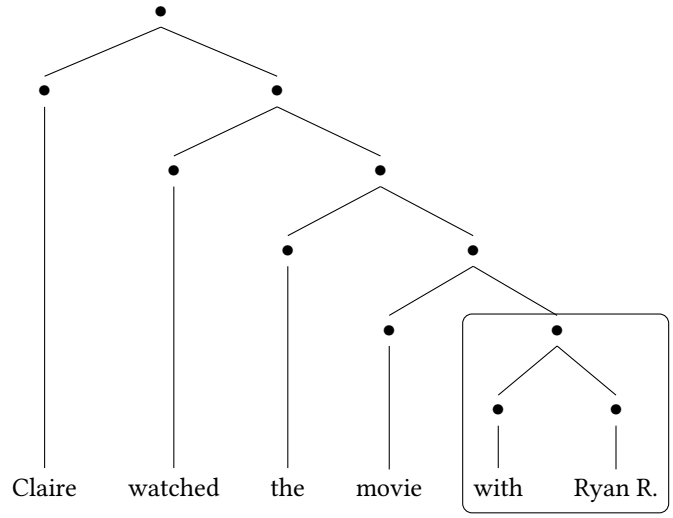
(9) A. My calf is in pain.
B. I am sorry, I am a doctor, not a vet.

One of the goals of this chapter is to learn how to draw representations such as the one we see in (8). For now, the point is that, in either of the readings of *Claire went to the bank*, this sentence has the *same* structure. Conversely, in *Claire watched a movie with Ryan Reynolds*, all words mean virtually the same.[1] It is how [*with Ryan Reynolds*] combines with the rest of the sentence that causes the different readings.

Intuitively, in the reading where Claire watched the movie starring Ryan Reynolds (6i), [*with Ryan Reynolds*] specifies which movie she watched—the one starring Reynolds and not the one starring e.g. Ryan Gosling. In this case, there is no characterization about how Claire watched the movie. On the other hand, in the reading where Claire watched some movie in Ryan Reynolds' company (6i), [*with Ryan Reynolds*] characterizes the event of watching the movie—Claire did not watch the movie alone. In this case, there is no characterization of the movie. Specifically, nothing is said about who is starring in it.

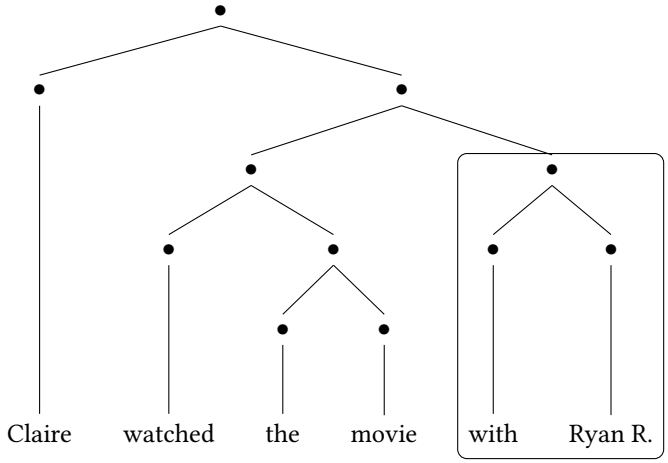
Let's represent the different readings with informal diagrams like those in (8).

(10) i. 'Claire watched the movie starring Ryan Reynolds.'
(i.e. she did not watch the one starring Ryan Gosling)



ii. 'Claire watched the movie in Ryan Reynolds' company.'
(i.e. she did not watch the movie (whatever it is) alone)

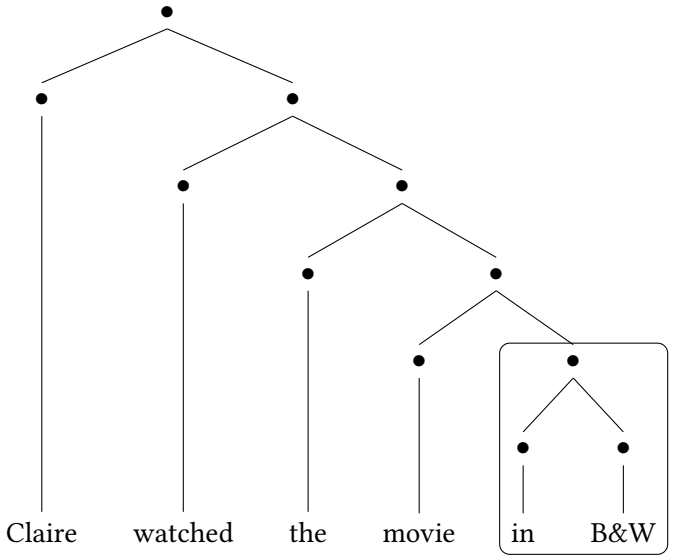
[1] By 'virtually,' I mean that the meaning of the preposition *with* is vague, so that it can mean both "which has in it" and "accompanying," accounting for the meanings in (6i) and (6ii), respectively.



In the diagram (10i), [*with Ryan Reynolds*] combines with *movie*, specifying which movie Claire watched. This is analogous to *the movie in black and white* in (11):

(11) Claire watched the movie in black and white. (cf. (10i))

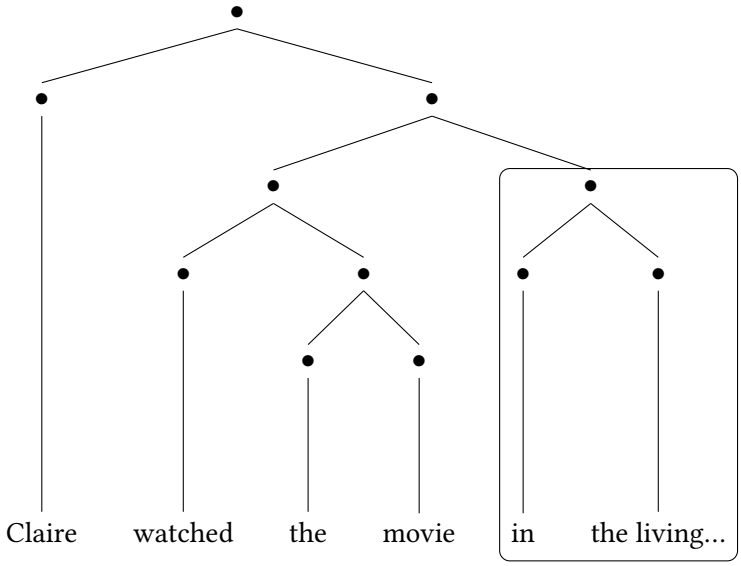
(e.g. Claire did not watch the one in color)



In contrast, in the diagram (10ii), [*with Ryan Reynolds*] combines with *watched the movie*, specifying how Claire watched the movie. This is analogous to *watched the movie in the living room* in (12).

(12) Claire watched the movie in the living room. (cf. (10ii))

(e.g. Claire did not watch the movie (whatever it is) in her room)



Importantly, despite the difference in arrangement and in internal structure, there is no difference in how the sentence is pronounced. This is **structural ambiguity**:

> **Definition 3**
>
> A sentence is *structurally ambiguous* when there are different ways for its constituents to be arranged, yielding different configurations, each with its own meaning. The difference in structure is *not* reflected in how the sentence is pronounced/realized/exponed.

While accidental homophony can be analogized to doppelgängers, structural ambiguity can be analogized to those toy building block sets from which you can build different figures, e.g. a toucan, a butterfly, or fish. It is the very same set of blocks, but, if you arrange them in different ways, you end up with radically different results. The same happens in structural ambiguity: it is the same set of words, but, if you merge them together in different ways, you end up with radically different sentences, each associated with its own meaning.

2.2.2 Interim conclusion

Sentences are realized as linear strings, where one word follows the other. However, if sentences were reduced to a linear string, we would not be able to account for the ambiguity that certain sentences such as *Claire watched in the movie with Ryan Reynolds* exhibit. Sentences like this have more than one interpretation and, yet, they are realized by the *same* linear string. Conversely, if we assume that the above-mentioned sentence is ambiguous due to the way in which its subcomponents are arranged, giving rise to *structural ambiguity*, then we are able to account for the fact that there is a one-to-many relationship between the linear realization of a sentence like *Claire watched the movie with Ryan Reynolds* and its possible interpretations.

Structural ambiguity demonstrates, thus, that sentences yielded by the grammar of natural languages have internal structure, which is masked by the linear string with which they are realized.

Exercise

The sentences below are structurally ambiguous.

(13) a. I saw the hiker in the mountain.
b. The teacher called the student with a microphone.
c. I saw her duck.
d. "Putin proposes direct peace talks with Zelenskyy in Turkey"

Provide paraphrases that disambiguate their readings. Make sure the paraphrases are not ambiguous themselves.

2.3 Constituency tests

The paraphrases in (7) indicate that the string *Claire watched the movie with Ryan Reynolds* has more than one reading. But how can we probe into the internal structure that corresponds to each reading? **Constituency tests** allow us to do exactly that.

Consider the following slightly modified versions of the sentence we have been investigating:

(14) a. [The movie [with Ryan Reynolds]], Claire watched.
b. [The movie], Claire watched [with Ryan Reynolds].

These sentences (14a–14b) are no longer ambiguous. What is the only reading that each sentence has?

(14a) only has the reading 'Claire watched the movie starring Ryan Reynolds,' while (14b) only has the reading 'Claire watched in the movie in Ryan Reynolds' company:'

(15) a. [The movie [with Ryan Reynolds]], Claire watched.
(i.e. 'The movie starring Ryan Reynolds, Claire watched.')
b. [The movie], Claire watched [with Ryan Reynolds].
(i.e. 'The movie, Claire watched in Ryan Reynold's company.')

(14a–14b) are formed through a syntactic operation called **topicalization**, whereby some string is displaced and pronounced at the beginning of the sentence:

(16) a. Claire watched [the movie [with Ryan Reynolds]] $\xrightarrow{\text{topicalization}}$
[The movie [with Ryan Reynolds]], Claire watched __

b. Claire watched [the movie] [with Ryan Reynolds] $\xrightarrow{\text{topicalization}}$
[The movie], Claire watched __ [with Ryan Reynolds]

Importantly, topicalization can only target **constituents**. Because [*the movie* [*with Ryan Reynolds*]] is topicalized in (14a), this string is a constituent in this sentence, under the "starring Ryan Reynolds" reading. Conversely, in (14b), only [*the movie*] is topicalized. As such, it is a constituent separate from [*with Ryan Reynolds*] in the structure corresponding to the "accompanied by Ryan Reynolds" reading.

A constituent is defined as follows:

Definition 4

Given a node N and a set of nodes $\{\alpha, \beta, \gamma, \ldots, n\}$, then N is a **constituent** *iff* all members of $\{\alpha, \beta, \gamma, \ldots, , n\}$ are dominated by N and there is no node e such that e is dominated by N and e is not a member of $\{\alpha, \beta, \gamma, \ldots\}$.

iff = if and only if

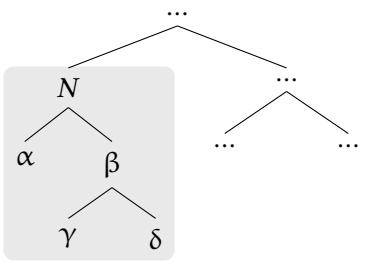
Definition 5

A node x **dominates** a node y *iff* there is one single descending line from x to y.

In Definition 4, the condition "there is no node e such that e is dominated by N and e is not a member of $\{\alpha, \beta, \gamma, \ldots\}$" ensures that all the nodes dominated by N are included in the definition of N as a constituent. This definition of *constituent* involves the definition of **dominance** in Definition 5.

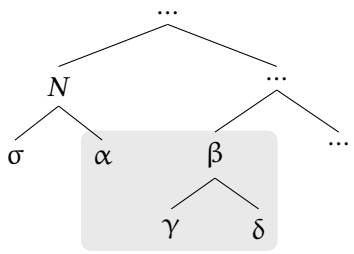
Let's see what being a constituent or not looks like. In (17), the set of nodes that N dominates is $\{\alpha, \beta, \gamma, \delta\}$. This is an exhaustive set of nodes that N dominates, so N is a constituent.

(17) $\{\alpha, \beta, \gamma, \delta\}$ *form a constituent, i.e.* N



However, in (18), the set of nodes $\{\beta, \gamma, \delta\}$ is not dominated by N: to go from N to any of nodes in this set, we have to go up first, and then go down. In other words, there is no single descending line from N to any of the members of $\{\beta, \gamma, \delta\}$, as required by Definition 5.

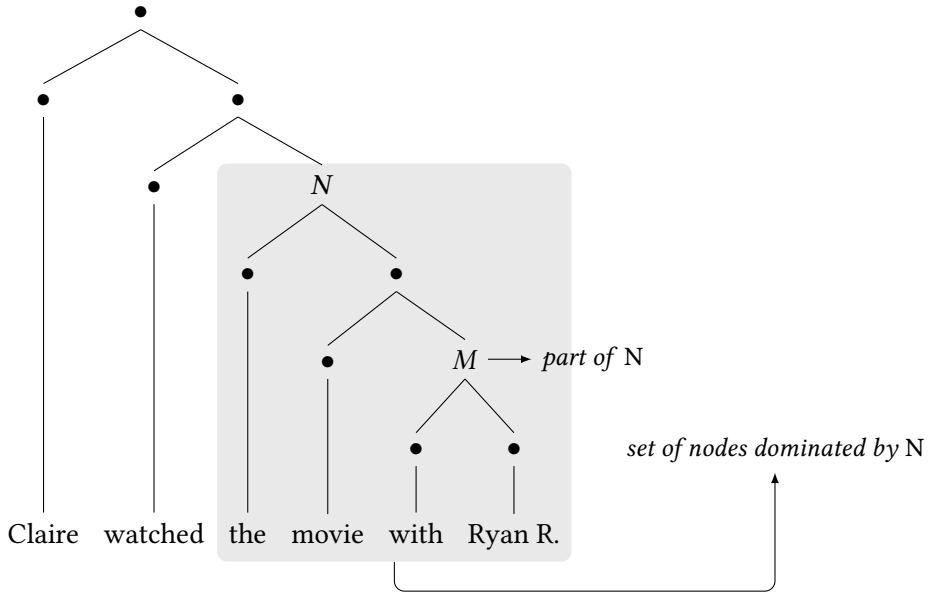
(18) {α, β, γ, δ} *do* ***not*** *form a constituent*



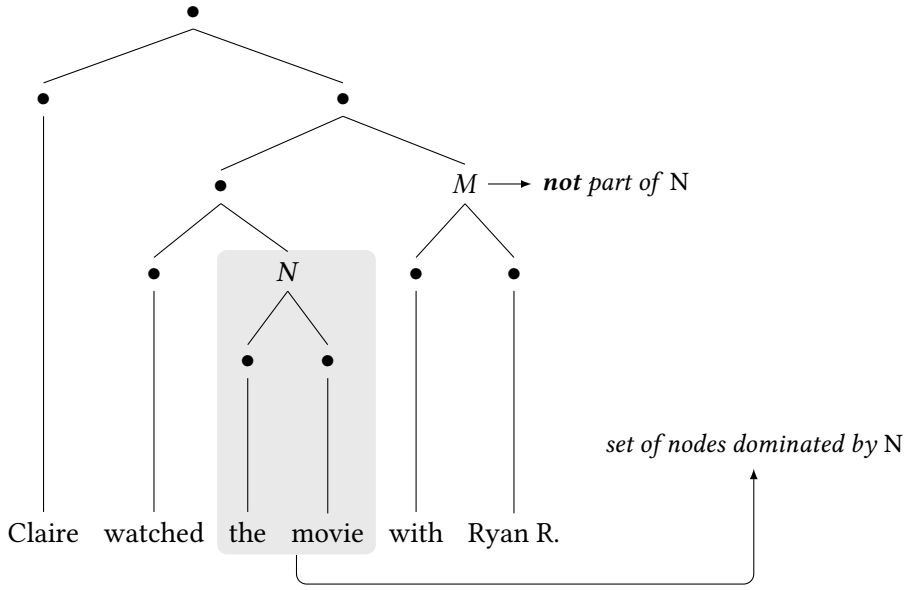
In (18), *N is* also a constituent, but a different one: now, the set of nodes dominated by *N* is {α, σ}.

With this background in place, we can go back to *Claire watched the movie with Ryan Reynolds*. In both possible structures, [*with Ryan Reynolds*] is a constituent, identified in (19) with the label *M*: both *with* and *Ryan Reynolds* are dominated by *M*, which does not dominate anything else. In the structure that yields the "starring Ryan Reynolds" interpretation (19i), [*with Ryan Reynolds*] is contained in the same constituent *N* as *the movie*. However, in the structure that yields the "accompanied by Ryan Reynolds" interpretation (19ii), [*with Ryan Reynolds*] is *not* contained in the same constituent *N* as *the movie*.

(19) i. 'Claire watched the movie starring Ryan Reynolds.'



ii. 'Claire watched the movie in Ryan Reynolds' company.'



This is why, when the string [*the movie* [*with Ryan Reynolds*]] is topicalized (15a), only the "starring" reading obtains: it is only in this reading (more precisely, in its corresponding hierarchical structure) that [*the movie* [*with Ryan Reynolds*]] is a constituent.[2]

Constituency tests such as topicalization allows us to identify the constituents of a sentence and, by extension, how they are arranged in the internal organization of each sentence. In what follows, we will examine a series of constituency tests.

2.3.1 Topicalization

As we just saw, *topicalization* consists in fronting a *constituent* to the beginning of the sentence. Here is another example. [*Her old collection of vinyls*] and [*the antique shop*] can be topicalized, as we can see in (20b) and (20c), respectively. However, (20d) is ungrammatical. This indicates that the string *an old collection of vinyls to the antique* is not a constituent in this sentence.

(20) a. Tasneem sold her old collection of vinyls to the antique shop.

b. [Her old collection of vinyls], Tasneem sold __ to the antique shop.

c. [The antique shop], Tasneem sold her old collection of vinyls to __.

d. Her old collection of vinyls to the antique, Tasneem sold __ shop.

Something else (20d) demonstrates is that linear order does not determine constituency, since the words in the string *an old collection of vinyls to the antique*

[2] The reason why the topicalization of [*with Ryan Reynolds*] alone (15b) can only give rise to the "accompanied by" reading is a bit more involved. It has to do with the same reason why a sentence like **Who do you wonder whether __ will come to the party* is ungrammatical. But this a matter for another chapter.

follow one another in the baseline (20a) and, yet, the result of attempting topicalization in (20d) is ungrammatical.

Topicalization has very particular intonational and discourse properties. The uppercase letters in (20) reflect the fact that, roughly speaking, the topicalized constituent is pronounced "with emphasis." Semantically, topicalization can be used for contrast, e.g.:

(21) a. [Her old collection of vinyls] Tasneem sold __ to the antique shop (though not her jewelry).
b. [The antique shop], Tasneem sold her old collection of vinyls to __ (not the record store).

Before we proceed to the next constituency test, it is worth emphasizing that a constituent that occupies the first position of a sentence can also be topicalized:

(22) [Tasneem] __ sold her old collection of vinyls to the antique shop (not Olivia).

In (22), *Tasneem*, the subject of the sentence, is topicalized. With or without topicalization (see (22) and the baseline (20a), respectively), this nominal expression occupies the first position of the sentence. Nonetheless, the result of topicalization is still a different sentence (22), since *Tasneem* in this case has the semantic and intonational properties that topicalized constituents usually have.

Exercise

Apply topicalization to the underlined strings in the sentences in (23) and determine whether they are constituents.

(23) a. Eyglo bought the book I talked about.
b. Eyglo bought the book about Bantu languages.

When a verbal constituent is topicalized, additional rules are needed.

(24) a. Solfrid bought the food.
b. [buy the food], Solfrid did __ (though cook it, she did not).

In (24b), the verbal constituent [*buy the food*] is topicalized. The verb appears in bare form, i.e. without any agreement or tense inflection. Rather, they appear in the auxiliary *do*, which matches the features of the verb in the baseline: in (24a), *bought* is a past tense form, so *do* in (24b) must occur as *did*. (25) provides a similar example, though now the verb in the baseline (25a) is [3rd] and [pres], so the auxiliary in the topicalization example (25b) must be *does*.

(25) a. Solfrid buys the food.
b. [buy the food], Solfrid does __ (though cook it, she does not).

The use of *do* is only required when the sentence does not have an auxiliary of its own:

(26) a. Solfrid will buy the food.
b. [BUY THE FOOD], Solfrid will __ (though cook it, she will not).

In (26a), the auxiliary *will* occurs and *do* is not inserted when the verbal constituent is topicalized (26b).

2.3.2 Clefting

Clefting is similar to topicalization, in that it involves the fronting of a constituent to the beginning of the sentence. However, in addition, clefting involves the expletive *it*, a form of the verb *be* (e.g. *is*, *was*, etc), and an appropriate relative word (e.g. *who*, *which*, *that*, etc).

An *expletive* is a "dummy" or meaningless element that usually occurs in a sentence to satisfy some grammatical requirement, specifically, the need for all sentences in English to have a subject.

(27) a. Tasneem sold her old collection of vinyls to the antique shop.
b. It was [her old collection of vinyls] which Tasneem sold __ to the antique shop.
c. It was her old collection of vinyls to the antique which Tasneem sold __ shop.

We can see in (27c) that, like topicalization, clefting can only target constituents, hence why it is used as a constituency diagnostic.

More generally, clefting has the following template:

(28) It_{EXPL} be [*constituent*] {which/who/where/...} ... __ ...

The form of *be* matches the tense and the agreement of the verb in the baseline—in e.g. the sentences in (27), the baseline is the sentence *Tasneem sold her old collection of vinyls to the antique shop*, where the verb *sold* is in the past.

Furthermore, the choice of relative word is determined by the features of the constituent that was clefted. For instance, if the constituent denotes a HUMAN, *who* is used, if the constituent denotes a LOCATION, *where* is used, and so on and so forth. Keeping the same baseline (27a), if clefting applies to *Tasneem*, the relative word must be *who*, since *Tasneem* is a proper name that denotes a HUMAN:

(29) It was [Tasneem] **who** __ sold and old collection of vinyls to the antique shop.

Additional examples of clefting are provided below:

(30) a. Eyglo usually studies at the Queen Elizabeth II Library on Tuesdays.
b. It is [at the Queen Elizabeth II Library] where Eyglo studies __ on Tuesdays.

c. It is [on Tuesdays] when Eyglo studies __ at the Queen Elizabeth II Library.

In (30b–30c), *be* is in the [3SG] and [PRES], to match the features of the verb *studies* in the baseline (30a). In (30b), the relative word is*where* because the clefted constituent [*at the Queen Elizabeth II Library*] denotes a *location.* In (30c), the relative word is*when* because the clefted constituent [*on Tuesdays*]is *temporal.*

[3SG] = '3rd person singular' and [PRES] = 'present.'

The general relative word *that* can also be used:

(31) a. It was [her old collection of vinyls] **that** Tasneem sold __ to the antique shop.
b. It was [Tasneem] **that** __ sold her old collection of vinyls to the antique shop.
c. It is [at the Queen Elizabeth II Library] that Eyglo studies on Tuesdays.

EXERCISE

Apply clefting to the underlined strings in the sentences in (23).

(23) a. Eyglo bought the book I talked about.
b. Eyglo bought the book about Bantu languages.

Does the result confirm the conclusion you arrived at with topicalization?

Not all constituency tests involve movement like clefting and topicalization. In the next sections, we examine just such tests.

2.3.3 PROFORM SUBSTITUTION

Yet another constituency test is **proform substitution**. A **proform** is a word like a pronoun (e.g. *he*, *she*, *it*, *them*, etc), as well as words like *then* or *there*, which stands for a constituent of a given type. This diagnostic is also referred to as *pronominalization.*

(32) Faatu will buy a new book tomorrow.
a. **She** (= Faatu) will buy a new book tomorrow. [3SG FEM HUMAN]
b. Faatu will buy **it** (= a new book) tomorrow. [3SG INANIMATE]
c. Faatu will buy a new book **then** (= tomorrow). [TEMPORAL]

Like other tests, proform substitution can only target constituents.

(33) Faatu will buy a new book tomorrow.
a. * Faatu will buy a new **it** (= book tomorrow).
b. * Faatu will buy a new **then** (= book tomorrow).

We can conclude from the ill-formedness of the sentences in (33) that the string *book tomorrow* is not a constituent, even if they form a contiguous linear string. This conclusion underscores once again the fact that the hierarchical organization into constituents that a sentence consists of is obscured by the linear order with which it is realized.

Exercise

Apply proform substitution to the underlined strings in the sentences in (23).

(23) a. Eyglo bought the book I talked about.
b. Eyglo bought the book about Bantu languages.

Does the result confirm the conclusion you arrived at with topicalization and clefting?

2.3.4 Fragment answer

Finally, only a constituent can answer a question, while retaining the meaning of the original sentence.

(34) Faatu will buy a new book tomorrow.

a. Q: *Who* will __ buy a new book tomorrow? A: [Faatu]
b. Q: *What* will Faatu buy __ tomorrow? A: [A new book]
c. Q: *When* will Faatu buy a new book __? A: [Tomorrow]

From the valid question–answer pairs in (34), we can conclude that [*Faatu*], [*a new book*], and [*tomorrow*] are all constituents in the baseline sentence *Faatu will buy a new book tomorrow*.

Following the logic of all constituency tests we examined thus far, a string that is not a constituent cannot be the answer to a question:

(35) Faatu will buy a new book tomorrow.

Q: *What* will Faatu buy __? A: *A new book tomorrow

(35) indicates once again that linear order is not a determinant factor for constituency: this is a string of contiguous words in the baseline sentence *Faatu will buy a new book tomorrow*, but it cannot be the answer to a question and, thus, is not a constituent.

Exercise

Apply the fragment answer diagnostic to the underlined strings in the sentences in (23).

(23) a. Eyglo bought the book I talked about.
b. Eyglo bought the book about Bantu languages.

Does the result confirm the conclusion you arrived at with topicalization, clefting, and proform substitution?

2.4 Summary

While sentences are realized as strings of words that are realized one after the other, linear order is not what determines how they are merged together in the underlying structure of a given sentence. Rather, words are grouped together in *constituents*. Constituency in turn is evidenced by a few diagnostics such as:

1. Topicalization
2. Clefting
3. Proform substitution
4. Fragment Answer

This chapter concludes with exercises where the reader can practice the application of constituency tests in ambiguous and non-ambiguous sentences.

Exercise

In the sentences below, is the underlined string a constituent?

(36) a. We watched a movie about Olympic weightlifting last week.
b. Eyglo will read a book tomorrow.

Support your analysis with the diagnostics just examined.

The solution of (36a) is provided below and can be used as a model.

(37) a. [Watch a movie about Olympic weightlifting], we did __ last week (but enjoy it, we did not).
b. It was [watch a movie about Olympic weightlifting] what we did __ last week.
c. We did it (= watch a movie about Olympic weightlifting) last week.
d. Q: What did we do __ last week?
A: [Watch a movie about Olympic weightlifting].

Given the well-formedness of the sentences above, we can conclude that [*watch a movie about Olympic weightlifting*] is a constituent in the sentence (36a).

Notice that, in order to apply constituency tests to a string linearly initiated by a past tense verb (in (36a), *watched*), the auxiliary *did* was used in (37). The verb then appears in a *bare* form, i.e. without any morphology—the past tense realized by *–ed* in *watched* now appears in the auxiliary *did*.

Something along these lines also holds in (36b), though no auxiliary is used in this case, since the auxiliary *will* is already present in the sentence.

Exercise

In (38–39), the same boldfaced string is part of both sentences in each paradigm.

(38) a. **The student with glasses** won a prize.
b. The headmaster gifted **the student with glasses**.

(39) a. **The book on the shelf** was a gift.
b. Eyglo put **the book on the shelf**.

Is the boldfaced string a constituent in both sentences in (38) and (39)? Support your reasoning with constituent tests.

(38) is solved here to be used as a model. If we apply e.g. topicalization and fragment answer to (38a), the results are the following:

(40) The student with glasses won a prize.
a. [The student with glasses] __ won a prize (though not the one with blue hair).
b. A. Who won a prize?
B. [The student with glasses].

Because the result is well-formed in both cases and the meaning of the baseline sentence (38a) is preserved, we can conclude that the string [*the student with glasses*] is a constituent in this sentence.

Compare the application of the same tests in (38b):

(41) The headmaster gifted the student with glasses.
a. * [The student with glasses] the headmaster gifted __.
b. A. * Who did the headmaster gift?
B. * [The student with glasses].

The result of topicalization in (41a) results ungrammatical. The reason is that *gift with*, in the sense of 'give a present,' requires both a present and its receiver. Compare (42a) with (42b):

(42) a. I gifted Eyglo with a new pair of shoes.
b. * I gifted Eyglo.

(41a) is ungrammatical for the same reason (42b) is: they are missing the *with* phrase interpreted as the present. In (41a), *with glasses* is interpreted as a modifier of *the student* (just as a *with Ryan Reynolds* in the "starring" reading (10i)). If we add a *with* phrase that denotes the present gifted, the result is now grammatical:

(43) a. The headmaster gifted [the student with glasses] with a new book.
b. [The student with glasses], the headmaster gifted __ with a new book (though not the one with blue hair).

This is also why (41b-A) is ungrammatical: this question lacks the phrase that denotes the present implied by *gift with*. Just as in (43), if such a phrase is added, the result is now grammatical:

(44) A. Who did the headmaster gift with a new book?
B. [The student with glasses].

Unlike what happens in (41), the use of topicalization and fragment answer in (43) and (44) results in a well-formed sentence. The reason is that the baseline in the latter is a grammatical sentence where the "present" phrase required by *gift with* is part of the sentence.

In conclusion, (40) and (41) show that, while the string *the student with glasses* is part of both sentences (38a) and (38b), it is a constituent only in the former.

Exercise

We saw that the sentences in (13), repeated below, are ambiguous.

(45) a. I saw the hiker in the mountain.
b. The teacher called the student with a microphone.
c. I saw her duck.

For each sentence, apply at least two constituent tests that disambiguate their readings.

(45a) is solved here to be used as a model. The readings that this sentence has can be paraphrased as follows:

(46) i. 'While I was in the mountain, I saw the hiker—the hiker may have been elsewhere.'
ii. 'There is a hiker in the mountain and I saw them—I was perhaps not in the mountain myself.'

If we apply clefting and pronominalization, these readings can be disambiguated:

(47) *Reading (46i)*: 'while I was in the mountain, I saw the hiker—the hiker may have been elsewhere.'
a. It was [the hiker] who I saw __ [in the mountain].
b. I saw [them] [in the mountain].

(48) *Reading (46i)*: 'there is a hiker in the mountain and I saw them—I was perhaps not in the mountain myself.'

a. It was [the hiker [in the mountain]] who I saw __.

b. I saw [them].

(47) indicates that [*the hiker*] and [*in the mountain*] are separate constituents, while (48) indicates that [*the hiker* [*in the mountain*]] is a single constituent.

2.4.1 Active retrieval

What is the difference between accidental homophony and structural ambiguity?

What does structural ambiguity have to say about the linear order sentences are exponed by?

Chapter 3

Phrase structure rules: X-Bar Theory

3.1 Overview

The conclusion from chapter 2 is that the flat linear order with which sentences are realized is illusory: underlying any sentence is a complex structure where morphemes and words are put together to form different constituents organized hierarchically. This is particularly clear in the case of sentences that are structurally ambiguous, since different underlying structures, each with its own meaning, are exponed with the same linear string.Here, we will continue the investigation of the internal structure of sentences . We will examine the rules provided by Universal Grammar that govern how different words can be merged together forming constituents and how constituents and words can be merged together into phrases, eventually yielding a sentence.

3.2 Representing constituency hierarchically

Let's examine the sentence in (1).

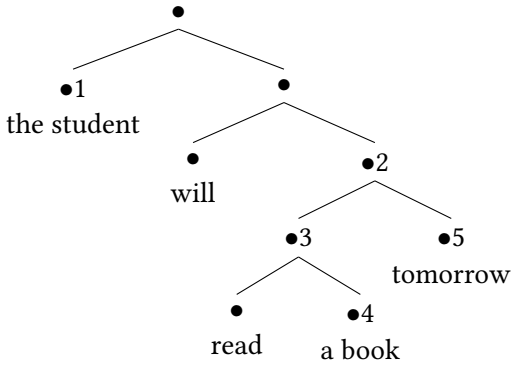
(1) The student will read a book tomorrow.

As we saw in the previous section, applying constituency tests, we can determine which set of words form a constituent that excludes all other words in the same sentence. The grouping together of words into constituents can be represented with a syntactic tree or with brackets.

(2) The student will read a book tomorrow.
   a. They (= the student) will read a book tomorrow.
   b. [Read a book tomorrow], the student will __.
   c. [Read a book], the student will __ tomorrow.
   d. The student will read it (= a book) tomorrow.
   e. The student will read a book then (= tomorrow).

In (2a), pronominalization applies to *the student*. Since the result is well-formed, this string must be a constituent. It is labeled '•1' in the tree representation (3). In (2b), *read a book tomorrow* is topicalized. This constituent is labeled '•2' in (3). In (2c), *read a book* is topicalized, stranding *tomorrow*, which indicates that this substring, labeled '•3' in (3), is also a constituent. In (2d), *a book* is pronominalized as *it*. This constituent is labeled as '•4' in (3). Finally, (2e) is the result of replacing *tomorrow* with the proform *then*, which confirms that *tomorrow* is a constituent. It is labeled as '•5' in (3).

(3)



Will in (3) is represented under its own node, but no constituent test was applied to it in (2). What evidence supports the claim, implicit in (3), that *will* is a constituent in the sentence in (2)?

Topicalization is an instance of a more general displacement operation called **movement**. As the name suggests, it targets a constituent that occupies some position in the syntactic structure and displaces it to another position. We will talk about movement in more detail later in this book. What matters to us right now is that *the operation movement only targets constituents*. Indeed, *will* can move in e.g. the so-called auxiliary inversion necessary for question formation in English:

(4) **Will** the student __ read the book tomorrow?

Under the assumption that only constituents can move, the well-formedness of (4) indicates that *will* is a constituent and, thus, it gets to occupy its own • in (3).

Each word in (3) corresponds to a different simplex **node**, represented with a '•.'[1] The whole sentence also corresponds to a single node (i.e. the topmost •). Each word corresponds to a **terminal node**: each word in e.g. (3), corresponds to a bullet • that does not dominate anything else. A **branching node**, in turn, is a node that dominates other nodes. In (3), *read*, for example, is a terminal node, since it corresponds to word and it is not divided or branched into other nodes (or instances of •. $•_3$, in turn, is a branching node, because it is divided into two other nodes (or instances of •), viz. *read* and $•_4$. Separate words combine to form a complex or branching node, e.g. *read a book tomorrow*—importantly, there is a single node dominating this constituent, viz. •2.

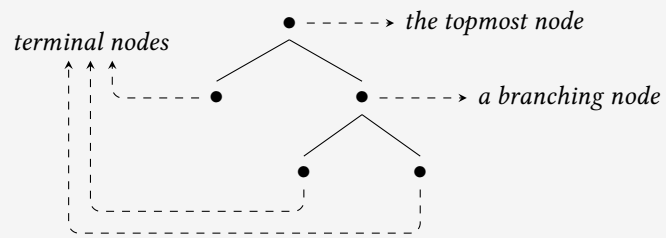
In sum:

[1] We will talk about the internal structure of *the student* and *a book* momentarily, in §3.7.

- Each word in a sentence corresponds to a constituent, specifically, a terminal node.
- The whole sentence also corresponds to a constituent, though one that dominates everything else in the sentence.
- Each sentence is composed of different constituents.
- Besides terminal nodes, nodes can also be of the branching type: a branching node is one that is divided into other, smaller nodes.

The different types of nodes are summarized in (5):

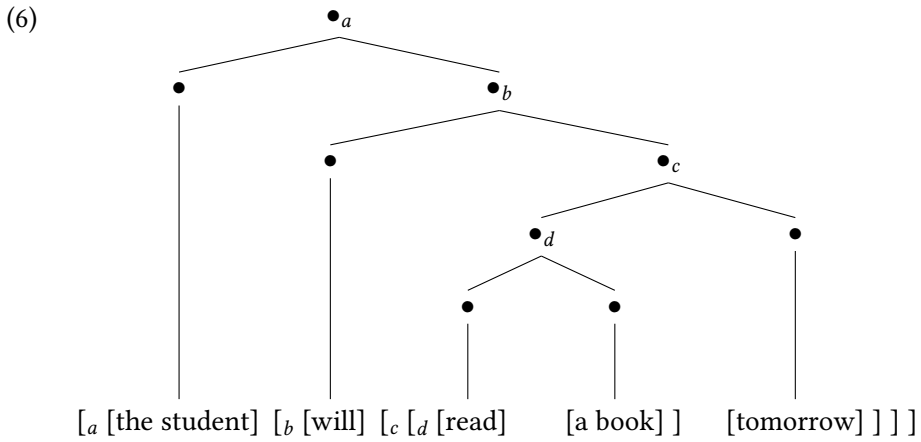
(5)



The representation in (3) captures the fact that sentences have an underlying complex structure, despite the fact that they are realized as linear strings.[2] (3) is an example of a **syntactic tree**, i.e. a diagram that represents an upside-down tree, where the root is at the top and the leaves are at the end of each node, branching or not. The leaves of the tree are the terminal nodes referred to above.

The same hoerarchical structure can be represented with bracket notation, as we can see at the bottom of (6):

(6)



Each node is enclosed between brackets. The entire sentence is dominated by the node $\bullet_a$. Correspondingly, in bracket representation, brackets enclose the entire sentence, with a subscripted *a* indicating the relevant delimitation. Going down one level, the node $\bullet_b$ corresponds to brackets enclosing [$_b$ *will read a book tomorrow*]. In other words, $\bullet_b$ dominates *will* and $\bullet_c$. The latter is then divided into a

[2]The linear order a sentence is realized by is created by an operation called *Linearization*, which applies after the syntactic structure is built, flattening it out.

node $\bullet_d$ and *tomorrow*. Last but not least, $\bullet_d$ corresponds to the brackets [$_d$ *read a book*].

Remember to complete the exercises labeled as '💬' before you continue reading the chapter.

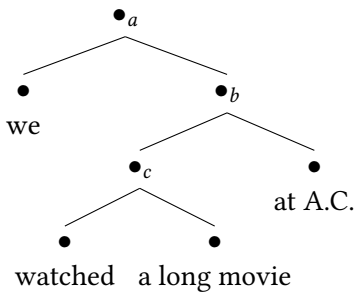
💬 Let's start practicing drawing syntactic trees. As a first step, identify the constituents of the sentence below, by applying constituency diagnostics, as we did in (8).

(7) We watched a long movie at Amherst Cinema.

Topicalization in (8a) indicates that [*watch a long movie at Amherst Cinema*] is a constituent. It corresponds to the node $\bullet_b$ in (9).[3] (8b) shows that a smaller portion of this string can also be topicalized, indicating that [*watch a long movie*] is also a constituent. It corresponds to the node $\bullet_c$ in (9). Pronominalization is employed in (8c) and it allows us to conclude that [*a long movie*] is a constituent. Finally, the same diagnostic is recruited in (8d), showing that the prepositional phrase in [*watch a long movie at Amherst Cinema*] (i.e. [*at Amherst Cinema*]) is also a constituent. Naturally, the whole sentence is also a constituent. It is labeled as $\bullet_a$ in (9). The subject of this sentence is a pronoun (viz. *we*), so under the assumption that pronouns are constituents, it occupies its own node as well. In fact, this assumption underlies the proform substitution test from the first part of this chapter—recall that proform substitution only yields a grammatical result if the string it substitutes is a constituent.

(8) We watched a long movie at Amherst Cinema.
   a. [Watch a long movie at Amherst Cinema], we did __.
   b. [Watch a long movie], we did __ at Amherst Cinema.
   c. We watched **it** [= a long movie] at Amherst Cinema.
   d. We watched a long movie **there** [= at Amherst Cinema].

(9)

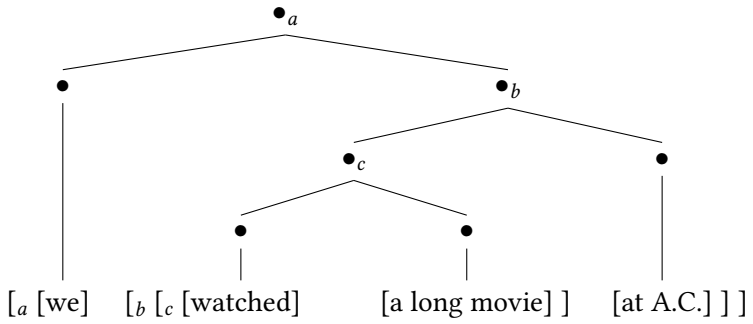


The hierarchical structure in (9) can be translated into bracket notation, as we see at the bottom of (10). The topmost node $\bullet_a$ in (9) corresponds to the outermost brackets with the same label. In the next level, $\bullet_b$ corresponds to [$_b$ *watched a long movie at Amherst Cinema*]. Finally, $\bullet_c$ is dominated by $\bullet_b$, so [$_c$ *watched a long movie*] is also enclosed by the *b* brackets. Each bottom-most node in (9) (viz.

[3] $\bullet_b$ dominates the past form of the verb *watched*, while the constituency tests used the bare, uninflected form *watch* (i.e. a form without tense or agreement). This is just a property of English, which "drags" inflection onto a dummy auxiliary *do* in certain constructions.

watched, *a long*, and *at Amherst Cinema*) corresponds to a bracketed constituent in (10).

(10)

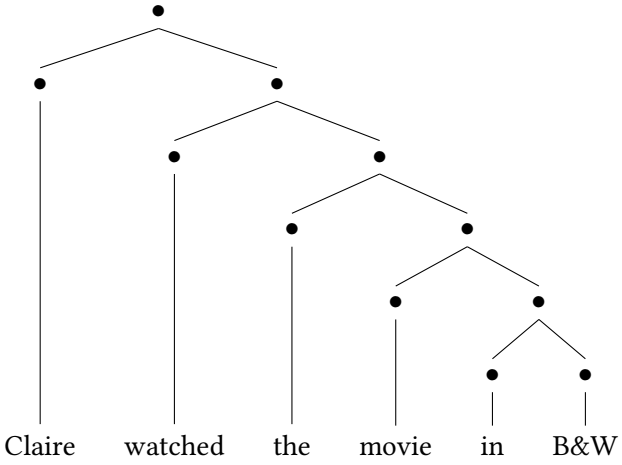


In the next section, we will make the hierarchical structures we drew so far in this chapter more precise by providing a label to the •, which we have been using so far as placeholders to refer to syntactic nodes.

Exercise

Convert the tree representation below into bracket representation. You may find it useful to label the different instances of •.

(11) Claire watched the movie in black and white.



3.3 Categories and nodes

Now that we know how to represent the hierarchical structure of a sentence, we can supply a more explicit identity to the '•' used provisionally in the nodes. Specifically, each node in a syntactic tree is labeled with an appropriate **grammatical category**. Grammatical categories are also sometimes referred to as 'parts of speech.'

Some common grammatical categories are listed in (12). The list includes the type of constituent or **phrase** that each category yields, e.g. a verb yields a verb phrase VP, a noun yields a nominal phrase NP, etc.

(12)

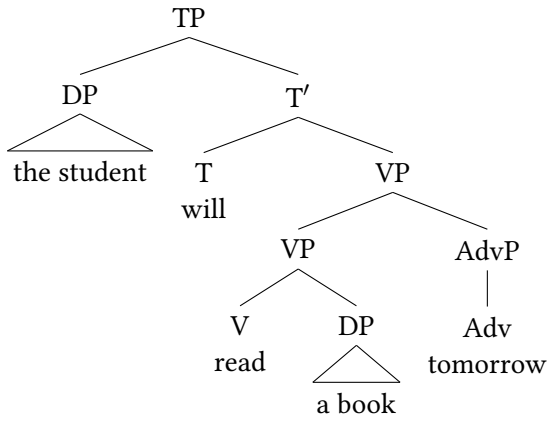
a.	verb	→	VP	'verb phrase'
b.	noun	→	NP	'nominal phrase'
c.	adjective	→	AP	'adjectival phrase'
d.	preposition	→	PP	'prepositional phrase'
e.	adverb	→	AdvP	'adverbial phrase'
f.	auxiliary	→	AuxP	'auxiliary phrase'
g.	tense	→	TP	'tense phrase'
h.	determiner	→	DP	'determiner phrase'
i.	complementizer	→	CP	'complementizer phrase'

Each category *K* yields a phrase of the same category *K*, i.e. a *K*P.

The category that is appropriate for a given node depends on the properties of the element occupying that node. For example, in our preliminary structure (3), *read* is a verb, so the • right above it should be replaced with 'V.' *Tomorrow*, in turn, is an adverb, so that the • right above should be replaced with 'Adv.' In the next sections, we will discuss each category in turn.

As a preview, using the categories above in (3) to label the • nodes in this representation, we arrive at the structure in (13). Triangles are used to represent an abbreviated structure. In (13), the internal representation of the DPs *the student* and *a book* is abbreviated. As mentioned, nominal structure is the topic of §3.7.

(13)



The subsequent sections are dedicated to the rules responsible for building structures like (13). They are the backbone of syntactic theory, since they represent how sentences are hierarchical structures—despite the fact that they are realized as a linear string. Additionally, they represent the grammatical category of each node, as well as how nodes merge with each other in order to form a complex configuration.

3.4 X-Bar Theory

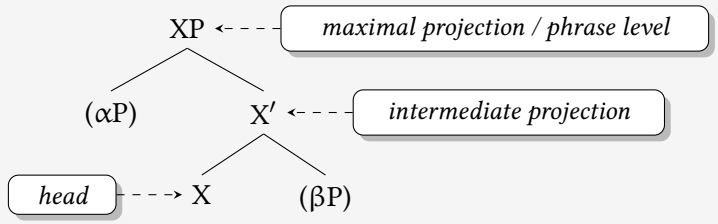
The Universal Grammar that underlies our knowledge of language is divided into a series of subcomponents, each responsible for some property that characterizes a sentence. The next chapters in this textbook are dedicated to a particular subcomponent of Universal Grammar. The present section deals with **X-Bar Theory**,

the subcomponent responsible for the internal organization of each node in a syntactic structure.

According to X-Bar Theory, any category X can combine with some phrase or constituent βP, forming a **level of projection** of the same category X. The result of the complex structure thus formed can then combine with another phrase or constituent αP, forming another level of projection with the same category X. When some X combines with both a βP and, subsequently, an αP, the level of projection formed by combining X and βP is called an **intermediate projection** and the level of projection created by combining this level with αP is called **maximal projection**. X itself is called a **head**,[4] since it heads the XP formed by the above-mentioned steps.

Definition 6

(14)



X is a variable that stands for *any* grammatical category in (12). The intermediate projection X' is also called 'X-bar,' which the subcomponent is named after.

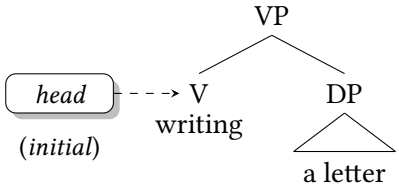
The *head* referred to here is head discussed in chapter 1, regarding the parameter that determines whether a language is head-initial like English or head-final like Adyghe. For instance, focusing on a verbal head, the data repeated in (15a–15b) indicate that English is a head-initial language, while Adyghe is a head-final language.

(15) a. The boy is writing a letter. (*English: head-initial*)

b. ç̆'ale-m pisme-r jetxə (*Adyghe: head-final*)
boy-ERG letter-ABS is.writing
'The boy is writing a letter.'

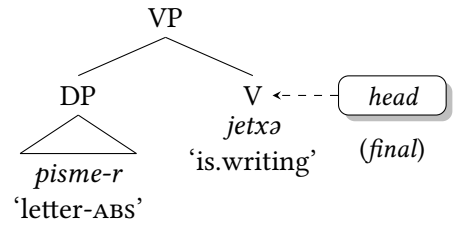
The VPs in (15a–15b) can be schematized as (16a–16b), respectively.

(16) a.



[4] The head may be represented as X^0.

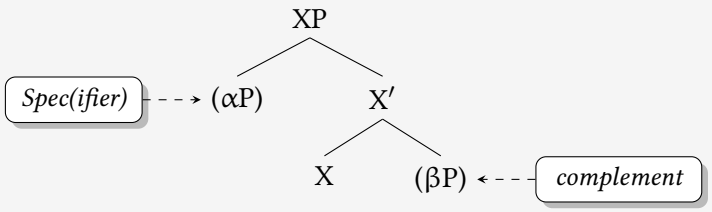
b.



The phrases βP and αP which *X* combines with also have particular names. The first phrase that *X* merges with is its **complement**. The phrase that merges with an intermediate projection and which is dominates by a maximal projection is the **specifier**. The latter is often abbreviated as 'Spec.'

Definition 7

(17)



a. **Complement**: the constituent that a head X merges with.
b. **Specifier**: a constituent that is sister to an intermediate projection X′ and which is dominated by the maximal projection XP.[5]

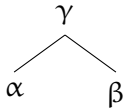
The operation responsible for combining X with some phrase is called **Merge**.

Definition 8

(18) a. **Merge** is a syntactic operation that applies to two elements α and β, forming a new element, γ. γ immediately dominates α and β.
b. γ *immediately dominates* α and β *iff* there is one single descending line connecting γ to α and one single descending line connecting γ to β and, furthermore, there is no node *e* that γ dominates and which dominates α or β.

Schematically:

(19) *Merge*(α, β) ⟶



[5] What it means to be a **sister** will be formalized in chapter 6. Intuitively, the nodes α and β are sisters when they are directly side-by-side, at the same level—α and β are at the same level when they are descendants (more precisely, daughters) of the same node above them.

In this notation, the elements in the parentheses that immediately follows *Merge* serve as the input to this operation. In (19), α and β are the input of *Merge*. Additionally, to the right of the arrow is the output of this operation—in (19), the output of *Merge* is the hierarchical structure γ.

Merge is, furthermore, a **recursive** operation. To understand what recursion is, we can consider a mathematical operation such as sum. This operation is recursive because the result of summing up two numbers can be summed up with another number. Using the same notation as that in (19), the operation *Sum* can be represented as follows:

(20) a. $Sum(A, B) = \alpha$
b. $Sum(\alpha, C) = Sum(Sum(A, B), C)$

Call 'α' the result of summing up A and B (20a). α can then be used as the input to another application of the operation *Sum*—e.g. α is added to C (20b). Concretely, suppose A, B, and C in (20) are 1, 2, and 3, respectively. The result of recursively applying *Sum* is, then, as follows:

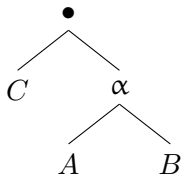
(21) a. $Sum(1, 2) = \alpha$
b. $Sum(\alpha, 3) = Sum(Sum(1, 2), 3) = 6$

Being a recursive operation, the output of an application of Merge can also be the input of another iteration of the same operation Merge:

(22) a. $Merge(A, B) = \alpha$
b. $Merge(\alpha, C) = Merge(Merge(A, B), C)$

Schematically:

(23)

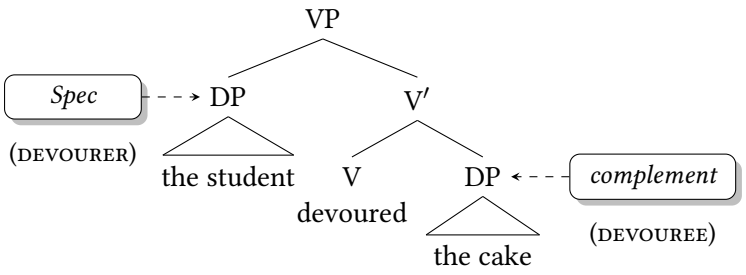


Merge creates a complex structure out of the elements in its input (see (19)). The fact that it is a recursive operation allows for the nodes put together by Merge to be themselves complex structures (e.g. α in (23)). In other words, the application of recursive Merge is how the grammar of natural languages builds sentences, understood as a hierarchical configuration.

The complement and Spec of some head X are required by X. For instance, consider a transitive verb such as *devour*. It requires the presence of both an object (i.e. the thing that is devoured) and a subject (i.e. the devourer). As we are going to see in the next chapter, the object is merged in the complement position of V, while the subject is merged in its Spec position.[6]

[6]Provisionally, however, subjects are merged in the Spec position of TP, as we will see §3.5.

(24)



The requirements imposed by some head X may vary. For instance, a head may require a complement, but not a Spec, or vice-versa. These are all the logical possibilities:[7]

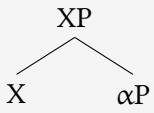
❶ X does not require either a complement or a specifier.
❷ X requires a complement only.
❸ X requires a specifier only.
❹ X requires both a complement and a specifier.

These possibilities result in the following possible structures for an XP:

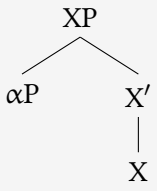
DEFINITION 9

❶ X does not require either a complement or a specifier.

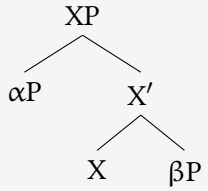
❷ X requires a complement only.



❸ X requires a specifier only.



❹ X requires both a complement and a specifier.



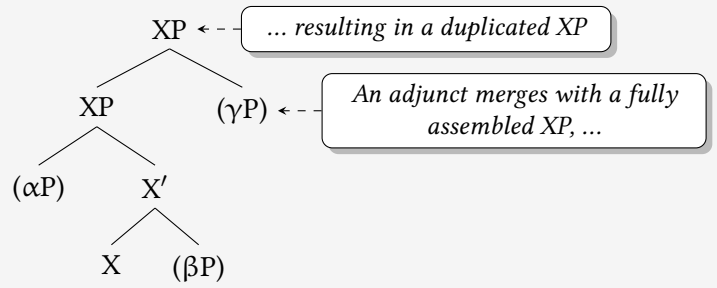
As we can infer from these diagrams, the only levels that must be projected are the head (X) and the maximal projection (XP). The intermediate projection X′ only occurs if a Spec is required by X—and X′ can dominate a complement or not.

Besides merging with a *required* complement or Spec, some category X can also merge with *optional* elements. Phrases that X can but does not have to merge with are called **adjuncts**. In order for an adjunct to be incorporated into a structure, first X merges with its complement and Spec (if any). The maximal projection XP thus formed then merges with the adjunct, forming another XP projection

[7] For now, it suffices to survey the space of possibilities afforded by X-Bar Theory. In chapters 4 and 5, we will see an instance of each logically possible structure in DEFINITION 9 when X = V.

Definition 10

(25)

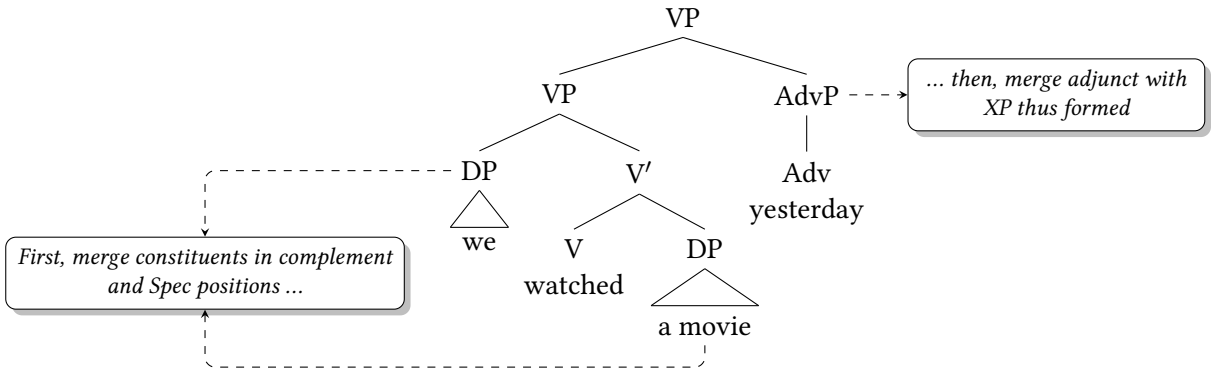


Adjuncts are always optional and, in principle, there could be an infinite number of them. Textbook examples of adjuncts are adverbs and adjectives, which optionally modify verbs or adjectives and nouns, respectively. In (26), the adjectives *long* and *beautiful* can optionally merge with the noun *movie*, while the adverb *yesterday* can optionally modify the event of watching a movie.

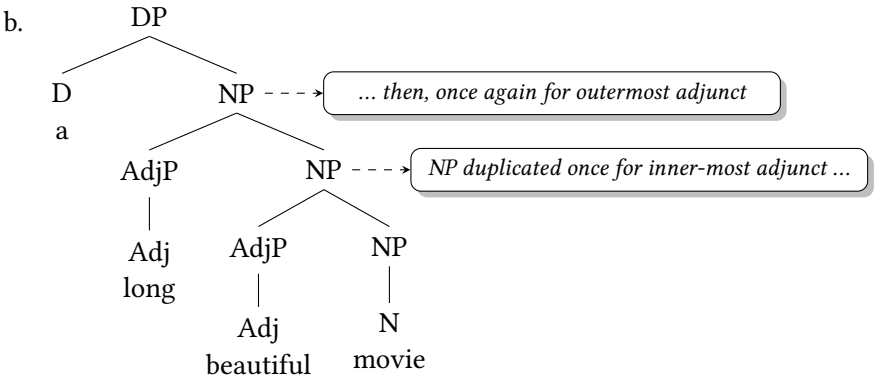
(26) We watched a (long) (beautiful) movie (yesterday).

(27a) and (27b) represent the adjuncts in (26). There are three instances of the maximal projection NP in (27b): the bottom-most one if projected from *movie*, which does not merge with either a complement or a Spec. This NP then merges with the adjective *beautiful*, forming the NP in the middle. Finally, the latter merges with *long*, yielding the topmost NP.

(27) a.



b.



An XP has to be duplicated as many times as there are adjuncts. This can be stated in terms of the application of Merge operations:

(28) *Merge*(long, *Merge*(beautiful, movie))

In the next sections, we will examine particular types of XPs, so that we are finally to represent a full sentence, previewed in (13).

3.4.1 Interim conclusion

X-Bar Theory is a subcomponent of the Universal Grammar which uniformly regulates the internal structure of XPs of any category. Because it is part of the Universal Grammar, it does not have to be learned. Furthermore, it is a general rule for how phrases of any category are built (as embodied by the use of the variable *X* in the name of the component): even though, e.g. verbs, prepositions, and nouns are arguably different categories, they all project a phrase (VP, PP, and NP, respectively) following the same rules, viz. Definition 6, Definition 7, Definition 9, and Definition 10. This is one of the reasons why our knowledge of language is creative—with creativity understood as the fact that we are able to utter and interpret sentences that we have never encountered before: combined with the recursiveness of Merge, the grammar of any natural language is equipped with a powerful computational system that allows for the generation of an unlimited number of sentences.

3.5 Clause structure: TP, AuxP, and VP

We will start with sentences with a transitive verb and discuss other types of predicates (e.g. adjectives) and other types of verbs (e.g. intransitives and ditransitives) in chapters 4 and 5.

A clause is projected from tense, which forms a TP (i.e. a *Tense Phrase*). The reason is that, without tense, a clause cannot be used as a standalone sentence. In English, a tensed clause can be morphologically identified by tense affixes (e.g. the past suffix *–ed* in *walked*). In the present tense, agreement morphology appears as well (e.g. *walk–s*). While English is not morphologically rich, we can clearly see differences in the morphological forms of the verb *be* in (29). In two sentences in (29a), *be* is inflected for present (viz. *is* and *are*) and past tense (viz. *was* and *were*). Furthermore, the choice of form depends on whether the subject is singular (viz. *the defendant*) or plural (viz. *the defendants*). (29b) indicates that the clause in brackets in (29a) with the aforementioned morphological variation in the form of *be* can be used as a standalone clause.

(29) **Tensed clause**

a. Moussa said [the defendant {is/was} guilty].
   Moussa said [the defendants {are/were} guilty].

b. [The defendants {is/was} guilty].
   [The defendants {are/were} guilty].

Clauses can also be tenseless. An example of tenseless clause is an infinitival clause, which, in English, is identifiable by the uninflected form of the verb and the presence of the *to*. This is seen in (30a), where *be* remains unchanged, irrespective of whether its subject is singular or plural. In both sentences in (30a), *be* is also preceded by the infinitival *to*. Unlike what happens in (29), a tenseless clause cannot be used as a standalone sentence—see the ungrammatical sentences in (30b).

(30) **Tenseless clause**

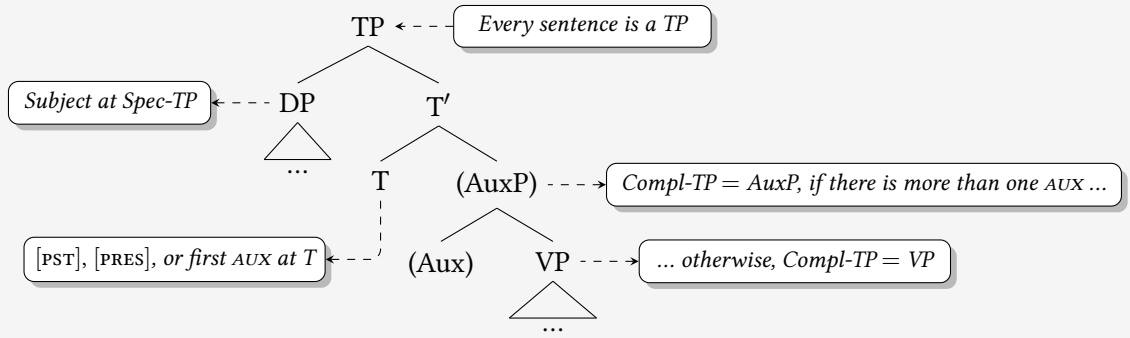
a. Moussa proved [the defendant to be guilty].
   Moussa proved [the defendants to be guilty].

b. * [The defendant to be guilty].
   * [The defendants to be guilty].

The well-formedness of the sentences in (29b) contrasts with the ill-formedness of the sentences in (30b), leading us to the conclusion that tense is necessary for a sentence. Assuming that tense is a grammatical category, by X-Bar Theory, it can project its own phrasal level TP. A sentence is, thus, a TP.

Now that we established that a sentence is a TP, we can examine its internal structure. The head of TP is occupied by the tense of the sentence (i.e. [PRES] 'present' or [PST] 'past'). If there is an auxiliary (viz. *be* and *have*) or modal verb (e.g. *will*, *have*, *can*, *might*, etc), T is occupied by it. The Spec position of TP is occupied by the subject of the sentence. Finally, the complement position of TP is occupied by a VP (i.e. a Verb Phrase).[8]

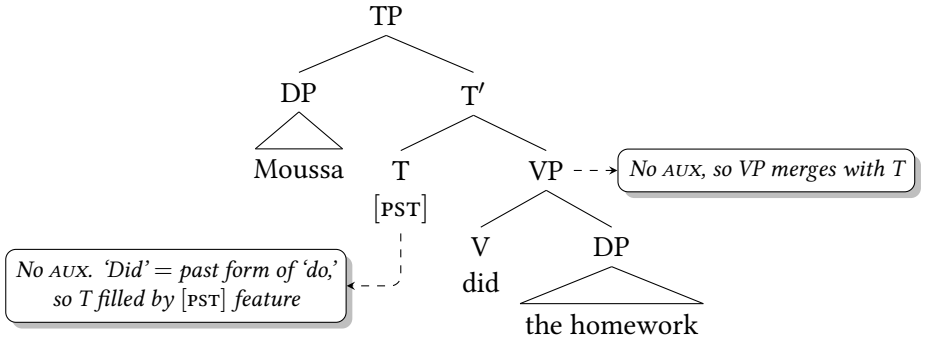
(31)



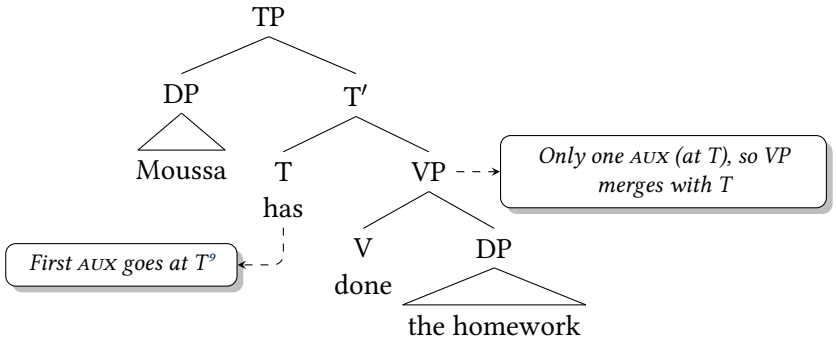
Let's now flesh out the schema in (31) with actual sentences. (32a–32b) are identical sentences, except that, in the former, the verb is in the past tense, while, in the latter, present perfect is used. In both sentences, the subject *Moussa* occupies the Spec of TP and VP is the complement of T. The feature [PST] occupies the head position T in (32a), while the auxiliary *has* occupies the same position in (32b). Furthermore, in the latter, the verb in V occurs in participial form, as required by the present perfect auxiliary *have*.

[8] In (31), 'AUX' is a mnemonic that stands for both auxiliaries and modals.

(32) a. Moussa did the homework.

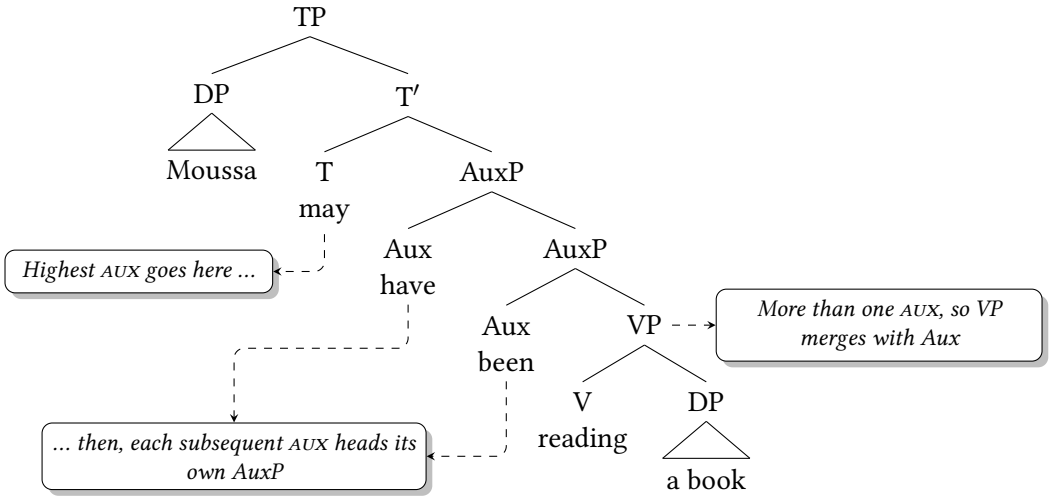


b. Moussa has done the homework.



Auxiliaries in English can be stacked. In this case, the highest one goes at the head of TP and the subsequent auxiliaries head AuxP's. In (33), the verb is the modal *may*, which is inserted at T. The auxiliaries following it (viz. *have* and *been*) each head its own AuxP. The verb (viz. *read*) heads the VP that is the complement of the right-most auxiliary. Analogously to (32b), the verb in (33) occurs in the gerund form, as required by the *be* auxiliary it is a complement of.

(33) Moussa may have been reading a book.



The VP that is the complement of a T or an Aux is projected from the main verb of the clause, i.e. the verb that carries lexical meaning. A lexical verb may

have at least one object (though this is not always the case, as we will see in the next chapters).

How TP and AuxP are filled out can be summarized as follows:

(34) a. AUX in (31) stands for auxiliaries and modals.
- English auxiliaries: *be*, *have*
- English modals: *will*, *would*, *can*, *could*, *may*, *might*, *should*, *must*, ...

b. If there is no AUX and the verb is simply inflected in the present or past tense, then T is filled with the abstract features [PRES] or [PST], respectively.

c. If there is exactly one AUX, it goes at T and T merges directly with a VP.

d. If there is more than one AUX, the first (i.e. the leftmost) one goes at T, then each remaining instance of AUX heads its own AuxP. In this case, T merges with an AuxP. Then, the last (i.e. rightmost) AUX merges with VP.

To ensure the structure of the TP is well understood, complete the exercise below before reading through the chapter.

EXERCISE

Using the trees above as models, draw a diagram for each of the sentences below:

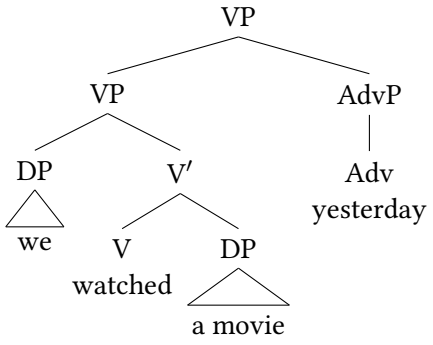
(35) a. Diana likes the story.
b. Diana will like the story.
c. Diana have liked the story.

For now, assume that *Diana* and *the story* are DPs (i.e. Determiner Phrases) and abbreviate their internal structure with a triangle.

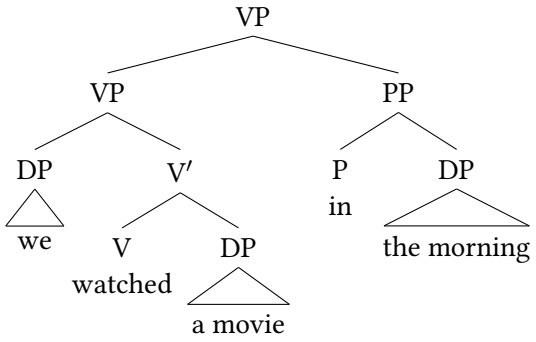
3.5.1 VP ADJUNCTS

As mentioned before, there can be any number of adjuncts adjoined to an XP such as a VP. Besides AdvPs (see (27a), repeated below as (36a)), Prepositional Phrases (PPs) can be VP adjuncts too (36b).

(36) a.



b.



Notice that the preposition *in* in (36b) projects a structure that abides by the general X-Bar schema afforded by the Universal Grammar: it merges with a DP in the complement position, yielding a PP.

Exercise

Based on (36a–36b), draw a VP where both adjuncts are combined:

(37) [$_{VP}$ we watched a movie yesterday in the morning]

The goal of this exercise is to practice drawing when multiple constituents are adjoined to the same XP. We do not have to be concerned with the structure of a whole TP.

Listed below are some typical VP adjuncts:

(38) a. *Quickly*, *yesterday*, *tomorrow*, *early*, *lately*, *unambiguously*, …
b. *With binoculars*, *in the morning*, *on Friday*, *during the lecture*, *with a sleight of hand*, *in the school*, *at school*, *after the lecture*, …

Exercise

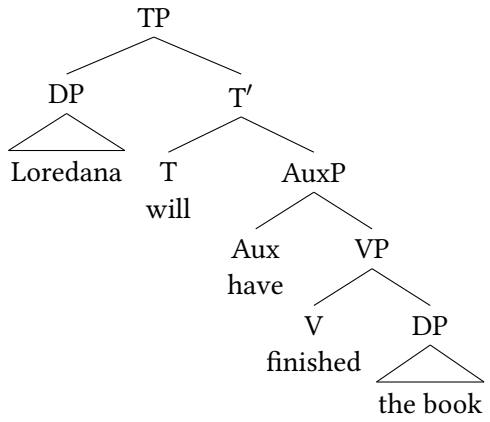
Draw trees for the sentences below. Abbreviate the structure of the subject and object with a triangle with the category Determiner Phrase (DP)—we will investigate the internal structure of nominals shortly.

(39) a. Loredana will have finished the book.
b. Seb sings in the choir.

In the choir is an adjunct to the VP in (39b)—it can be omitted without causing the sentence to become ungrammatical: *Seb sings. In the choir* is a PP whose head is *in*. *The choir* is a DP in the complement position of this PP.

The tree representation for (39a) is as follows:

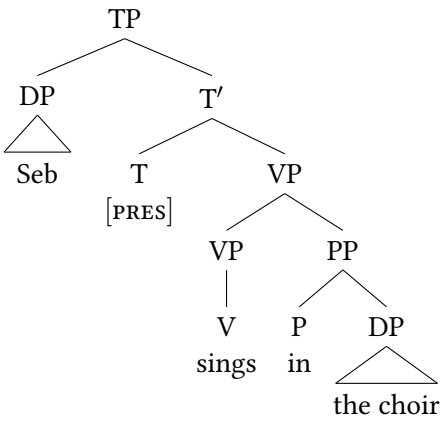
(40)



In this sentence, the auxiliaries *will* and *have* are stacked. The highest one (viz. *will*) is merged as the head of T and the auxiliary following it (viz. *have*) is merged as the head of an AuxP that T takes as a complement. The verb occurs in the participial form *finished*, as required by the present perfect auxiliary *have*. *Have* itself has to occur in a bare or uninflected form, since this is a requirement imposed by *will* (cf. *Loredana* ***reads*** *books for a living* and *Loredana will* ***read*** *books for a living*).

(39b), in turn, corresponds to the following syntactic tree:

(41)



In this sentence, there is no auxiliary, so [PRES] is represented at T. Unlike *finish* in (39a), *sing* in (39b) does not have a complement. The VP in this case is duplicated due to the presence of the adjunct *in the choir*.

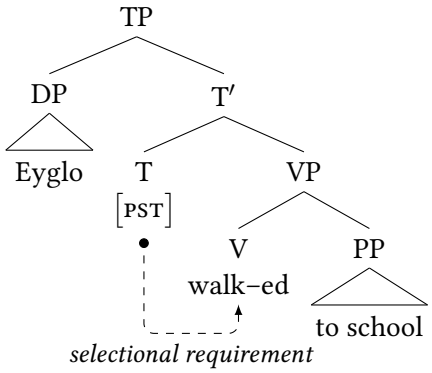
3.5.2 Verbal affixes and selectional requirements

Before we continue, a comment is in order regarding the representation of (English) verbs and verbal affixes. English has verbal affixes such *–ed* for [PST] and *–s* for [PRES 3SG]:

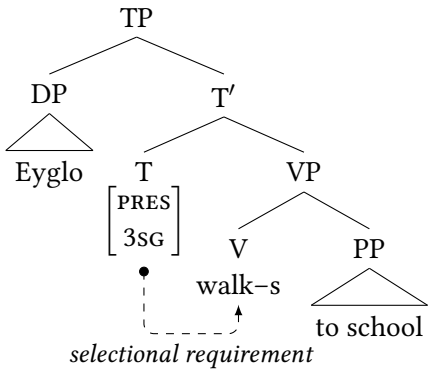
(42) a. Eyglo walk–ed to school.
b. Eyglo walk–s to school.

Tense, according to our theory so far, is represented at T. However, the verb is represented at the head of a VP, bearing the verbal suffix that encodes tense.

(43) a.

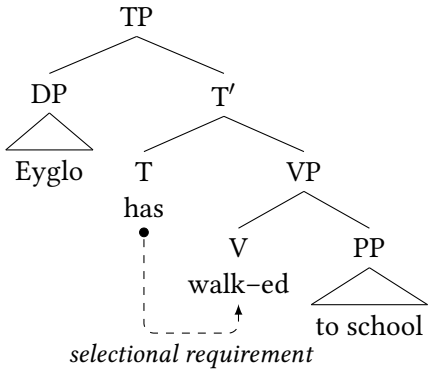


b.

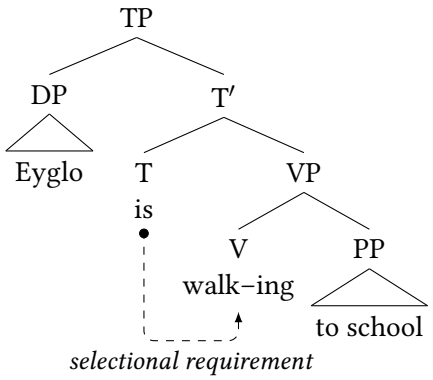


If the verb already has a tense suffix in (43a–43b), is it redundant to represent tense (viz. [PST] and [PRES] in (43a–43b)) at T as well? In a future chapter about case and agreement, tense (as well as agreement) will be represented at T only, and then an operation called Amalgamation will put together the tense suffix at T with the verb at the head of the VP. For the moment, we will assume that T imposes a **selectional requirement** on the AuxP or VP that is its complement. For instance, a [PST] selects a VP headed by a verb in the past form (43a), while a [PRES] selects a VP headed by a verb in the present form. This requirement is more general. As mentioned above, if T is headed not by a tense future, but by an auxiliary, that auxiliary imposes restrictions in its complement too:

(44) a.



b.



The auxiliary *have* requires a participial form (44a), while the auxiliary *be* requires a progressive or gerund form (44b).

3.5.3 Sentence vs. clause

We concluded above that sentences must project a TP (see the discussion surrounding (29–30)) that sentences are TPs.

Sentences can be *monoclausal* or *biclausal*. A sentence is monoclausal if it contains only one clause, which is identifiable by a predicate like a verb such as *finish* in (45). In this sentence, the auxiliaries *will* and *have* are also present, but they are not lexical verbs: it is the verb which denotes the event that this sentence depicts (i.e. an event of finishing the book). The auxiliaries only express temporal and aspectual information (e.g. information about when the event expressed in the sentence).

(45) Loredana will have **finished** the book.

A sentence is biclausal if contains two predicates—more generally, a sentence can be *multiclausal*. In (45), for instance, *finish* merges with a nominal expression as its complement. In (46a), the verb *say* is part of a clause, but it merges with another clause as its complement (instead of merging with a nominal expression). The latter clause is identifiable by its own predicate, viz. *finish*. In (46b), the adjective *surprising* is predicated of the clause between brackets (cf. *The announcement was surprising*, where this adjective is predicated of a nominal expression). Finally, (46c) is similar to (46a), in that a verb belonging to a clause merges with another clause as its complement. However, the verb in the selected clause in (46a) is tensed (cf. (29)), while that in (46c) is tenseless (cf. (30)).

(46) a. Seb *said* [that Loredana will have **finished** the book].
b. [That Loredana will have **finished** the book] was *surprising*.
c. Seb *believed* [Loredana to have **finished** the book].

In each example in (46), the whole string is a sentence, which is composed of two clauses. This means that every sentence is a clause, but not every clause is a sentence.

Biclausal sentences can be divided into a **matrix** and an **embedded** clause. A matrix or main clause is the encapsulating clause projected from the predicate that selects another clause and its Spec or complement. The selected clause is an embedded or subordinate clause. In the sentence (47), the matrix and embedded clause can be identified as follows:

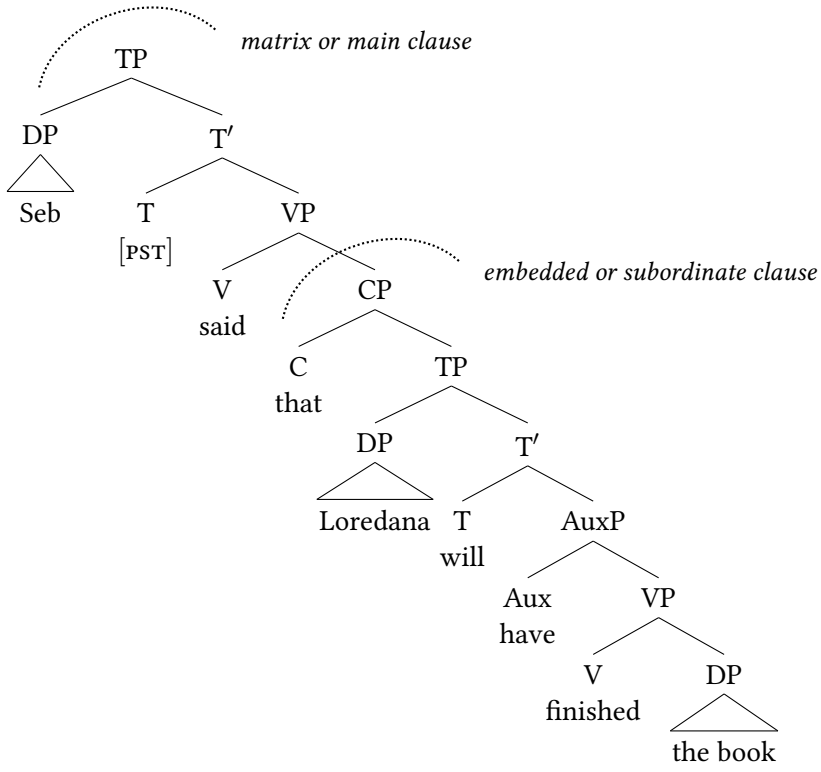
(47) [Seb said]$_{matrix}$ [that Loredana will have **finished** the book]$_{embedded}$].

The matrix clause is projected from the verb *say*, which, as mentioned, can merge with a clause as its complement. The latter is, thus, an embedded clause, which is headed by *finish*.

Propose a structure for the sentence in (47), assuming that the subordinate or embedded clause is a Complementizer Phrase (CP) whose head is the complementizer *that*. *That*, in turn, takes a TP as its complement.

The tree representation of (47) is as follows:

(48)



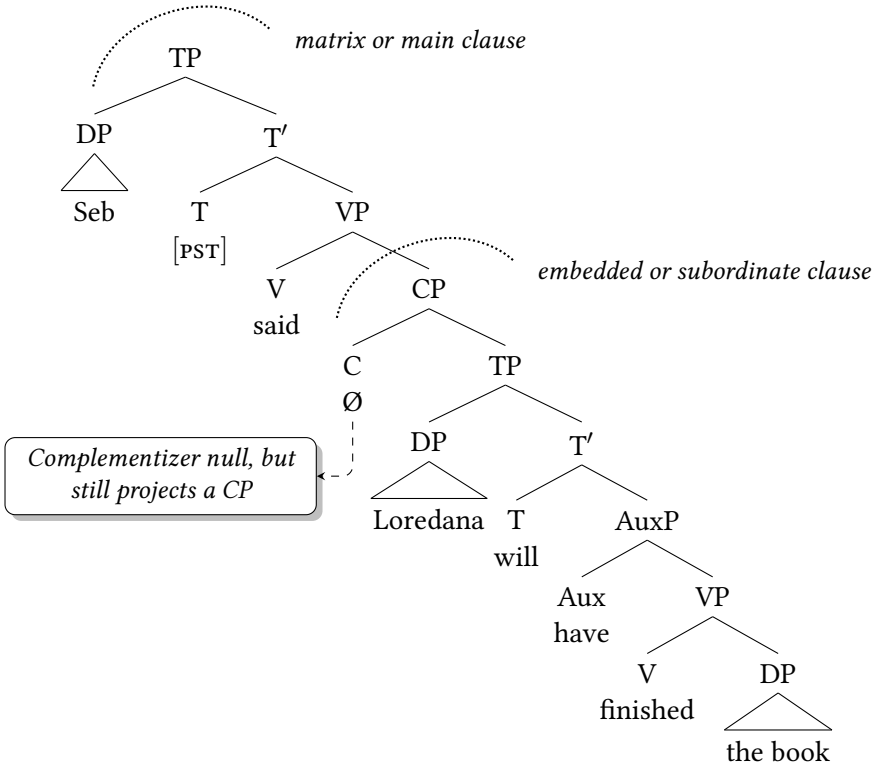
In English, the complementizer *that* is not always present in a sentence. Nonetheless, a CP is still projected:[10, 11]

[10] 'Ø' in (49) denotes a phonologically null complementizer.

[11] It is not always the case that the complementizer *that* has a null counterpart, e.g.:

(i) a. [*(That) Mary came] is surprising.
b. The regulations require [*(that) taxes be filed on time].

(49) [Seb *said* [Ø Loredana will have **finished** the book]]. (cf. (47))



Exercise

Draw a diagram for each of the sentences below:

(50) a. Jeynaba committed a crime.
b. I believe Jeynaba.
c. I believe (that) Jeynaba committed a crime.

Having examined how X-Bar Theory determines the internal organization of a clause, in §3.7, we turn to the internal structure of the DPs that are merged in the subject position of a sentence (viz. Spec–TP) or the complement position of a V. Before that, though, a note is in order regarding the position of heads relative to their complements.

3.6 The head position parameter

In §1.1.2, we saw that languages can be parameterized with respect to the position of their heads. This parameter refers to heads in general and not just verbs, which is the only type of head we used to illustrate the Parameter then. As such, all heads in a given language (e.g. T, V, and P) have to follow the head-initiality of head-finality that this language is parameterized for.

English is an example of a head-initial language. Indeed, in all the diagrams

drawn above, all heads X are to the left of the complement they merge with. Take (49), for instance, the T heads are to the left of the VP or AuxP that occupy their respective complement positions. Likewise, the V heads are to the left of the CP or DP that occupy their respective complement positions. The same can be said of the C head, which is to the left of its TP complement. In (41), the preposition *in* is also to the left of its DP complement.

Draw trees for the English and Mongolian sentences below, taking into account the Parameter that determines the position of heads with respect to their complements.

(51) a. Bat read this book. *English: head-initial*

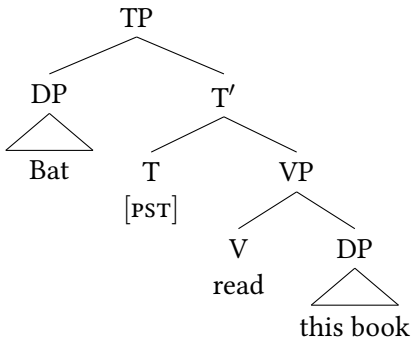
b. Bat ene nomiig unshsan. *Mongolian: head-final*
Bat this book read.PST
'Bat read this book.'

Because Mongolian is a head-final language, the complement of the verb will have to be to the left of that head. Furthermore, T is also a head, so its position has to follow the same head-final pattern.

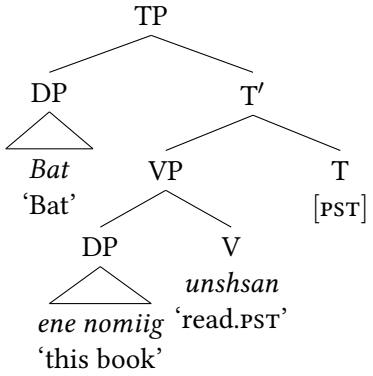
Assume that everything else is identical between the English and the Mongolian sentences.

The head-initial English sentence (51a) is represented in (52a) and the head-final Mongolian sentence (51b) is represented in (52b).

(52) a.



b.



It is important to notice that, while (52a) and (52b) look superficially different, the **structural relationship** between the nodes is the same in both trees, irrespective of its head-initiality or its head-finality. Consider, for instance, the VP. In both (52a–52b), the verb in V (i.e. *read* and *unshsan*) and the DP that is its object (i.e. *this book* and *ene nomiig*, respectively) are sisters: they merge together, yielding a VP. This means that the two following instances of the application of the operation Merge are identical (in (53a–53b), 'OBJ' stands for whatever DP is *V*'s object):

(53) a. $Merge(V, \text{OBJ}) \rightarrow VP$ b. $Merge(\text{OBJ}, V) \rightarrow VP$

Whether OBJ is to the right or to the left of the verb, they always end up side-by-side, dominated by a projection of the latter (i.e. VP). In this sense, (53a–53b) are equivalent.

The equivalence between (53a–53b) is analogous to that between (54a–54b) below:

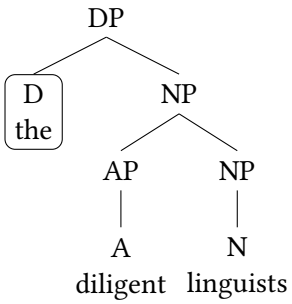
(54) a. $Sum(1, 2) \rightarrow 3$ b. $Sum(2, 1) \rightarrow 3$

The output of both (54a–54b) is 3, irrespective of the order of the numbers in the input of the *Sum* operation, in the same way that the output of both (53a–53b) is a VP, irrespective of the order between *V* and OBJ.

3.7 Nominal structure

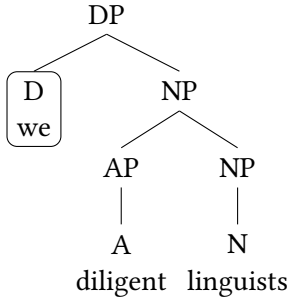
A nominal expression such as *the diligent linguists* is represented as in (55). 'DP' stands for *Determiner Phrase*. The term 'determiner' encompasses different types of articles like the definite article *the* and indefinite articles like *a* or *some*, as well as demonstratives like *this* and *that*. A DP can have a Nominal Phrase (NP) as its complement. The NP, in turn, can have an Adjectival Phrase (AP) as an adjunct—in (55), the NP level was duplicated in order for the adjunct to be merged into the structure (see (25)).

(55)

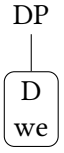


Pronouns are also considered to be determiners. The reason is that there are nominal phrases such as ***we*** *diligent linguists*, represented in (56) (cf. the virtually identical (55) above). A standalone pronoun is a DP without an NP complement, as represented in (57).

(56)



(57)



Every category projects its own structure, according to the rules dictated by X-Bar Theory. The same holds of adjectives like *diligent* in (55) and (56). This adjective does not merge with either a complement or a Spec, so it only projects a maximal projection, in this case, an AP (for 'Adjectival Phrase').

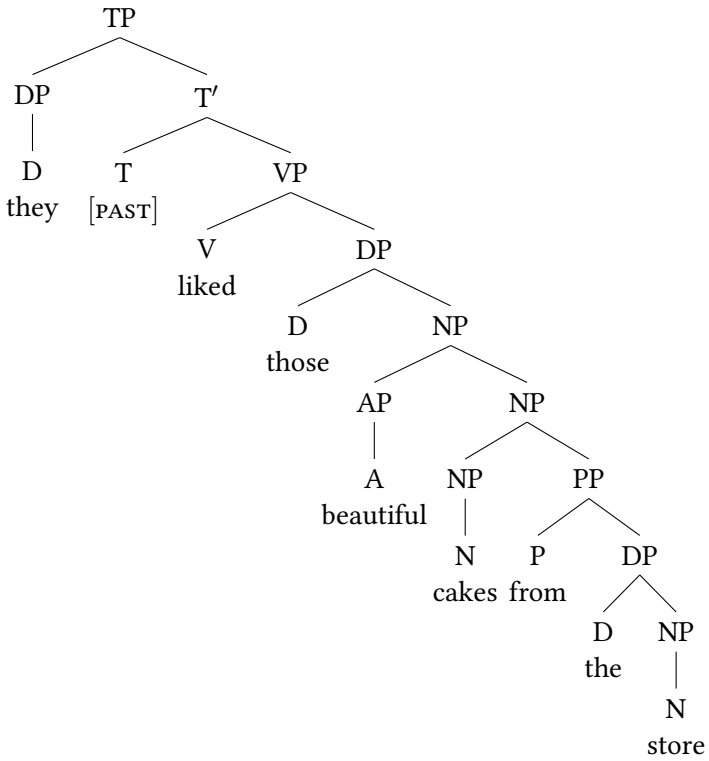
Draw a tree for the following sentence, now providing a representation for the internal structure of the subject and object too.

(58) They liked those beautiful cakes from the store.

NB: there are adjuncts on both sides of the NP *cakes*.

The tree representation of (58) is as follows:

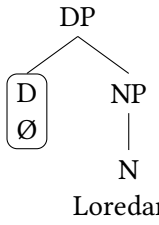
(59)



What happens to proper names like *Faatu* and *Loredana*? We will assume that they are also DPs, but one where the determiner is phonologically null, which is

represented with an empty set symbol 'Ø'. The proper name heads the NP that is the complement of the null DP:

(60)



Why would we think that proper names project a DP if the head of the latter is phonologically null? Why not just assume an NP that is not dominated by a DP? In languages like Brazilian Portuguese (61) and Shuswap (62), proper names can be preceded by an overt determiner:

(61) *Brazilian Portuguese* (Romance)

[$_{DP}$ A Loredana] vai ter terminado o livro.
the Loredana goes have finished the book
'Loredana will have finished the book.'

(62) *Shuswap* (Salish)

Wík-t-Ø-s [$_{DP}$ re John].
see-TRANS-3SG.OBJ-3SG.SUBJ DET John
'S/he saw John.'

Hence, crosslinguistically, assuming that a proper name is a DP is not implausible. Under this assumption, there is only a superficial difference between Brazilian Portuguese and Shuswap, on the one hand, and English, on the other: in the latter, there is a null counterpart of the overt determiner that we see in the former.

Additionally, pronouns and proper names can occur in the same position, i.e. they have the same distribution. For instance, both types of nominals can occur in the subject (63) or object (64) position or as the complement of a preposition (65).

(63) a. [$_{DP}$ She] will have finished the book.
b. [$_{DP}$ Ø Loredana] will have finished the book.

(64) a. I saw [$_{DP}$ her].
b. I saw [$_{DP}$ Ø Loredana].

(65) a. this book is about [$_{DP}$ her].
b. this book is about [$_{DP}$ Ø Loredana].

It is, thus, plausible that proper names have the same category, inasmuch as they have the same distribution and behavior. Since we analyzed pronouns as DPs (57), proper names must also be DPs.

In fact, even in a language like English proper names may be preceded by a determiner, as long as there is a modifier such as an adjective (e.g. *late* or *dear*) or a relative clause (RC):

(66) a. [the] late John Smith
b. [the] John Smith [$_{RC}$ that I know]
c. [my] dear John Smith

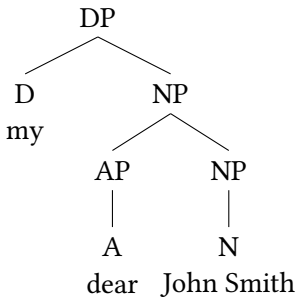
All these facts converge in providing support for the assumption that proper names project a DP, as represented in (60), even if the head of DP is not always pronounced.

Exercise

Provide a structure for the DPs in (66). Triangulate the relative clause in (66b) and simply label it simply as 'RC.'[12] Furthermore, assume that the possessive pronoun *my* in (66c) is the head of a DP and that it takes *dear John* as its complement.

(66) is provided below as a model:

(67)

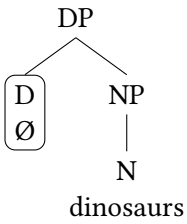


A null determiner can also be resorted to in English so-called bare plurals:

(68) a. **Dinosaurs** are extinct.
b. **Calculators** were invented in the 17th century.
c. Loredana adores {**books**, **puppies**, ...}.

A bare plural is represented as follows:

(69)



Finally, an observation is due regarding the form of pronouns. Underlying (66) is the assumption that *my* is a determiner occupying the head of a DP. It is, in fact, a possessive pronoun. Being a pronoun, it is a D that projects a DP, though, in this case, it merges with a complement (viz. *dear John Smith*). Pronouns can have different forms such as *she* in e.g. (63) or *her* in (64). There is a correlation between

[12] Unfortunately, this book does not provide an analysis of relative clauses.

the form of a pronoun and the position it occurs in: *my* in (66) is a possessive DP that merges with an NP, *she* in (63) occurs in the subject position, and *her* in (64) occurs in an object position. We will examine the nature of this correlation in a later chapter dedicated to case and agreement.

Below is a summary of the nominal structure rules surveyed above, with English examples of elements that occupy the possible positions inside a DP.

(70) a. Nominal expressions are DPs (i.e. Determiner Phrases).
b. Possible determiners:
- Definite article: *the*
- Indefinite article: *a*
- Demonstratives: *this*, *these*, *that*, *those*
- Null determiner for English proper names (e.g. [$_{DP}$ *Ø* [$_{NP}$ *Jeynaba*]])
- Null determines for English bare plurals (e.g. [$_{DP}$ *Ø* [$_{NP}$ *students*]])
- Possessive pronouns (e.g. [$_{DP}$ *my* [$_{NP}$ *students*]])

c. Compl-DP can be occupied by an NP, e.g. [$_{DP}$ *the* [$_{NP}$ *student*]].
d. Pronouns (e.g. *I*/*me* and *she*/*her*) are DPs without a complement (or Spec): [$_{DP}$ *she*].
e. The NP in Compl-DP can be modified by optional adjuncts.

Typical nominal adjuncts are adjectives and prepositional phrases:

(71) a. *blond*, *intelligent*, *curious*, *cunning*, *dear*, ...
b. *with dyed hair*, *in a pink shirt*, ...

Before we conclude this chapter, it is worth nothing that English has two instances of *that*, a complementizer that heads a CP (72a) and a demonstrative that heads a DP (72b).

(72) a. Seb said [$_{CP}$ **that** students will receive a prize].
b. Seb praised [$_{DP}$ **that** student].

Despite the phonological identity, there are several distributional and morphological differences between the complementizer *that* and the demonstrative *that*. First, we saw above that, in English, the complementizer *that* can, in certain circumstances, alternant with a null variant (73a). As we can see in (73b), this possibility is not available to a determiner.

(73) a. Seb said [$_{CP}$ students will receive a prize].
b. * Seb praised [$_{DP}$ student].

Second, the English demonstrative has different forms depending on proximity (e.g. *this book over here* vs. *that book over there*) and number (e.g. *this book* vs. *these books*). The complementizer *that*, on the other hand, is invariable. In (72a),

it is linearly followed by the plural noun *students*. In this case, this is a bare plural with a null DP head (see the structure in (69)). A demonstrative, on the other hand, must be plural if its NP complement is also plural:s

(74) Seb praised [$_{DP}$ {*__this__ / __these__} students].

Finally, the distinction between the complementizer *that* and the demonstrative *that* can be clearly seen when they co-occur in the same sentence, especially when they are linearly adjacent:

(75) Seb said [$_{CP}$ __that__ [$_{DP}$ __that__ student] will receive a prize].

Exercise

Draw trees for (72a) and (75). Describe the position that each occurrence of *that* occupies in these sentences.

3.8 Summary

Sentences are organized in terms of constituents. In other words, sentences have an internal hierarchical structure, with words that "belong together" forming a constituent. This hierarchical structure can be represented with syntactic trees, where each constituent corresponds to a node in that tree. Nodes can themselves be internally complex, being composed of smaller nodes. The component of the grammar responsible for regulating the internal structure of sentences is called *X-Bar Theory*.

Exercise

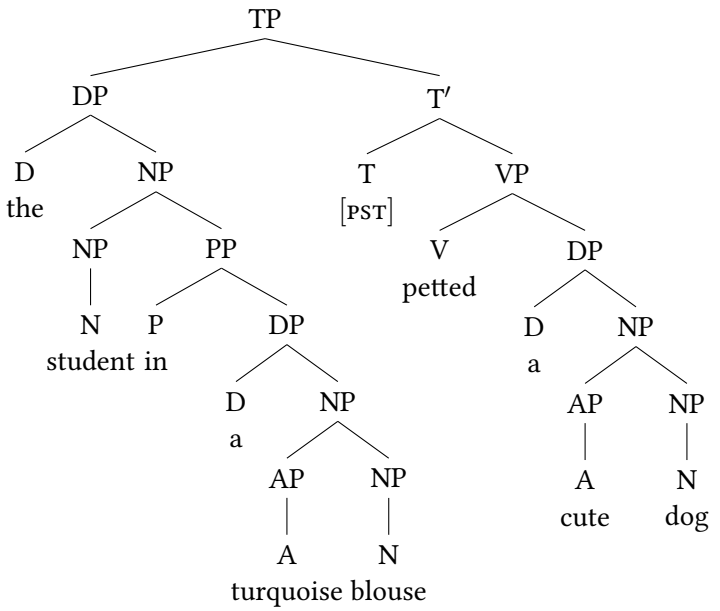
Draw a tree for each of the sentences below. Here and in the exercises to follow, *do not abbreviate the structure of DPs*.

(76) a. The student will read a book tomorrow.
b. The student in a turquoise blouse petted a cute dog.
c. Tasneem announced that her friend will buy the renovated house.

(76a) was previewed in (13). We can draw your own tree and then check your work against (13).

The tree representation for (76b) is provided below to be used a a model:

(77)



Exercise

We see in (38) and (71) that PPs can be modifiers to both NPs and VPs. With this in mind, we are finally in the position to draw structures for the sentence we started with, *Claire watched the movie with Ryan Reynolds*. Draw trees for this sentence, bearing in mind that it is structurally ambiguous.

PPs follow the same X-Bar theoretic schema that all other heads examined in this chapter do. Here, it is headed by *with*, which takes the proper name *Ryan Reynolds* as its complement.

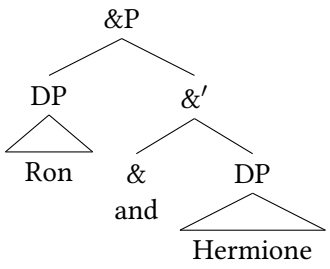
Exercise

Draw trees for the sentences below. If a sentence is structurally ambiguous, draw a tree for each of its readings.

(78) a. Claire went to the bank.
b. The enraged cow injured the farmer with an ax.
c. I saw tall trees.
d. Solfrid baked the cake in the freezer.
e. The teacher said that the students will eat a cake after the lecture.
f. The blond engineer and the tall historian published a book.
g. The professor said she would give an exam on Monday.

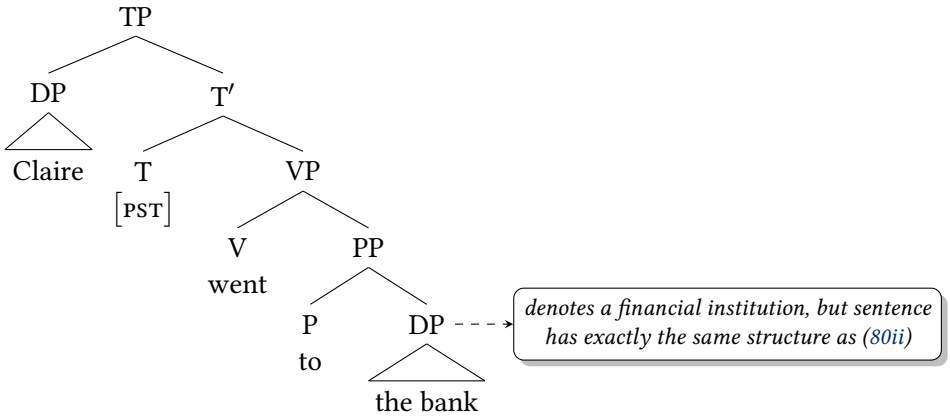
In (78f), assume that *and* heads a coordination phrase &P, whose Spec and complement positions are filled by the conjuncts it puts together:

(79) Ron and Hermione

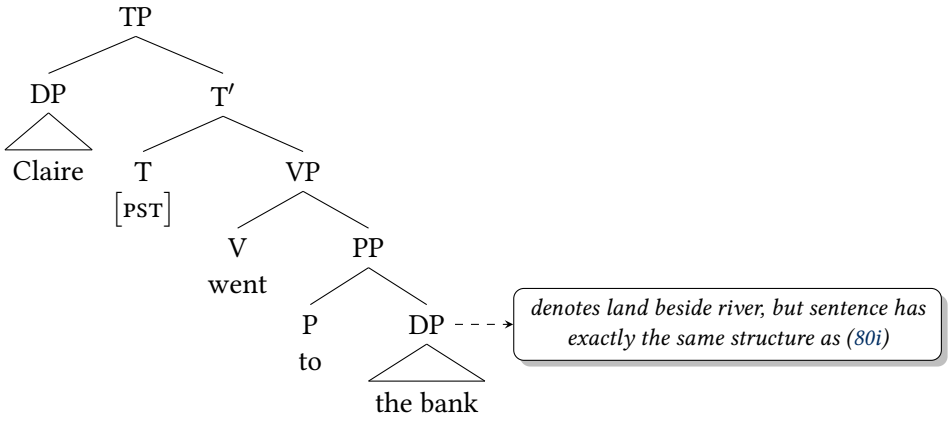


(78a) is drawn below to be used as a model. Recall from chapter 2 that this sentence is ambiguous because of homophony: there are two different words which happen to have the same phonological form *bank*, though each has a different denotation. Regardless of this difference, the structure of the sentence is the same:

(80) i. 'Claire went to a financial institution (e.g. to deposit a check).'



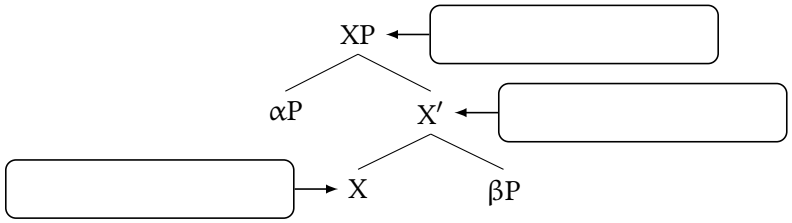
ii. 'Claire went to the bank alongside the river.'



3.8.1 Active retrieval

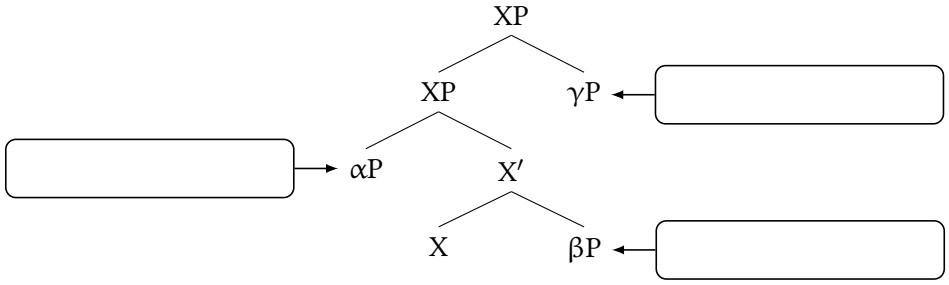
Label the different projections of some phrase XP:

(81)



Label the phrases that some projection of a head X merges with according to their position within X's projections:

(82)



Draw the basic skeleton of a sentence. Recall that it must start with a TP. What occupies Spec-TP? What are the possibilities for Compl-TP? What about Compl-VP?

Draw a tree for each of the nominal types we went over in §3.7:

(83)

a.	the student	*definite determiner*
b.	{this/that/these/those} student(s)	*demonstratives*
c.	Rizki	*proper name*
d.	books	*bare plural*
e.	they/them	*pronoun*
f.	their book	*possessive*

Appendix: when a constituency test fails

Recall from the X-Bar Theory chapter that, if we apply topicalization to an ambiguous sentence such as *Claire watched the movie with Ryan Reynolds*, we may be able to resolve the ambiguity:

(84) a. [The movie [with Ryan Reynolds]], Claire watched __.
'Claire watched the movie starring Ryan Reynolds.'
b. [The movie], Claire watched __ [with Ryan Reynolds].
'Claire watched the movie in Ryan Reynolds' company.'

However, what if we had decided to apply topicalization to *with Ryan Reynolds* instead?

What is the result of the test? What are the possible readings?

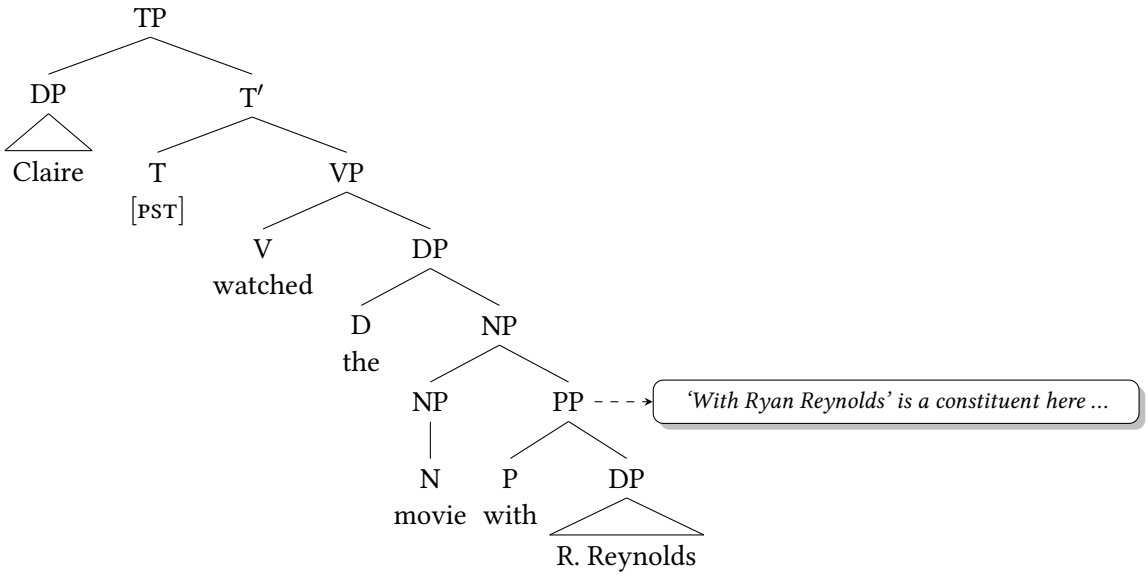
The sentence is no longer ambiguous—only the 'in Ryan Reynolds' company' reading is available:

(85) a. ✗ [With Ryan Reynolds], Claire watched [the movie __].
'Claire watched the movie starring Ryan Reynolds.'
b. ✓ [With Ryan Reynolds], Claire watched [the movie] __.
'Claire watched the movie in Ryan Reynolds' company.'

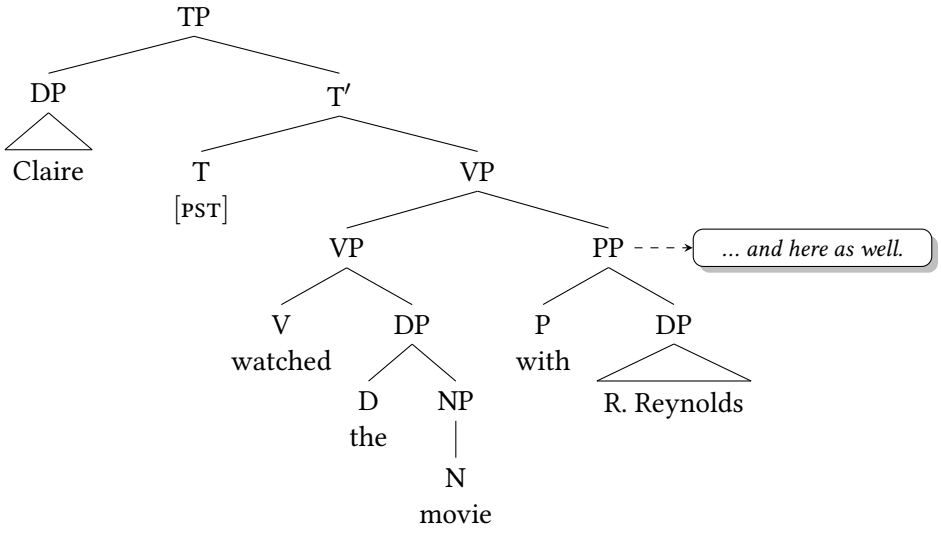
Given the unavailability of the 'starring Ryan Reynolds' reading in (85a), we could conclude that the string *with Ryan Reynolds* is not a constituent in the underlying structure that corresponds to this construal.

However, we now know that *with Ryan Reynolds* is a prepositional phrase (i.e. a PP) and that it corresponds to a constituent in both readings:

(86) a. 'Claire watched the movie starring Ryan Reynolds.'



b. 'Claire watched the movie in Ryan Reynolds' company.'



We assumed in the previous chapter that only constituents can undergo the diagnostics we examined (e.g. topicalization). Given the structures in (86a–86b), *with Ryan Reynolds* should be topicalizable in both sentences, since it corresponds to a constituent in both—it is the PP highighed in (86a–86b). Why, then, is the string *With Ryan Reynolds, Claire watched the movie* unambiguous? Furthermore, out of the two possible readings, why is only the 'in Ryan Reynolds company' reading available?

In this case, there is no contradiction between the PP [*with Ryan Reynolds*] being a constituent in both (86a–86b) and the ungrammaticality of (85a), as revealed by the unavailability of the 'starring Ryan Reynolds' reading. The reason is that there is an **independent** reason why topicalization fails: movement cannot depart from certain syntactic domains.

Such domains are called *islands*. Nominals are usually islands. Compare the following sentences:

(87) a. Jihye claimed [that Mattie read *Alias Grace*].
b. **Which book** did Jihye claim [that Mattie read __]?

(88) a. Jihye believed the claim [that Mattie read *Alias Grace*].
b. * **Which book** did Jihye believe the claim [that Mattie read __]?

(87b) and (88b) are identical sentences, except that, in (87b), *claim* is the matrix verb, while, in (88b), the main verb is *believe*, which, furthermore, takes the noun *claim* as its object. The bracketed *that* clause is a complement of the verb *claim* in (87b), but of the noun *claim* in (88b). As soon as a noun is introduced in the structure, the extraction of *which book* that was available in (87b) becomes unavailable in (88b).

Naturally, we cannot claim that the reason why (88b) is ungrammatical is that *which book* is not a constituent—if it were not, (87b) should be equally ungrammatical, which it clearly is not. The reason why (88b) is ungrammatical is the same reason why (88b) is (85a) is ungrammatical: in both cases, movement (viz.

interrogative movement or topicalization) targets a constituent that is inside a nominal island. In (88b), the island is the nominal expression [$_{\text{NP}}$ *claim that Mattie read which book*], while in (85a), [$_{\text{NP}}$ *movie with Ryan Reynolds*]. As we are going to see in a future chapter, a range of other syntactic domains are islands. We have already encountered some of them in the introductory chapter:

(89) a. * Who do you like the book [that __ wrote]?
b. * Who do you wonder [whether __ wrote *Crying in H Mart*]?
c. * Who did you invite [__ and Faatu]?
d. * Who will you be happy [if __ comes to the party]?
e. * What do you think [who bought __ at the market yesterday]?

Going back to (88b) and (85a), the ungrammaticality of these sentences does not have anything to do with the constituenthood of the string that is being moved (viz. *which book* and *with Ryan Reynolds*, respectively): rather, the *independent* issue is that movement is trying to escape an island.

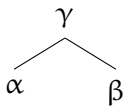
The takeaway for excursus about constituency diagnostics is that, if we apply them to some string and the result is well-formed, we can conclude that this string corresponds to a constituent. However, if the result is not, as in (85a), we cannot simply conclude that the string is not a constituent. First, we have to rule any independent factor that may be causing the ungrammaticality of the resulting sentence. In (85a), in particular, the independent reason is the islandhood of the NP that the PP *with Ryan Reynolds* merges with.

Chapter 4

Argument Structure, *pt.* 1: Foundations

4.1 Overview

In our theory so far, Merge is an operation that takes two elements as its input and yields a third element, which immediately dominates the elements in the input:

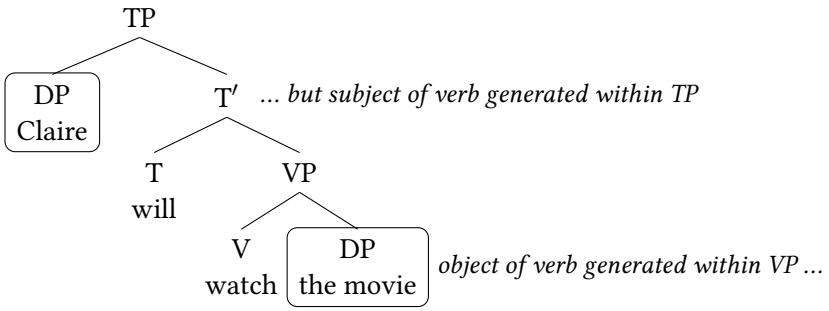
(1) *Merge*(α, β) ⟶ 

Merge thus defined is an unconstrained operation, in that nothing is said about the nature of its input (i.e. α and β in (1)). In this chapter, we will investigate the the result of Merge when one of the elements in its input is a predicate such as a verb (e.g. *devour*, *tickle*, *read*, *buy*, *watch*, ...).

We will see that a predicate and its projections merge with the *arguments* that the predicate selects. Specifically, in this and the next chapter we will discuss three types of predicates: *(i)* those that select both a subject and an object, *(ii)* those that select only an object, and *(iii)* those that select only a subject. The latter two fulfill the two logical possibilities for the internal structure of an XP where the head X merges only with one element: if a verb selects only an object, it merges at Compl-VP, but, if a verb selects only a subject, it merges at Spec-VP.

Furthermore, we will investigate the positions occupied by the subject and object required by a verb. By the rules introduced in chapter 3, the object of a verb such as *watch* is merged at the complement of the VP projected by this verb, while the subject is merged at the Spec position of a different projection, namely TP:

(2) Claire will watch the movie.



Why should there be such an asymmetry between the subject and object of a verb if they are both selected by it? We will see that there is empirical reason to think that *both* arguments selected by a verb are in fact generated inside the VP that it projects. The subject is then displaced from the position where it was generated and lands at Spec-TP, where it can be pronounced before auxiliaries such as *will* in (2).

4.2 θ-role assignment

4.2.1 Introduction

Linguistic expressions can be divided into **predicates** and **arguments**. Predicates are expressions that require the presence of other elements, while arguments are those elements that satisfy the requirements imposed by predicates. For example, the verb *devour* is a predicate that requires two arguments, a devourer and something that is devoured:

(3) Avery devoured the croffle.

Furthermore, predicates impose certain syntactic and semantic restrictions on their arguments. To see why this is the case, consider the following sentences:

(4) a. * Avery devoured.
b. Avery devoured the croffle.
c. * Avery devoured [that the croffle was delicious].

By comparing (4a–4b), we can conclude that the verb *devour* requires the presence of an object, the entity that undergoes the devouring—the absence of an object renders the sentence ungrammatical (4a). In turn, by comparing (4b–4c), we conclude that the presence of an object is a *necessary* condition for a *devour* sentence to be grammatical, though not a *sufficient* one: the object required by *devour* must be a nominal (4b) and cannot be a clause such as [*that the croffle was delicious*] (4c). We know from chapter 3 that *the croffle* is a DP, while a *that* clause is a CP.

A sentence can result ungrammatical not only if there are fewer arguments than required by a predicate, but also when there are superfluous constituents. *Show* in (5a) requires three arguments, an agent that does the showing (viz. *Rizki*), an entity that is being shown (viz. *a picture*), and an entity to whom something is

being shown (viz. *Olivia*). If we replace *introduce* with *see* and keep all three DPs, the result is ungrammatical (5b). However, if *see* merges with only one object (viz. either *Olivia* or *a picture*), the result is well-formed (5c).

(5) a. Rizki showed Olivia a picture.
b. * Rizki saw Olivia a picture.
c. Rizki saw {Olivia/a picture}.

Given the contrast between (5b–5c), the ungrammaticality of (5b) can be explained as the reflex of the presence of a superfluous object: unlike *show*, *see* only selects two arguments and there is one too many in (5b).

Besides the number of arguments and its grammatical category (e.g. nominal vs. clausal), a predicate imposes restrictions on the semantics of its arguments. *Investigate* in (6a) requires two arguments: the entity that is undergoing the investigation and the entity who executes the investigation. In addition, both arguments must be DPs. This description holds of both (6a) and (6b). Why, then, is (6b) ungrammatical?

(6) a. The detective investigated the crime.
b. # The window investigated the crime.
c. The window cracked.

The # symbol denotes that something is grammatical, though semantically ill-formed. This holds of the well-known Chomskyan example "colorless green ideas sleep furiously."

The reason is that predicates also impose semantic restrictions on their arguments. *Investigate*, in particular, requires at least that its subject (i.e. the investigator) be animate. This is true of the entity denoted by *the detective*, but not true of *the window*. (6c) indicates that there is nothing inherently wrong with *the window* being the sentential subject, as long as the predicate that selects is compatible with an inanimate subject such as *crack*.

In order to capture the semantic restrictions that a predicate imposes on its arguments, we say that a predicate assigns a **theta-role** (usually abbreviated as 'θ-role,' using a Greek letter) to an argument that it selects. For instance, *investigate* assigns an AGENT θ-role to its subject and a THEME or PATIENT θ-role to its object.

By convention, θ-roles are written in small caps.

Given these observations, we can define the **argument structure** of a predicate P as the set of arguments that P selects, including the syntactic and semantic requirements that P imposes on its arguments, the former of which is encoded in the form of θ-role assignment.

Definition 11

Argument Structure is the set of arguments that a given predicate requires, along with the syntactic and semantic restrictions that it imposes on them.

The syntactic restrictions have to do with the grammatical category of the argument (e.g. a DP vs. CP distinction), while the semantic restrictions are translated in terms of θ-role assignment.

Definition 12

A **θ-role** is some semantic property that a predicate assigns to an argument that it selects, e.g. AGENT, EXPERIENCER, THEME/PATIENT, SUBJECT MATTER, etc.

To drive the point home, let's use *investigate* in (6) once again to illustrate Definition 11 and Definition 12. The argument structure of this predicate contains two arguments, a DP that denotes the entity undergoing the investigation and a DP that denotes the entity doing the investigating. The θ-role assigned to the latter is that of an AGENT, while the θ-role assigned to the former is that of a THEME. In (6a), *the detective* is assigned an AGENT θ-role and *the crime*, a THEME θ-role. (6b) is semantically ill-formed because *the window* does not denote an entity that can be assigned an AGENT θ-role.

A predicate such as *investigate* which selects both a subject and an object is called a **transitive** predicate. Most of the predicates examined in this chapter will be of this type.

In the next sections, we turn to the differences and similarities of the θ-role assignment of subjects and objects.

Exercise

Explain why the sentences below are ungrammatical, taking into account the demands imposed by the underlined predicate. In addition, provide a new sentence that is minimally from the one given, but which fixes the issue(s) you have identified.

(7)
a. * Rizki high-fived.
b. * Rizki high-fived that Garik medaled.
c. # The cake worried about eggflation.
d. * Rizki persuaded to compete.
e. * Rizki behaved.
f. * Rizki likes Garik a book.
g. # Rizki surprised the cake.

The first few sentences in (7) are solved here to be used as model. (7a) would be grammatical if we added an object to *high-five* (i.e. an entity that is undergoing the high-fiving): *Rizki high-fived Garik*. As such, (7a) must be ungrammatical due to the lack of an argument required by the predicate *high-five*. Furthermore, not only does *high-five* require an object, it demands that this object be a DP such as the proper name *Garik* and not a CP—this is why (7b) is also ungrammatical. This sentence can also be corrected with the example *Rizki high-fived Garik*. (7c) would be well-formed if we replaced *the cake* with another DP, e.g. *The baker worried about eggflation*. The difference between *the baker* and *the cake* is that the latter denotes an animate entity, while the former does not. Hence, (7c)'s semantic ill-formedness, denoted by the symbol #, must be due to the semantic properties

of its subject.

4.2.2 Subject θ-Role vs. object θ-Role

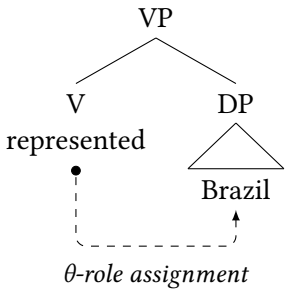
We just concluded that a predicate assigns a θ-role to an argument that it selects. However, this claim requires qualification, when we consider that there is an asymmetry between subjects and objects. Consider now the following set of sentences:

(8) a. I love Brazil. SUBJECT MATTER
b. I sent the package to Brazil. GOAL
c. I represented Brazil (in this painting). THEME

In these sentences, the DP *Brazil* is always in some grammatical object position. But its θ-role changes according to the verb of the sentence: in (8a), *Brazil* is the subject matter of loving, in (8b), it is the goal or target of the sending, and in (8c), it is the theme or patient that undergoes the painting. Hence, we may conclude, that the θ-role of an object comes from the predicate that selects it, viz. *love*, *send*, and *represent*.

θ-role assignment from the verb to its object can be represented as follows:

(9)



The selection of an object by some predicate is also referred to as **subcategorization**. *Represent*, for example, subcategorizes for a THEME.

What about the subject? Consider now the following paradigms:

(10) a. Merisa **took** a book from the shelf.
b. Merisa **took** notes.
c. Merisa **took** a nap.
d. Merisa **took** Bus 2.
e. Merisa **took** a fit.
f. Merisa **took** criticism.

(11) a. Merisa **has** a book.
b. Merisa **had** fun.
c. Merisa **had** a look.
d. Merisa **has** a cold.

Intuitively, the θ-role of the subject (viz. *Merisa*) changes in each sentence, even though the verb (viz. *take* and *have*) remains constant in (10) and (11), respectively. In other words, Merisa is doing different things depending on e.g. whether she is taking a book from the shelf or taking a nap. Likewise for e.g. having a look and having a cold. More precisely, while *Merisa* is an AGENT when the predicate is *take a book from the shelf*, it is more appropriately classified as an EXPERIENCER when the predicate is *take a nap*.

The phenomenon is more general. It can be witnessed, for instance, in Brazilian Portuguese:

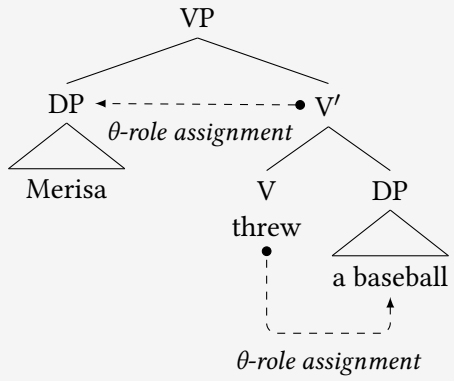
(12) a. Ela **deu** um presente para a Maribel. (*Brazilian Portuguese*)
she gave one gift for the Maribel
'She gave Maribel a gift.'

b. A aula de natação **deu** fome nas crianças.
the class of swimming gave hunger in.the children
'The swimming class got/made the children hungry.'

In both sentences in (12), the verb is *dar* 'give,' but the interpretation of the subject is different in each case. In (12a), *ela* 'she' is intepreted as an AGENT. In (12b), *a aula de natação* 'the swimming class' is interpreted as a CAUSE.

In (10), (11), and (12), even though the predicate (in these sentences, a verb) remains constant, the object selected by this verb is different in each sentence. Importantly, the change in the interpretation of the subject in this sentence is correlated with a change in the object. This observation leads to the conclusion that the θ-role of a subject does not come from the predicate alone, but from the **combination between the predicate and its object**. Schematically:

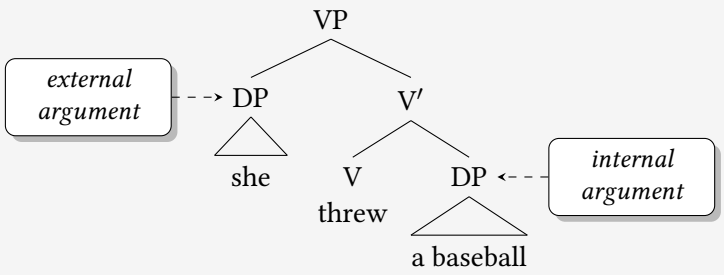
(13)



Reflecting this asymmetry, the thematic object and thematic subject are also called **internal** and **external** argument, respectively. Informally, the external argument is often referred to as *subject* and the internal argument, as *object*. However, given the discussion below about the different positions that a "subject" may occupy during the course of the derivation, it important to draw a distinction between different uses of the term *subject*.

Definition 13

(14)



(14) introduces a divergence from an assumption made in chapter 3. As seen in (2), we assumed that the "subject" of a sentence was base-generated in the position where it is pronounced, viz. Spec-TP. In a sentence like (2), this is clearly indicated by the fact that the subject precedes the auxiliary *will*, which we assumed was the head of the TP. However, in (14), the subject occupies the Spec position of the VP (and not TP). Which option is correct? We will conclude in the next section that the answer is **both**: the "subject" or, more precisely, the *external argument* of a V is generated inside the VP (just as the object is), but, subsequently, it is displaced to Spec-TP, where it is realized. In what follows, we will examine a few empirical arguments in favor of this derivational history.

4.3 The VP-Internal Subject Hypothesis

The discussion above leads to the conclusion that there is an asymmetry between the θ-role assignment of the object (or internal argument) and the subject (or external argument). The object is assigned a θ-role directly by the predicate that selects it, while the subject is assigned θ-role by the projection that results from merging the predicate and its object (e.g. V′).

Nonetheless, even though the assignment of a θ-role to the internal and external arguments is slightly different, they are still similar in that both take place within the projections of the verb, i.e. inside the VP projected by the verb. This is called the **VP-Internal Subject Hypothesis** (VISH), defined in (15).

Definition 14

(15) *VP-Internal Subject Hypothesis*

The subject of a predicate is generated within the projections of that predicate.

While (15) is titled 'VISH,' it is stated in more general terms, so that it is a statement about the relationship between predicates in general (and not just verbs) and the subject that they select. As we will see in §4.5, other grammatical categories such as nouns and adjectives, can also be predicates that have Argument Structure.

To appreciate the relevance of VISH, consider a sentence such as the following:

(16) Merisa might have taken notes.

If the VP-Internal Subject Hypothesis (15) is correct, the subject *Merisa* must be generated inside the VP project by the verb that selects it, *take*. However, in (16), the subject is quite far away from it—*might* and *have* intervene between *take* and its subject. Does a sentence like (16) falsify VISH? In other words, is this sentence showing us that the VP-Internal Subject Hypothesis cannot be correct, given the distance between the subject and the predicate that assigns it a θ-role?

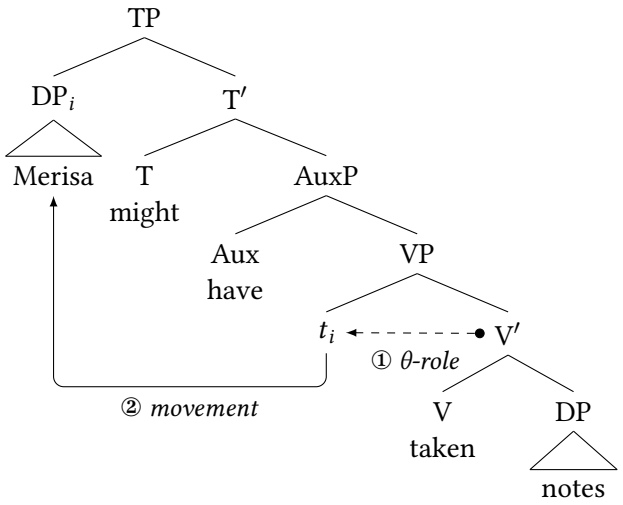
We can maintain VISH if we resort to a different syntactic operation, **movement**, the displacement of a syntactic constituent from one position to another. In chapter 3, one of the constituency tests we discussed was topicalization, whereby a constituent is moved to the beginning of the sentence, so that it is pronounced before the subject:

(17) a. Tasneem sold [AN OLD COLLECTION OF VINYLS] to the antique shop.
b. [**An old collection of vinyls**], Tasneem sold __ to the antique shop.

As we can see in (17), syntactic movement such as the one that results in topicalization, creates a mismatch between the position where a constituent is assigned a θ-role and the position where it is pronounced. In (17b), *an old collection of vinyls* is the object of *sell* (cf. the baseline (17a)). However, as a consequence of movement, this DP is pronounced at a different position, where it precedes the subject *Tasneem*—we can see from (17a) that objects in English usually follow the verb that selects them.

Going back to our example (16), if we assume that VISH (15) is correct, there must have been a previous stage in the derivation where *she* was inside the projections of *throw*, where it was assigned a θ-role, before it landed in the position where it is pronounced, preceding the auxiliaries *might* and *have*:

(18)

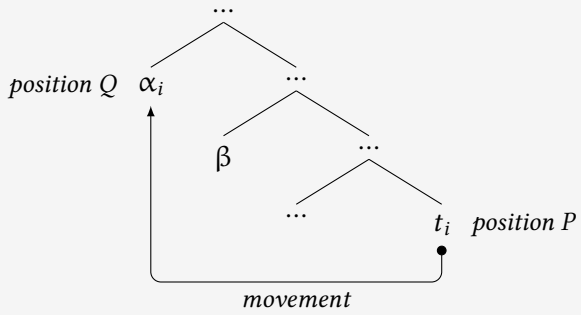


In this derivation, θ-role assignment to the subject follows VISH, defined in (15), but movement accounts for the fact that the subject is pronounced before the auxiliaries *might* and *have*.

The operation movement is particularly apt to solve cases where there is a discrepancy between the position where an element is interpreted (i.e. where it receives a θ-role role) and the position where it is pronounced. Movement is formally defined as follows:

Definition 15

(19) a. A constituent α can be generated in a syntactic position *P*, but be displaced to a higher position *Q*, where it is pronounced.



b. After movement, *P* is replaced with a *trace t*, which is an unpronounced position.

c. *t* indicates the position a constituent has moved from. This can be indicated by a subscripted index (e.g. *i*). The moved constituent and each *t* generated by the movement have the same index.

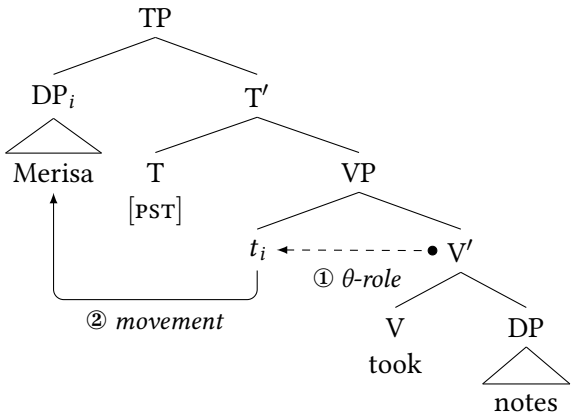
d. *Q* c-commands *P*, i.e. the moved constituent c-commands its trace.

Before movement, α in (15) would be pronounced after β. Thus, a consequence of movement is that α will now be pronounced before β. Notice how *Merisa* at Spec-TP and the trace *t* it leaves behind at Spec-VP have the same index *i*, which indicates that these positions are related because of movement.

The discussion so far indicates that VISH serves as a motivation for the postulation of the operation movement to the subject from a VP-internal position to the position where it is actually pronounced, Spec-TP. In the latter position, it may precede modals or auxiliaries such as *might* and *have*.

For uniformity, let us assume that the movement from a VP-internal position to Spec-TP always takes place, even if there is no phonological effect to such operation (e.g. there is no auxiliary intervening between the two positions). Compare (16), represented in (18), with the sentence below:

(20) Merisa took notes.



In (20), *Merisa* would be pronounced before the lexical verb *take* regardless of whether or not it has moved. Nevertheless, we will assume that the subject moves to Spec-TP even when the movement is *string-vacuous*.

An instance of movement is **string-vacuous** if it has no phonological effect.

This requirement is embodied by the following principle:

Definition 16

(21) *Extended Projection Principle* (EPP)
The grammatical subject position (viz. Spec-TP) must be filled.

In a language like English, the effect of the EPP can also be witnessed when the grammatical subject position Spec-TP is filled by the dummy **expletives** *it* or *there*:

*(*x*) = *x* is obligatory.
(**x*) = *x* is prohibited.

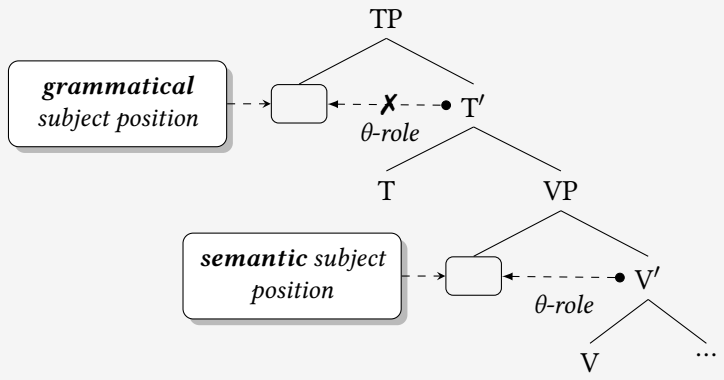
(22) a. *(**There**) is a dog in the garden.
b. *(**It**) is sunny/raining/snowing.
c. *(**It**) is rumored/seems that Xiaojun may compete again.

As indicated by the '*' outside of the parentheses in (22), the presence of *there* or *it* is obligatory. The ungrammatical version of these sentences (where there is no expletive at Spec-TP) can be analyzed as the failure of the EPP (21) to be complied with.

Expletives, being meaningless, cannot be assigned a θ-role. As such, they are not base-generated in an argument position inside the VP. Rather, they are base-generated right at Spec-TP. This means that the EPP can be fulfilled by the base-generation of an expletive or by the movement of an argument from inside the VP, as in (18) or (20).

Going back to VISH, a consequence of assuming it is that we must distinguish two "subject" positions, one inside the VP (e.g. Spec-VP) and Spec-TP. The VP-internal position is classified as a **semantic subject** position because a DP receives a θ-role there, while Spec-TP is classified as a **grammatical subject** position. Importantly, a DP is not assigned a θ-role at the grammatical subject position.

(23)



To emphasize an observation made above, the term *subject* is often used informally to refer to elements of different nature, neutralizing their differences. *Subject* can correspond to the external argument position of a transitive verb, which assigns it a θ-role, but it can also refer to the *grammatical* subject position, Spec-TP, which is **not** assigned any θ-role. This distinction is particularly relevant when the DP that occupies the grammatical subject position (viz. Spec-TP) is not base-generated at Spec-VP, but rather at Compl-VP. This is the case of unaccusative "subjects," investigated in the next chapter, as well as of the subject of passive sentences (e.g. *The ball was thrown by her*, cf. (20)), discussed in a later chapter.

Theoretically, VISH allows us to claim that θ-role assignment always takes place within the projections of the predicate that assigns them (e.g. inside the VP), regardless of whether the θ-role goes to a subject or to an object. But is there any *empirical* evidence in favor of this hypothesis? There in fact is. The evidence is provided by phenomena such as *(i)* quantifier floating, and *(ii)* Across the board movement (ATB). We discuss each phenomenon in turn.

Empirical evidence has to do with actual data, above and beyond a particular theory one assumes.

4.3.1 Quantifier floating

Consider the following pair of sentences:[1]

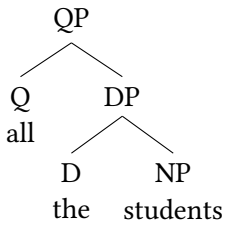
(24) a. All the students have read the book.
b. The students have all read the book.

Semantically, in (24b), the quantifier *all* quantifies over *the students*, just as in (24a). In other words, both sentences are true in the same scenarios. Roughly, (24a–24a) mean that, given a set of students, it is true of all the members of this set that they have read the book. However, in (24b), the quantifier *all* is pronounced separately from the nominal it quantifies over (viz., *students*). How could we account for the fact that these sentences have same meaning, despite a difference in form, more precisely, the difference in where the quantifier *all* is pronounced?

The VP-internal Subject Hypothesis allows us to do exactly that. Let us assume that *all the students* is a Quantifier Phrase (QP) that takes a DP as its complement, with the DP projecting the structure that is by now familiar to us:

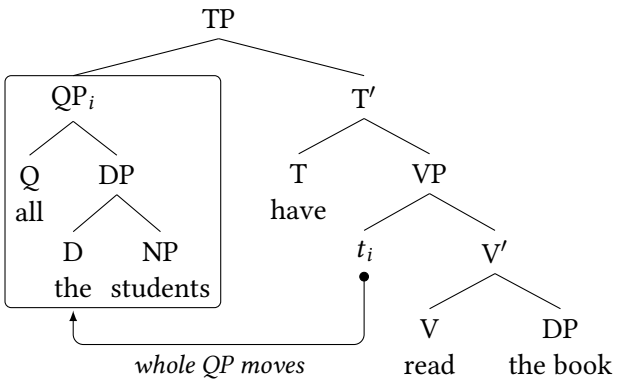
[1]There is some linguistic variation in quantifier floating in English, so the reader may or may nor agree with the judgments reported here.

(25)



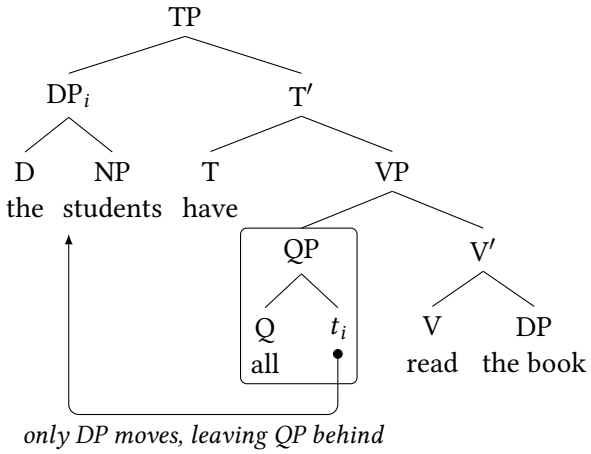
In both (24a–24a), the subject *all the students* is generated at Spec-VP, the semantic subject position, where it receives a θ-role. Afterwards, either the entire QP or part of it moves to the grammatical subject position, Spec-TP, with movement taking place according to (15). If the entire QP moves (26), the result is the sentence (24a), where *all* is pronounced along with the rest of the QP.

(26) *Derivation of (24a): 'All the students have read the book'*



Otherwise, if only the DP that is the complement of QP moves, the result is sentence (24b), where the quantifier is pronounced separately from the DP it quantifies over.

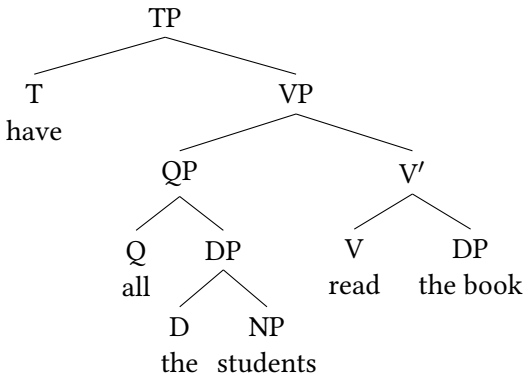
(27) *Derivation of (24b): 'The students have all read the book'*



The VP-internal Subject Hypothesis is fundamental in capturing the relationship between the sentences (24a–24a). According to the analysis represented in (26–27), these sentences are underlyingly identical, in that the QP *all the students*

is generated inside the VP, but subsequent movement of different portions of the QP result in different surface realizations of the same underlying structure.

(28) *Underlying representation of both (26–27), before any movement*



The derivation represented in (27) illustrates *quantifier floating* (sometimes also referred to as *quantifier stranding*). This phenomenon consists in the movement of a DP that leaves behind a quantifier that selects the DP as a complement and which quantifies over it. Because the quantifier is left behind after the DP movement, it is as if it is left stranded.

Quantifier floating is an argument in favor of VISH because the floated or stranded quantifier marks the position where the subject was generated inside the VP.

4.3.2 Across the Board Movement

Besides quantifier floating, a phenomenon called **Across the Board Movement** (ATB) also provides empirical support for VISH. Consider the following sentences:[2]

(29) a. * I wonder **which books** [$_{TP}$ Mary hates __] and [$_{TP}$ Sam likes **the magazines**].

b. * I wonder **which books** [$_{TP}$ Mary hates **the magazines**] and [$_{TP}$ Sam likes __].

c. I wonder **which books** [$_{TP}$ Mary hates __] and [$_{TP}$ Sam likes __].

In the sentences in (29), the embedded clauses (represented between brackets) are coordinated by the conjunct *and*. We know that clauses are being coordinated in (29) because each clause contains its own subject (viz. *Mary* and *Sam*) and the verb of each clause is inflected—notice the 3rd person present suffix *–s* in the present form of the verbs *hate* and *like*. Let us assume, then, that TPs are coordinated in (29).

Besides the coordination of TPs, another property of the sentences in (29) is the fact that the interrogative phrase *which books* is interpreted as the object of at least one of the coordinated verbs (viz. *hates* and *likes*). In other words, *which books* receives a θ-role from one of these verbs. The other verb may have its own non-interrogative object (viz. *the magazines*). Of the three sentences in this paradigm,

[2] This section is more appropriate for a graduate-level course.

only (29c) is grammatical. The empirical generalization is that, only when there is one single object associated with both conjuncts is the sentence grammatical. That single object is the interrogative DP *which books*, which is understood as the object of both *hates* and *likes*.

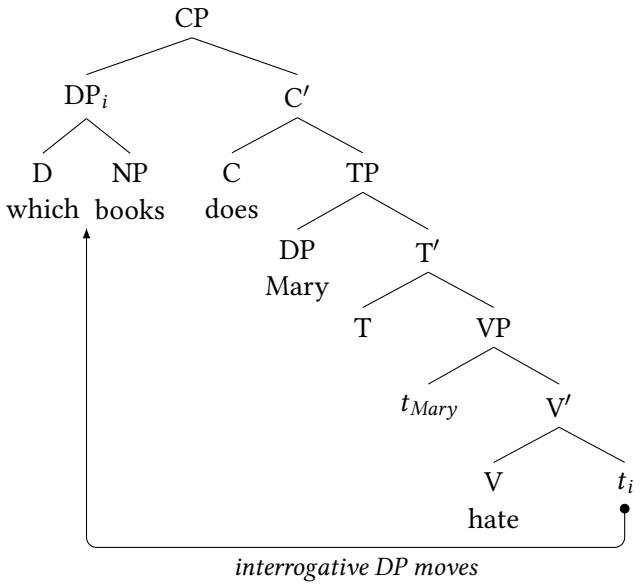
An *empirical generalization* is a statement that emerges from the description of the data and which captures a general property that the data exhibits.

In English, the object of a verb usually follows it. However, *which books* in (29) is pronounced in the beginning of the clause, right before the subject of a sentence. This is more clearly illustrated in the simpler sentences in (30) below, which do not involve clausal coordination.

(30) a. Solfrid said [Mary hates **these books**].
b. **Which books** did Solfrid say [Mary hates __]?

(30b) illustrates a combination of properties that we have seen before: in this sentence, a DP is interpreted in a lower position, i.e. it receives a θ-role in that position, just like *these book* does in the non-interrogative baseline (30a), but is pronounced in a higher position. These are the hallmark properties that characterize movement, which was formalized in Definition 15. We can conclude, thus, that an interrogative sentence like (30b) is derived via the movement of an interrogative phrase. For concreteness, let us assume that an interrogative phrase moves to Spec-CP—we will motivate this assumption in a later chapter. As such, (30b) can be represented as follows:

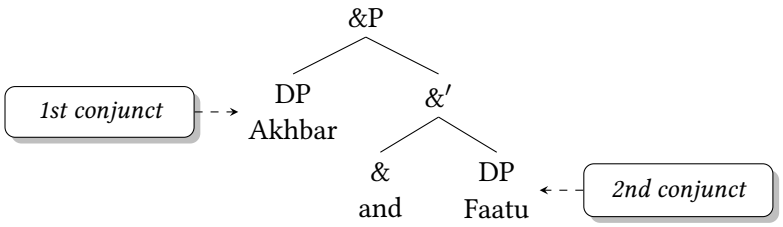
(31)



To recall, CP stands for 'Complementizer Phrase.' C takes TP as its complement.

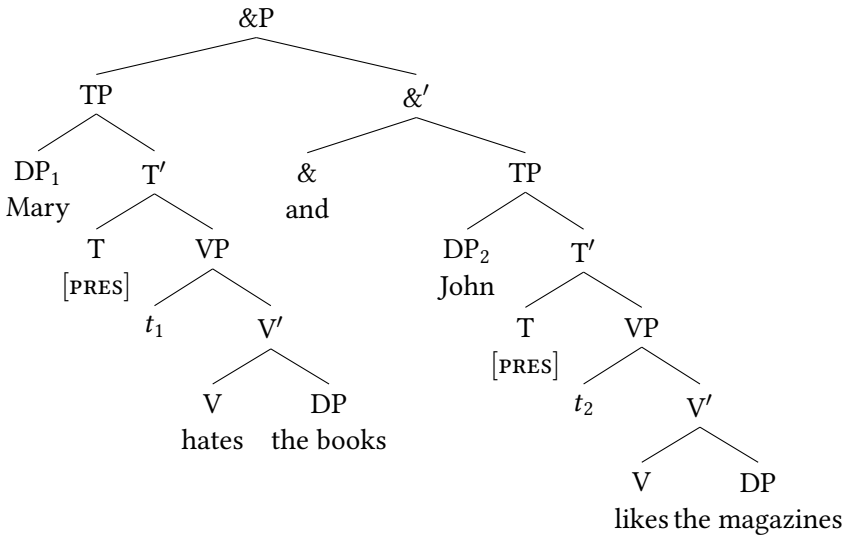
Before we go back to (29), let us also assume that coordination is syntactically represented as a &P headed by *and*, where one conjunct is represented at the Spec position and the other, at the complement position. (32) illustrates the internal structure of &P, using the coordination of DPs as an exemplar.

(32) Akhbar and Faatu



In (33), the conjuncts are full clauses and, thus, TPs:[3]

(33) [$_{TP}$ Mary hates the books] and [$_{TP}$ Sam likes the magazines].



Now we can put the pieces together. The sentences in (29), repeated below as (34), involve coordination of TPs, represented with the conjuncts dominated by a &P. Furthermore, the result is only grammatical if one single interrogative phrase (viz. *which books*) moves *simultaneously* from both conjuncts to Spec-CP.

(34) a. * I wonder **which books** [$_{TP}$ Mary hates __] and [$_{TP}$ Sam likes **the magazines**].

b. * I wonder **which books** [$_{TP}$ Mary hates **the magazines**] and [$_{TP}$ Sam likes __].

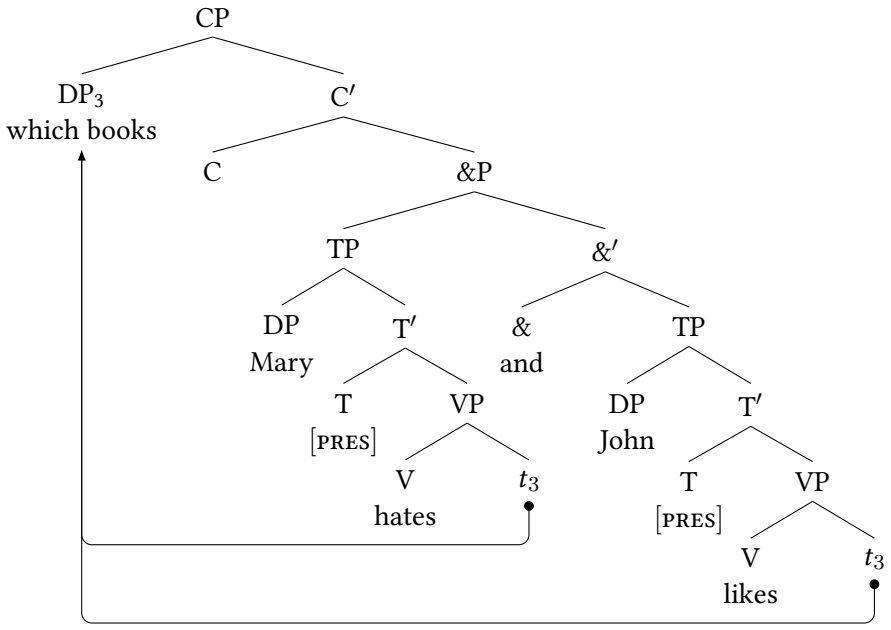
c. I wonder **which books** [$_{TP}$ Mary hates __] and [$_{TP}$ Sam likes __].

The simultaneous movement of a single phrase from two separate clauses targeting the same landing site is dubbed **Across The Board** movement (ATB). In (29c), the relevant phrase *which books*, which moves from the object positions of two separate clauses, targeting Spec-CP. If the interrogative phrase moves only from the first conjuct (34a) or only from the second conjunct (34b), the result is ungrammatical.

The coordinated clauses in (29c) can then be represented as follows:

[3] To simplify representations, the internal structure of DPs may not be represented and a triangle may also be omitted, specially, when we are concerned with the structure of the overall sentence and not of nominals.

(35)



Now that we know what Across the Board movement is and what it looks like, we can turn to how it can be used as an empirical argument in favor of VISH. Consider the following paradigm:

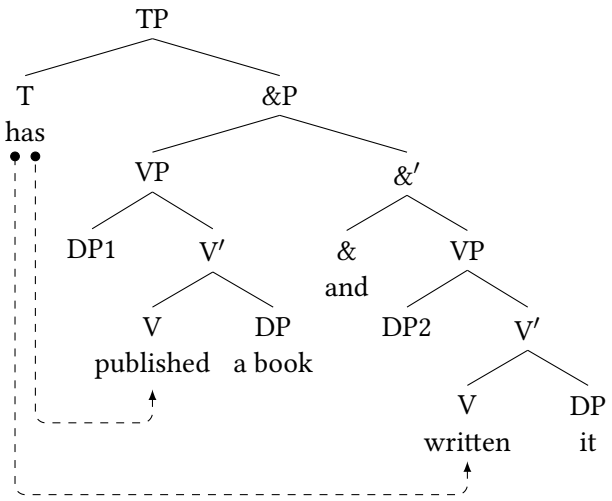
(36) a. * They said that **the student** has [$_{VP}$ __ published a book] and [$_{VP}$ **Mary** written it].

b. * They said that has [$_{VP}$ __ published a book] and [$_{VP}$ **the student** written it].

c. They said that **the student** has [$_{VP}$ __ published a book] and [$_{VP}$ __ written it].

Unlike what happens in (29), in (36), smaller constituents are coordinated. The auxiliary *has* precedes the first conjunct and is not included in the conjuncts. Following our assumption that auxiliaries are generated at T, a reasonable conclusion is that VPs are being coordinated in (36). Relevantly, the head of each coordinated VP is in the past participle form, which is required by the auxiliary *has*. A partial representation of the underlying structure of the sentences in (36) is in (37), which focuses on *has* selecting the form of the coordinated VPs it merges with.

(37)



selectional requirement imposed by 'has' obeyed in both conjuncts

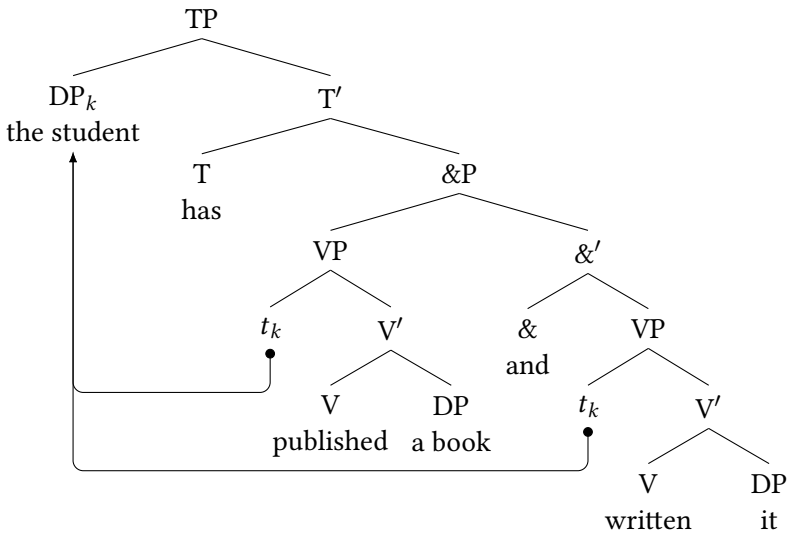
In (36a), the subject of the first coordinated VP (viz. *the student*) moves from a position inside the VP to Spec-TP, where it precedes the auxiliary *has*. The subject of the second conjunct (viz. *Mary*) remains inside the VP. In (36b), the first conjunct does not have a subject (informally represented by the gap '__'), while the subject of the second conjunct again remains inside the VP. Both (36a–36b) are ungrammatical. The only grammatical option is (36c), where *the student* is the subject of both conjuncts, moving simultaneously from both of them and landing at Spec-VP, where it precedes the auxiliary *has*. The sentence in (36c), thus, illustrates another instance of Across the Board movement.

Based on (35) and (37), draw a representation of (36c) and explain why this sentence provides an argument for VISH.

Tip: pay special attention to what is moving Across-The-Board and where it is moving to.

(36c) can be represented as follows:

(38)



In (38), *the student* is the subject of both *published* and *written*. It is generated at the Spec position of the VPs projected by these verbs and it receives an external argument θ-role from them. Because of the Extended Projection Principle (21), *the student* then moves Across-the-Board to Spec-TP.

ATB in the sentence (36c) is an argument in favor of the VP-Internal Subject Hypothesis because the positions the subject simultaneously moves from is internal to the VP. Empirically, ATB requires simultaneous movement. In (38), the movement of the subject simultaneously moved from the external argument position of coordinated VPs.

4.3.3 Interim summary

Before we move on to the last section of our investigation of argument structure, let us retrieve the information we obtained up until this point.

Exercise

a. What do data like the following tell us about where the θ-role of subjects come from?

(39) a. Merisa **took** the book.
b. Merisa **took** a rest.
c. Merisa **took** offence.

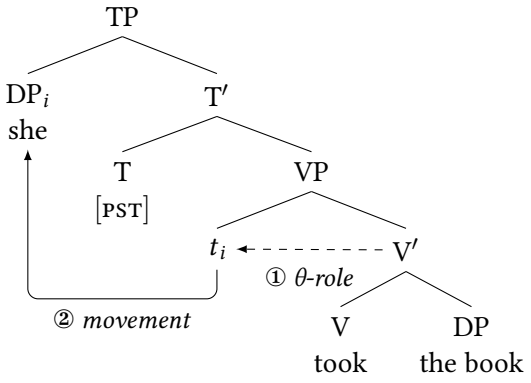
b. Draw a tree for the sentence (39a), taking VISH into account.

What the data in (39) show is that the θ-role assigned to the external argument of a transitive predicate does not come from the predicate alone, but from the *combination* between the verb and its object, which is represented as 'V′.' Specifically, this is indicated by the fact that the verb of the sentences in (39) remains the same (i.e. *take*), while the interpretation of the subject is different in each case: *she* is AGENT in (39a), an EXPERIENCER in (39b), and a THEME of sorts in (39c). The θ-role

assigned to the subject *she* co-varies with the alternations of the DP that occupies the object position (viz. *the book*, *a rest*, and *offence*, respectively).

Assuming VISH, the sentence (39a), for instance, can be represented as follows:

(40)



VISH encapsulates the idea that the external argument is assigned a θ-role within the projections of the VP, despite sometimes being clearly pronounced in a different position (i.e. Spec-TP). VISH was empirically supported by phenomena such as quantifier floating (§4.3.1) and Across-the-Board movement (§4.3.2).

EXERCISE

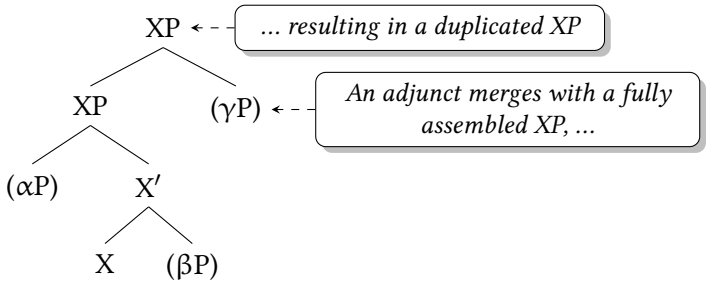
Draw trees for the sentences below. Use arrows to indicate θ-role assignment and movement of a DP to Spec-TP to comply with the EPP.

(41) a. The doctor treated the patient
b. Linguists have cited this paper.
c. The general may approve the plan.

4.4 Adjuncts vs. arguments

In the previous chapter, we saw that X-Bar Theory merges constituents in the Spec and complement position of some XP differently than adjuncts to that XP. Specifically, first, an XP is formed by merging the head with its complement, and, subsequently, with its Spec. The XP thus formed is, then, duplicated as a consequence of merging it with an adjunct.

(42)



We can now be more specific about the constituents that merge with some projection of some X. The constituents merged at the complement and Spec positions inside the XP are arguments required by some head. The adjunct position is reserved for optional modifiers of the XP projected by X.

Definition 17

(43) a. Arguments obligatorily required by some predicate X are merged at the complement and Spec positions inside the XP projected by X.

b. Optional modifiers merge with the XP thus formed, *after* obligatory arguments have been merged.

To appreciate the difference between obligatory arguments and optional modifiers, let's examine the following contrasts:

(44) a. Rizki high-fived *(Garik).

b. Rizki (enthusiastically) high-fived Garik.

'*(x)' indicates that x is obligatory: (44a) is only grammatical with the presence of *Garik*.

(44a) summarizes two versions of a sentence, one with *Garik* in the object position of *high-five* and one without. The sentence is only grammatical if *Garik* is present. This indicates that *Garik* is an obligatory argument selected by the predicate *high-five*. (44b) has two versions as well, one with the adverb *enthusiastically* and one without. However, in this case, both versions of the sentence are grammatical. This indicates that *enthusiastically* is not selected by the predicate *high-five*. It is, thus, an optional modifier.

Exercise

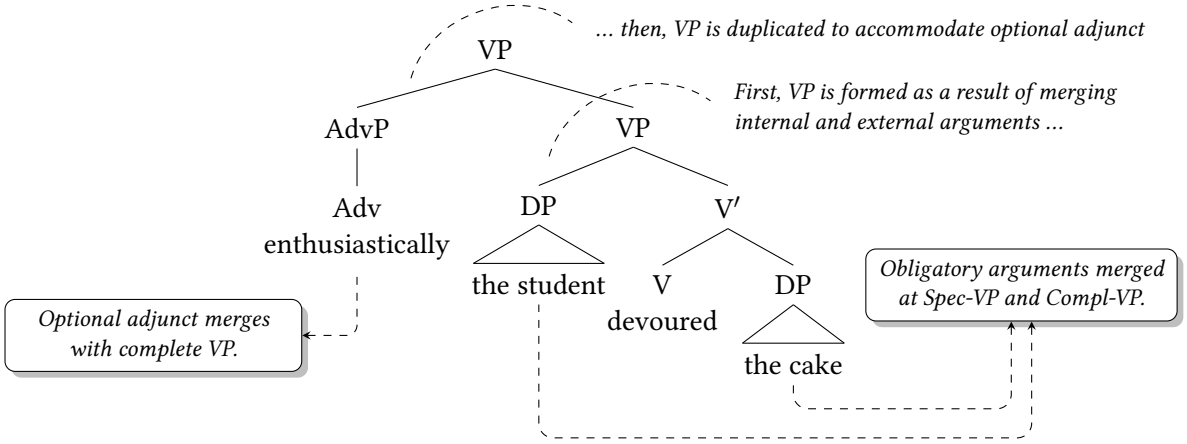
Based on (44), explain the contrast seen in (45):

(45) a. The student devoured *(the cake).

b. The student devoured the cake (after the lecture).

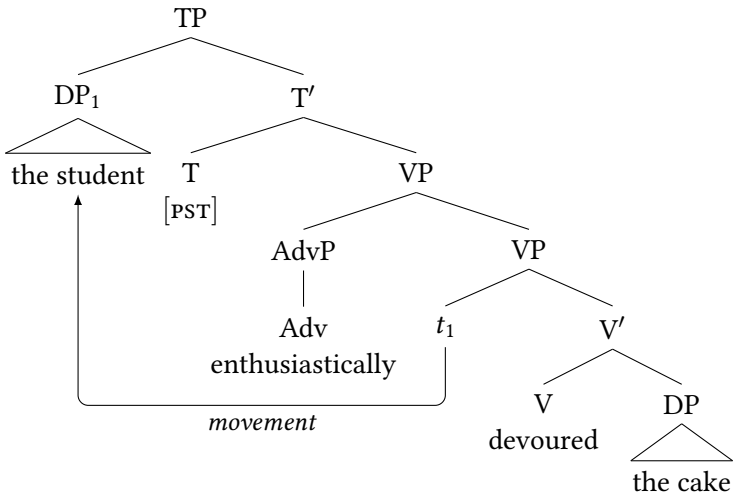
The empirical distinction that characterizes obligatory arguments vs. optional modifiers is captured by X-Bar Theory in the manner described in (42) and in Definition 17. Following these rules, the VP in (44b) is as follows:

(46)



The derivation of (44b) does not end at the VP level depicted in (46), of course. Afterwards, T merges with this VP and, subsequently, the external argument *the student*, which was generated at Spec-VP in (46), moves to Spec-TP, in compliance with the EPP.

(47)



Exercise

Draw an equivalent TP tree for (45b). *After the lecture* is a PP headed by the preposition *after*. It takes the DP *the lecture* as its complement.

Identifying the arguments of a predicate and distinguishing them from optional modifiers is the cornerstone of grammatical theory, so make sure to complete the exercises below before you continue working on this textbook.

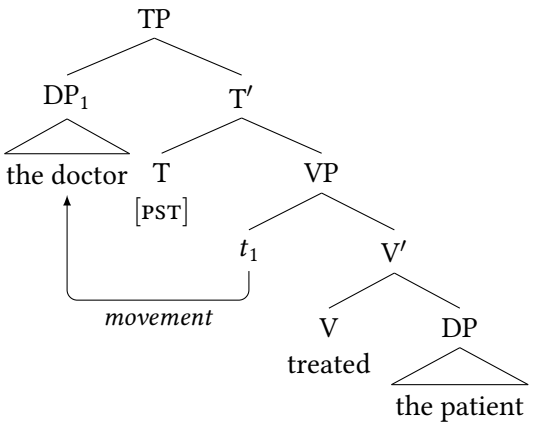
Exercise

Adjuncts were added to the sentences in (41). Draw trees for the new sentences below and compare them with your diagrams for (41).

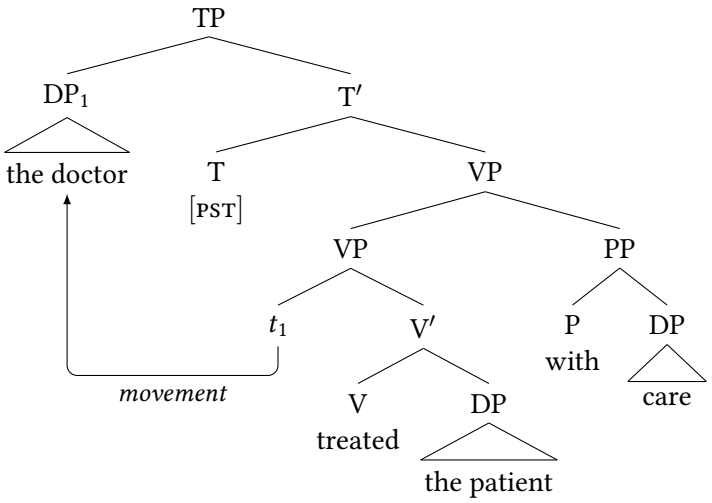
(48) a. The doctor treated the patient with care.
b. Linguists have often cited this paper.
c. The general may approve the plan swiftly.

The diagrams for (41a) and (48a) are below:

(49)



(50)



Exercise

In each of the sentences below, indicate whether the [bracketed constituents] are arguments of the underlined predicate or an adjunct. Explain your reasoning.

(51) a. [Fabin] will hug [Hampton] [warmly].
b. [Fabin] welcomed [Hampton] [with open arms] [yesterday].
c. [The teacher] [aggressively] scolded [the student].
d. [The director] [immediately] fired [the teacher].
e. [Fabin] tickled [his dog] [in the morning].
f. [Fabin] has purchased [a book] [at the bookstore].
g. [The director] has [regretfully] betrayed [their principles].

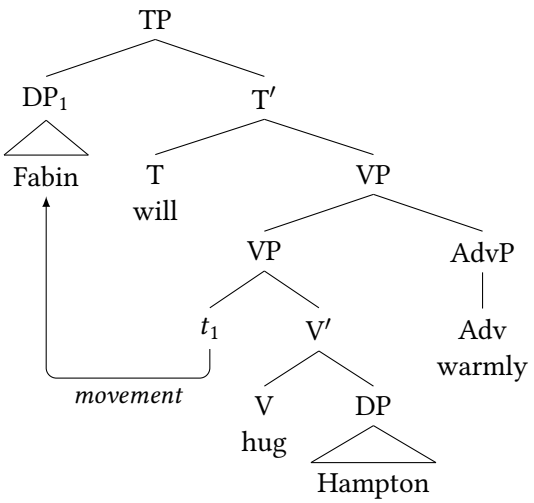
As additional practice, you may want to draw trees for these sentences too.

(51a) is done below and can be used as a model. In this sentence, *Fabin* and *Hampton* must be arguments of *hug* since they cannot be omitted, as indicated in (52). *Warmly*, on the other hand, must be an optional modifier, since it can be taken out without compromising the grammaticality of the sentence:

(52) *(Fabin) will hug *(Hampton) (warmly).

Here is the tree for (51a):

(53)



Having reflected on the difference between optional modifiers and obligatory arguments, in the next section, we will expand the inventory of predicates investigated in this textbook.

4.5 Non-verbal predicates

While all predicates we discussed so far were verbal, it is important to notice that e.g. adjectives (54), and nouns (55) also take arguments.

(54) Solfrid is **proud** of Faatu.

(55) the **construction** of the city

Just like verbal predicates impose requirements on their arguments, so do their adjectival and nominal counterparts. (56a) indicates that *Solfrid* is obligatory in the sentence. (56b), in turn, shows that, not only does a DP have to be present as the subject of *proud*, it cannot denote an inanimate entity such as *the window*—because the proper name *Solfrid* denotes an animate entity, (56a) is grammatical.

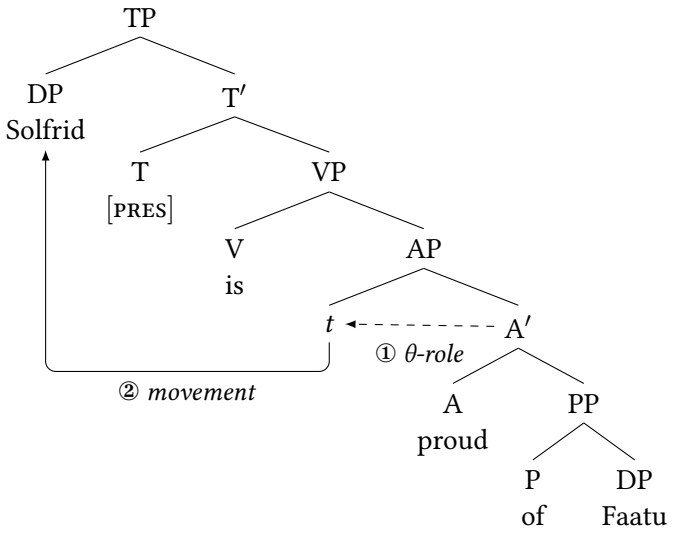
(56) a. (*Solfrid) is proud of Faatu.
b. # The window is proud of Faatu.

In this section, we will investigate some properties of adjectival and nominal predication, though, regrettably, in a cursory way.

4.5.1 Adjectival predicates

Any predicate, verbal or non-verbal, can select both an external argument and an internal argument. *Proud* in (54), for example, is a transitive adjectival predicate that takes an EXPERIENCER (viz. *Solfrid*) as its external argument and a THEME (viz. *Faatu*) as its internal argument.

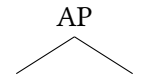
(57)

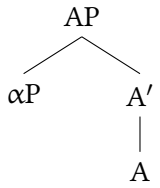


Just as in a sentence where the predicate is verbal, the external argument is generated inside the projections of the predicate that selects it (specifically, at Spec-AP in (57)) and only later in the derivation does it move to the grammatical subject position. In other words, the derivation of sentences where the predicate is not verbal also comply with VISH.

4.5.1.1 Adjectival predicates in Icelandic

As we are going to see in the next chapter, predicates can be not only transitive, but also **intransitive**, i.e. select only one argument. In that case, X-Bar Theory predicts that this single argument could go at either a Spec (58) or a complement (59) position—see more details in the next chapter.

(58)


(59)


In this section, we will examine adjectival predicates in Icelandic. The main goal is to back up the claim that all predicates, including not only verbal, but also adjectival ones, are able to assign θ-roles. Along the way, we will also see that the particular adjectival predicates investigated in this section realize the options afforded by X-Bar Theory, as illustrated in (58–59).

An indirect argument in support of the claim that adjectives can assign a θ-role to an argument they select is provided by Icelandic morphosyntax. First, some background on Icelandic is due.[4] In this language, the form of nouns and the choice of the predicate that selects them can co-vary. In both (60a–60b), the subject is a [1PL] pronoun (i.e. 'we'). However, the pronoun has a nominative form in (60a), but a dative form in (60b).

(60) a. **Við** lásum bókina.
1PL.NOM read.1PL the.book.ACC
'We read the book.'

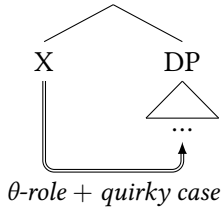
b. **Okkur** vantaði bókina.
1PL.DAT lacked.3SG the.book.ACC
'We lacked the book.'

Nominative and dative are instances of *case*, a particular morphology that appears on nouns in correlation with their syntactic position. Compare the difference between *við* and *okkur* with the difference between *we* and *us* in English. Both are [1PL] pronouns, but *we* is a nominative form that occurs in the subject position (e.g. *We*$_{\text{NOM}}$ *saw Eyglo*), while *us* is an accusative form that occurs in object position (e.g. *Eyglo saw us*$_{\text{ACC}}$). All that is relevant to us at this moment is that the choice between *við* and *okkur* is correlated with a difference in the predicate that selects them, viz. *lásum* 'read' (60a) and *vantaði* 'lack' (60b), respectively.

When an Icelandic predicate imposes a particular case morphology on one of its arguments (here, the external argument), it is said to assign it **quirky case**. Specifically, quirky case is considered to be assigned along with a θ-role, as schematized in (61). We can think of it in terms of an additional restriction that some Icelandic predicates impose on their arguments, on top of the semantic and categorial restrictions discussed in §4.2.1. The ability to assign quirky case is a property that some predicates in Icelandic are idiosyncratically endowed with.

[4] Abbreviations: 1 = first person, ACC = accusative, DAT = dative, DFLT = default, NOM = nominative, PL = plural.

(61) XP (*where X is some predicate that is able to assign quirky case*)



With this background in place, consider now what happens with some adjectives in Icelandic. We see in (62a–62b) that the adjective 'cold' can merge with a subject that is nominative (62a) or dative (62b). Furthermore, the translation indicates that the overall meaning of the sentence is different in correlation with the case morphology of the subject. Roughly speaking, the subject of 'cold' in Icelandic is interpreted as a 'passive' entity that emits cold when it is marked with nominative case (62a). However, it is interpreted as some type of experiencer when it is marked with dative case (62b).[5]

(62) a. **Ég** er kaldur.
1SG.NOM am cold.NOM
'I am cool/cold to touch.'

b. **Mér** er kalt.
1SG.DAT is cold.DFLT
'I am feeling cold.'

The difference in the case and interpretation of the subject between (62a–62b) can be analyzed in terms of quirky case assignment: 'cold' in Icelandic is able to assign two different types of θ-role to its argument, as inferred from the different interpretations seen in (62a–62b). Furthermore, each of these θ-roles is assigned along with a particular quirky case. In other words, 'cold' in Icelandic is an adjectival predicate that is idiosyncratically endowed with the ability to assign quirky case, just like 'read' (60a) and 'lack' (60b). Let's assume that a THEME is base-generated at a complement position, while an EXPERIENCER, at a Spec position.[6] The assignment of quirky case in (62a–62b) can, then, be schematized as follows:

[5] The form of the adjective 'cold' changes too in correlation with the features of the subject: *kaldur* in (62a) has a nominative form, just like its subject, while *kalt* in (62b) has a default form. This phenomenon is called 'agreement,' or, more precisely, 'concord.' Because os space constraints, it is not discussed in this textbook, though some examples of gender ([MASC] vs. [FEM]) and number ([SG] vs. [PL]) concord in French are provided below for comparison.

(i) a. le petit chat
the.MASC.SG small.MASC.SG cat.MASC.SG

b. la petite chatte
the.FEM.SG small.FEM.SG cat.FEM.SG

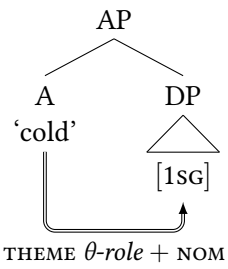
c. es petits chats
the.MASC.PL small.MASC.PL cat.MASC.PL

d. es petites chattes
the.FEM.PL small.FEM.PL cat.FEM.PL

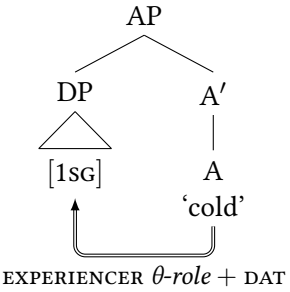
In the Icelandic sentences in (62a–62b), we can see concord in case (viz. [NOM] vs. [DAT]).

[6] The difference in the base-generation position associated with different types of θ-roles will be commented on in the next chapter, in §5.5.

(63) a.



b.



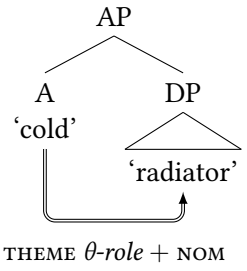
This analysis of (62a–62b) posits that the difference between these two sentences is related to θ-role assignment—specifically, the difference is caused by the different combinations of θ-role and quirky case that ‘cold’ can assign to its argument. That this account is on the right track is indicated by the fact that this adjectival predicate imposes semantic restrictions on the DP that receives the θ-role and quirky case it assigns. As mentioned above, if the subject of ‘cold’ is marked with nominative case, it is interpreted as a ‘passive’ entity that emits cold—this was captured in terms of a THEME θ-role in (63a). An inanimate entity such as a radiator is perfectly compatible with this interpretation (64a). In contrast, when the subject of ‘cold’ is marked with dative case, it is experiencing the cold, rather than emiting it. As such, ‘radiator’ is no longer a viable argument for this predicate (64b).

(64) a. **Ofninn** er kaldur.
the.radiator.NOM is cold.NOM
‘The radiator is cool/cold to touch’

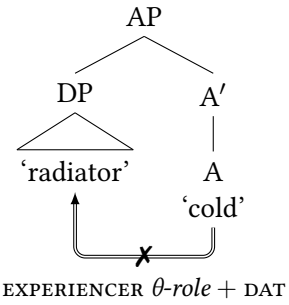
b. # **Ofninum** er kalt.
the.radiator.DAT is cold.DFLT
Literally: ‘The radiator is feeling cold.’

The contrast between (64a–64b) can be schematized as follows:

(65) a.



b. #



In conclusion, the data investigated in this section demonstrates that adjectives are able to assign a θ-role, just like their verbal counterparts. In Icelandic, this is particularly clear when a predicate (verbal or adjectival) is able to assign a quirky case along with a θ-role. We assume that adjectives and, more generally, non-verbal predicates are able to assign θ-roles in any language, even when the assignment is not morphologically transparent as it is in Icelandic.

In the next section, we tackle a particular property sentences in English (and other languages) where the predicate is adjectival.

4.5.1.2 The copula *be*

When discussing (56), repeated below as (66), we concluded that *proud* assigns a θ-role to its subject (in addition to the θ-role it assigns to its object). However, the verb *be*, inflected as *is* in (66), separates *proud* from its external argument.

(66) a. (*Solfrid) is proud of Faatu.
b. # The window is proud of Faatu.

The verb *be* in (66) is called a **copula**: it is functional verb that links together some types of predicates (e.g. adjectives) and their subject.

Be is classified as a functional verb for two main reasons. First, it simply carries tense and agreement morphology, as we can see in (67). Specifically, in (67a) are singular and plural forms of *be*, which match the features of the subject. In (67b), *be* varies in form according to tense. Throughout the sentences, the adjectives *talented* and *content* remain unchanged.

(67) a. {Solfrid is/Solfrid and Rizki are} talented.
b. Solfrid {was/is/will be/…} content.

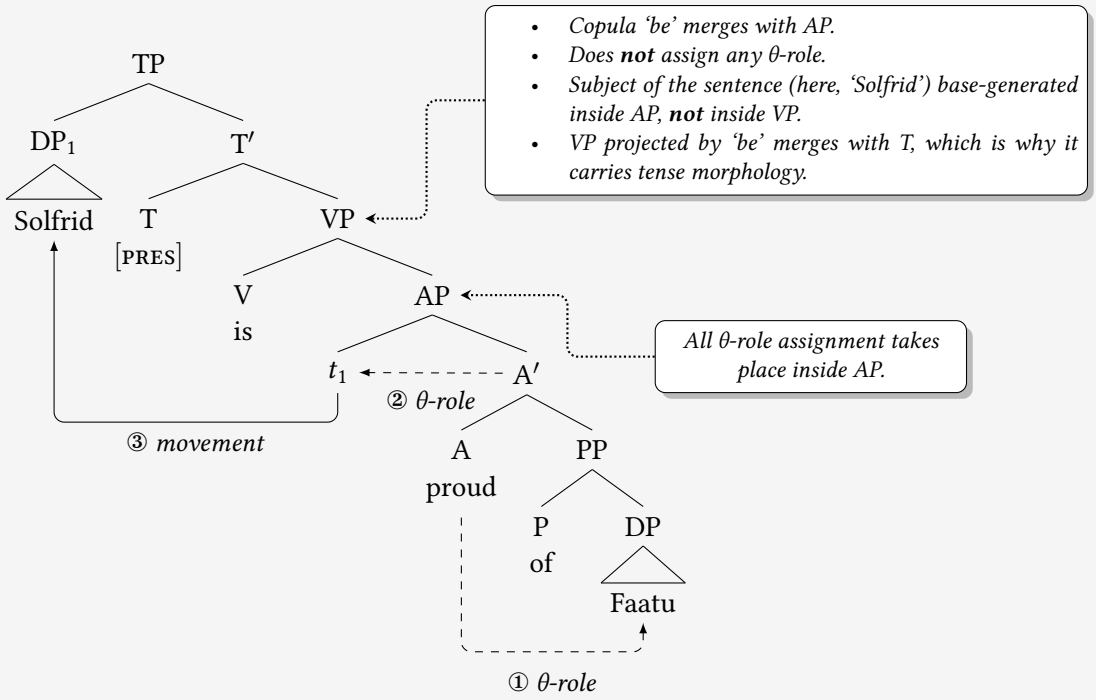
The second reason why the copula *be* is considered a functional element is that it does **not** assign any θ-role—it is the adjectival predicate following it that does. In (68a), we see that a DP that denotes an animate and sentient entity such as *the director* can be the subject of the string *be*+*distraught*. The same cannot be said of *the bookcase* in (68b).

(68) a. The director is distraught.
b. # The bookcase is distraught.
c. The bookcase is sturdy.

The ill-formedness of (68b) cannot be attributed to the copula *be*: (68c) is a perfectly well-formed sentence and *be* occurs there as well. The culprit must be the adjectival predicate, since this is the only difference between (68b–68c): *distraught* cannot be predicated of an inanimate DP such as *the bookcase*, but *sturdy* is perfectly compatible with it.

Focusing on the behavior copulas, as revealed by (67–68), sentences with adjectival predicates can be diagrammed as follows:

(69) Solfrid is proud of Faatu.



First, all θ-roles are assigned by the adjectival predicate inside its AP—in (69), *proud* is a transitive predicate that assigns a θ-role to *Faatu*, the THEME of the pride expressed by the adjective, and another to *Solfrid*, the EXPERIENCER. The AP then merges with the copula *be*. Importantly, *be* does not assign any θ-role, as mentioned above—notice how the subject *Solfrid* in (69) is base-generated at Spec-AP and **not** at Spec-VP. T then merges with the VP projected by the copula. It is because of this relationship that *be* ends up with tense morphology, as seen in (67b). In our system, *be* is in the position where the selectional requirements imposed by T are satisfied.[7] Finally, the subject moves to Spec-TP, so that the EPP is complied with.

Besides its functional nature, something else that must be emphasized about the copula *be* (70b) is that it should not be confused with the auxiliary of the same form *be* (70a). The auxiliary *be* merges with a verb and requires that it be in progressive form, i.e. the *–ing* form *training* in (70a). The copula *be*, on the other hand, merges with an adjective such as *strong*.

(70) a. Guifang is_{AUX} training right now. be_{AUX} + V–*ing*

b. Guifang is_{COP} strong. be_{COP} + ADJ

Given the right type of adjectival predicate, the copula *be* can co-occur with

[7] The same would be true in a sentence with more auxiliaries or modals. In that case, the copula *be* would also comply with the appropriate selectional requirements, e.g.:

(i) a. Solfrid has **been** proud of Faatu.

b. Solfrid {may/can/should/…} **be** proud of Faatu

the auxiliary *be* used in the progressive. (71a) is another illustration of the progressive auxiliary *be* and (71b), of the copula *be*. Finally, in (71c), the copula *be* is used because of the adjective *unreasonable*. Furthermore, the copula appears in progressive form, as it is preceded by the progressive auxiliary *be*.

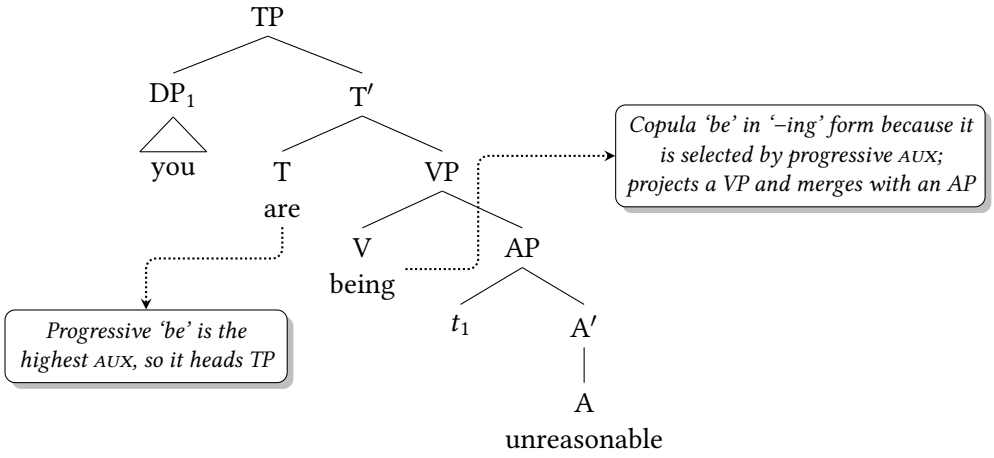
(71)

a.	You are$_{\text{AUX}}$ running.	be_{AUX} + V–*ing*
b.	You are$_{\text{COP}}$ unreasonable.	be_{COP} + ADJ
c.	You are$_{\text{AUX}}$ being$_{\text{COP}}$ unreasonable.	be_{AUX} + [be_{COP}–*ing* + ADJ]

Draw a tree for (71c). Assume that *you* is base-generated at Spec-AP (see (59)).

(71c) can be diagrammed as follows:

(72)



You is base-generated inside the AP projected by *unreasonable*, which it receives a θ-role from. This AP then merges with the copula *be*. The VP thus formed merges with the progressive auxiliary, which requires that the copula occur in an *–ing* form. Because there is only one auxiliary in this sentence, it is base-generated at the head of TP, following the conventions assumed in this textbook. The derivation ends with the movement of *you* to Spec-TP, so that the EPP is satisfied.

While the copula *be* always projects a functional VP, the progressive auxiliary occurs in different positions, depending on whether or not there are other auxiliaries or modals in the same sentence. In (73), for instance, the progressive *be* heads an AuxP because of the stacked modals and auxiliaries in this sentence. Regardless, the copula *be* still heads a VP.

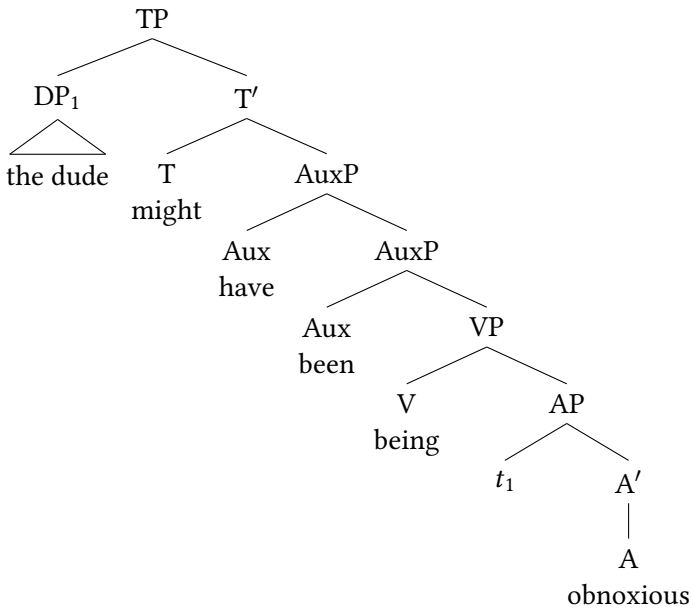
(73) The dude might have been being obnoxious.[8]

Draw a tree for the sentence in (73). Assume that the argument of *obnoxious* is also base-generated at a Spec position (see (59)).

(73) is diagramed as follows:

[8] Adapted from an online example.

(74)



Exercise

Based on (63a–63b), draw a complete tree for each of the Icelandic sentences (62a–62b).

Having briefly investigated the derivation of adjectival predication, in the next section, we conclude our foray into non-verbal predication by examining a particular type of nominal that can merge with a complement.

4.5.2 Nominal predicates that select a CP

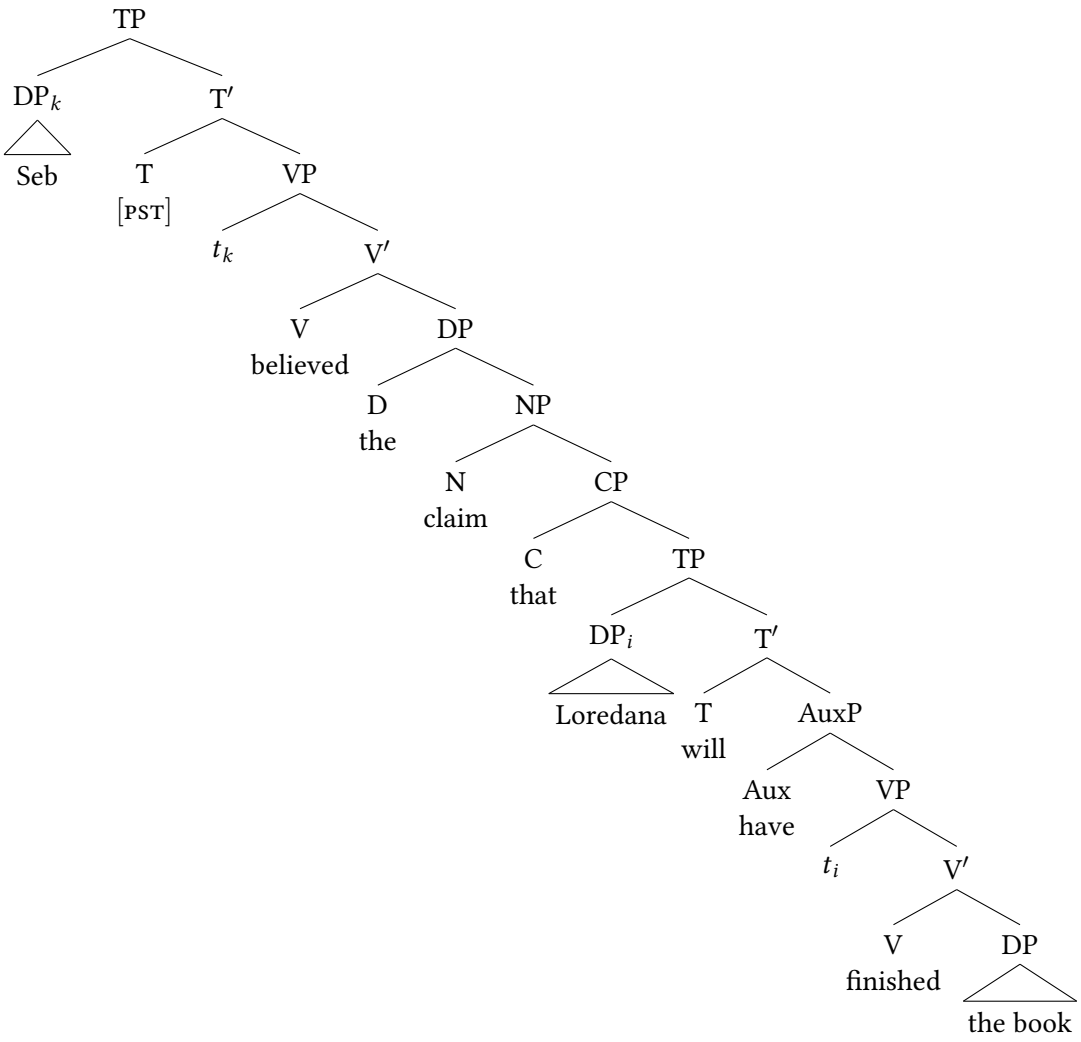
Just like verbs and adjectives, nouns can also select arguments and assign a θ-role to them. Because of space constraints, in this section, we will examine nominal predicates that subcategorize for a CP. Recall from chapter 3 that verbs (75a) can select clauses as their complement (or, more precisely, their internal argument). Nouns (75b) can also take a clause as their complement:

(75) a. Seb claimed [$_{CP}$ that Loredana will have finished the book].
b. Seb believed the claim [$_{CP}$ that Loredana will have finished the book].

Draw a tree for (75b). Bear in mind that the clause in brackets is selected by the noun *claim* and that *the claim* is itself selected by *believe*.

The structure of (75b) is as follows:

(76)



There are a few verb–noun cognate pairs that subcategorize for a CP, e.g.:

(77) a. believe–belief
b. announce–announcement
c. state–statement

Exercise

Draw a diagram for each of the two sentences below, paying attention to the θ-role assignment between V/N and its CP complement.

(78) a. Solfrid announced that Faatu won a gold medal.
b. Solfrid appreciated the announcement that Faatu won a gold medal.

Exercise

Adjectives can select a CP as their complement too. Draw a tree for the sentence below:

(79) Solfrid is proud that Faatu won a gold medal.

4.6 Summary

In this chapter, we investigated argument structure, i.e. the set of arguments that a given predicate requires and the semantic and formal restrictions that it imposes on them. We examined the behavior of transitive predicates, which select both an internal an external argument. The external argument of a transitive predicate is usually an AGENT or EXPERIENCER, which is mapped onto a higher position, Spec-VP, while the internal argument is typically a THEME that is mapped onto Compl-VP. A distinction was drawn between the semantic subject position and the grammatical subject position. The latter is Spec-TP, which can be filled by movement of a DP that is base-generated inside an argument position in the VP. Movement to the grammatical subject position is enforced by the EPP, the Extended Projection Principle, a requirement that the grammatical subject position Spec-TP be filled. Finally, we also took a quick tour through adjectival and nominal predicates, which obey similar rules.

Exercise

To cap off this chapter, this exercise allows you to put in practice the knowledge you gained in the preceding sections about argument structure. Draw trees for the sentences below, using an arrow to indicate subject movement. If a sentence is structurally ambiguous, draw a tree for each of the readings it has.

(80)
a. I greeted Akhbar and Faatu.
b. The blonde engineer and the brunette historian published some books.
c. The teacher said that the students will eat a cake after the lecture.
d.
   i. Tasneem is happy about the book.
   ii. Tasneem is happy that she published a book.
e. The teacher published the grades after the students left.
f.
   i. Students and teachers received a prize.
   ii. Smart students and teachers received a prize.
g. Tasneem is happy that Solfrid bought an encyclopedia.

4.6.1 Active retrieval

What is the **VP-Internal Subject Hypothesis** (VISH)?

What is the EPP and what are the two ways to satisfy it that we discussed in this chapter?

What are other names for the object and the subject, which highlight the position where they are generated inside the VP and what assigns them a θ-role?

What phenomenon is illustrated by the sentence below and why does it provide support for VISH?

(81) a. All the instructors have released the grades.
b. The instructors have all released the grades.

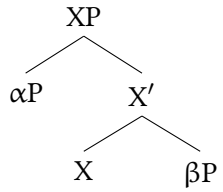
Chapter 5

Argument Structure, *pt.* 2: Intransitive predicates

5.1 Overview

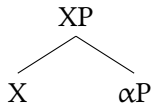
Recall from chapter 3 that any XP, in principle, has enough space for a complement and Spec position:

(1)

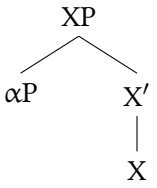


As we saw in the previous chapter, this is exactly the structure for a transitive VP (i.e. the VP projected by predicates such as *hug*, *devour*, *buy*, *authorize*, *clean*, *cite*, *approve*, *high-five*, etc). Assuming that either a Spec or a complement position can be missing within some XP, (2–3) are two other structures that we expect to be possible, given X-Bar Theory.

(2)



(3)



In (2), X merges only with a complement, while, in (3), X merges only with a Spec.

Do these structures also correspond to the projections of some type of predicate, in the same way that (1) represents the projections of a transitive predicate? In this chapter, which continues the investigation of argument structure started in chapter 4, we will see that the answer to this question is positive. Specifically, we will see that (2–3) correspond to the VPs projected by two types of *intransitive* predicates, i.e. those that select only one argument. Specifically, (2) represents the structure of *unaccusative* predicates, which only select an internal argument,

Recall that *transitive* predicates are those that select two arguments, an internal and an external one.

whereas (3) corresponds to the structure of *unergative* predicates, which only select an external argument. In what follows, we will

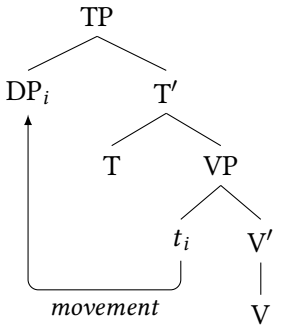
5.2 Unaccusatives vs. Unergatives

So far, we have examined predicates that select two arguments, an external and an internal argument. Such predicates are called **transitive predicates**. Some predicates, however, take one single argument. They are called **intransitive predicates**. Some examples of such predicates can be found in (4).

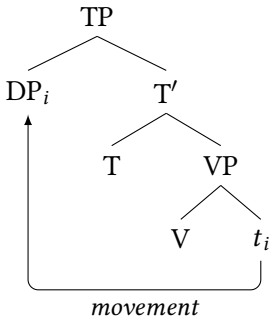
(4) a. Jeynaba sneezed.
b. Jeynaba will call.
c. Jeynaba fell.
d. Jeynaba arrived.

We now know that the projections of a predicate have enough room for two arguments, a subject in the Spec position and an object in the complement position. Given this, what position does the DP *Jeynaba* occupy in the sentences in (4)? Assuming the Extended Projection Principle (21), this DP appears in the grammatical subject position, Spec-TP, but it could have moved from either the complement or of the Spec positions inside the VP:

(5) *Movement from Spec-VP*



(6) *Movement from Compl-VP*



The result would be the same, a string where the subjectat Spec-TP precedes T, auxiliaries (if any), and, crucially, any material inside the VP. This description holds of all sentences in (4).

In what follows, we will see that there are empirical reasons to distinguish between two classes of intransitive verbs, those that select only an external argument (5) and those that select only an internal argument (6). The former are called *unergative* and the latter, *unaccusative*.

5.3 English diagnostics

In this section, we will investigate a series of constructions in English that are sensitive to a subject vs. object distinction. When applied to intransitive predicates, these diagnostics systematically indicate that there are two types of predicates

that select only one argument, namely, those that select only an internal argument or object, and those that select only one external argument or subject—in other words, unaccusative and unergative predicates, respectively.

Specifically, first, we will investigate the properties that characterize the following phenomena: *(i)* resultatives, *(ii)* adjectival formation, and *(iii)* the licensing of cognate objects. These constructions will be illustrated with transitive verbs, showing how they draw a distinction between external and internal arguments. We will then use these constructions as a diagnostic to probe into the properties of the sole argument that intransitive predicates select.[1]

5.3.1 Resultatives

A *resultative phrase* is a constituent that describes a state that results from some event. For instance, in (7) below, [*flat*] is a resultative phrase and it denotes a state that results from the event of Keisha hammering the metal.

(7) Keisha hammered the metal [flat]. *transitive baseline*

a. 'The metal is flat as a result of hammering.'

b. # 'Keisha is flat as a result of hammering.'

Importantly, the resultative phrase describes that state of the DP denoted by the *internal* argument of the predicate modified by the resultative phrase. In the baseline (7), *the metal* is the internal argument of the transitive verb *hammer*. What is flat as a result of the hammering event is the metal (7a)—*Keisha*, the external argument of *hammer*, is not flat as a result of the hammering event (7b).

This means that resultatives phrases draw a distinction between internal and external arguments: they can only describe the state of the former, not of the latter. Given that this is a stable properties of resultative constructions, we can use it as a diagnostic to investigate the nature of the argument that intransitive predicates select. The restrictive possibility of what the resultative phrase can describe, in fact, leads to the prediction that resultative phrases are possible only when the intransitive predicate selects an internal argument, yielding a reading that is analogous to (7a). If the sole argument of the intransitive predicate is external, the sentence should be ungrammatical, analogously to the impossible reading paraphrased in (7b).

These predictions are borne out by facts. Unaccusatives are intransitive predicates that subcategorize for an internal argument only. In (8a–8b), these predicates are *break* and *freeze*, respectively. Given the well-formedness of these sentences, the resultatives phrases [*into pieces*] and [*solid*] must be describing the state of the internal argument of *break* and *freeze*.

(8) a. The vase broke [into pieces]. *unaccusatives*

b. The water froze [solid].

In contrast, unergatives are intransitive predicates such as *sing* and *laugh*, which only select an external argument. We can see from the ill-formedness of

[1] The data and discussion in the following sections are taken from Gluckman (2021).

(9a–9b) that resultative phrases cannot be licensed in these sentences. This is exactly what we expect if resultatives can only describe the resulting state of an internal argument, but unergative predicates have only an external argument.

(9) a. * John sang [into pieces]. *unergatives*
b. * Mary laughed [solid]

In sum, we identified some phenomenon, viz. resultative phrase licensing, which distinguishes between external and internal arguments—specifically, resultatives can only describe the result state of the latter. Armed with knowledge, we contrasted the two types of intransitive predicates. Despite their initial similarity, unaccusative and unergative predicate exhibit contrastive behavior regarding the licensing of resultative phrases. Because they are possible with unaccusative predicates such as *break* or *freeze*, this must mean that their sole argument is internal. By the same token, the impossibility of licensing resultatives in intransitive sentences where the predicate is unergative such as *sing* and *laugh* must mean that their sole argument is external.

The same reasoning will apply in the upcoming investigation of adjectival formation and of the licensing of cognate objects.

5.3.2 Adjectival formation

An *–ed* adjective can be morphologically derived from a verb. For instance, suffixing *–ed* to the verb *hammer* yields the adjective *hammered*.

Syntactically, one of the primary functions of an adjectival (whatever its morphological makeup) is to modify nouns. However, *–ed* adjectives derived from a verb can only modify a noun that is interpreted as an internal argument of that verb. In (10), *hammer* is a transitive verb whose internal argument is *the metal* and whose external argument is *the technician*.

(10) The technician hammered the metal.

The adjective *hammered* can be used to modify the internal argument *metal* (11a), but not the external argument *technician* (11b).

(11) a. the hammered metal *transitive baseline*
b. * the hammered technician

With this background in place, let us now use this restriction imposed on deverbal adjective formation as a diagnostic to examine intransitive predicates. If *–ed* adjectives can only be used to modify arguments that are interpreted as an internal argument of the verb they are derived from, then, we predict that an *–ed* adjective can be derived from an unaccusative predicate, since their sole argument is internal. Following the same reasoning, we are also able to predict that *–ed* adjectives cannot be derived from an unergative predicate, seeing that their sole argument is external.

Both predictions are, once again, correct. *Broken* and *frozen* in (12) are deverbal adjectives formed out of unaccusative predicates.[2] Because unaccusative predicates only select an internal argument, *vase* and *water* in (12) can be modified by these adjectives. (12a–12b) are well-formed, in the same way that (11a) is.

(12) a. the broken vase *unaccusatives*
b. the frozen water

Sung and *freeze* in (13), in turn, are *–ed* adjectives derived from unergative predicates. Inasmuch as unergative predicates only select an external argument, *man* and *woman* in (13) *cannot* be modified by these adjectives. (13a–13b) are ill-formed, in the same way that (11b) is.

(13) a. * the sung man *unergatives*
b. * the laughed woman

Deverbal adjectival formation, just like the licensing of resultative phrases, is sensitive to whether some argument is internal or external. Specifically, they can only attach to a nominal that is interpreted as the internal argument of the verb they are derived from. Given this restriction, this particular type of adjective can be recruited to tease apart the two types of intransitive predicates, their distinction being based on whether their sole argument is internal or external.

5.3.3 Cognate objects

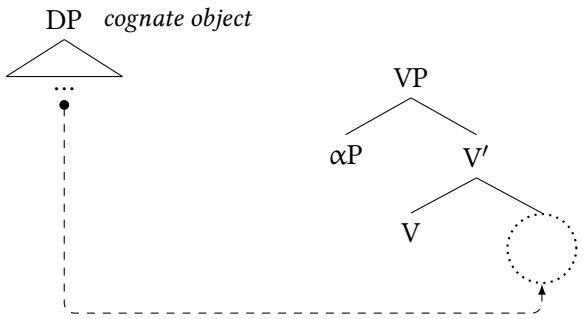
Finally, we turn to the last diagnostic to distinguish between unaccusative and unergative predicates, the possibility of adding a cognate object in a sentence whose verb is intransitive. Morphologically, a cognate object or internal argument is a nominal that has the same stem as the verb that subcategorizes for it. Because the verb and its cognate objects are morphologically related, they also share the same meaning.

As we know, objects, cognate or not, are generated in the complement position of the XP projected by the predicate that selects them. Assuming that one single phrase can occupy any given node in the syntactic structure, we can make predictions about whether or not a cognate object will be possible in unaccusative and unergative sentences, depending on the space available inside the VP they project.

Let's go over these predictions in detail before examining the data that verify or falsify them. The only argument that an unergative predicate is external and, thus, generated at Spec-VP. The complement position inside the same VP is left unoccupied. A cognate object is predicted to be possible in an unergative structure, since there is nothing else vying for the complement position inside the VP.

[2]The term '*–ed*' adjective is used for convenience to refer to the participial form of a verb, the most regular instance of which in English is formed by *–ed* affixation. The so-called 'irregular' or 'strong' verbs in English do not employ the regular *–ed* in participial formation, resorting to some stem vowel alternation instead, e.g. *sing sung*.

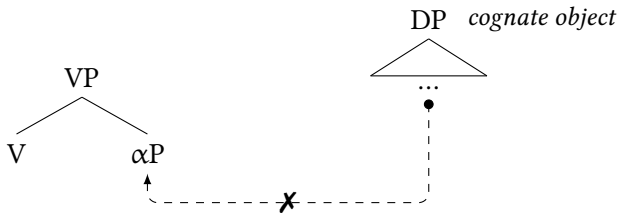
(14)



cognate object can be introduced in Compl-VP, since this position is empty—an unergative predicate selects an external argument (i.e. αP at Spec-VP)

On the other hand, unaccusative predicates only select an internal argument, which is generated in the complement position. Because the complement is already filled, cognate objects should not be possible: they are predicted to "compete" with the internal argument of the unaccusative verb for the same position.

(15)



cognate object cannot be introduced in Compl-VP: this position is already occupied by unaccusative's original object, αP

Both predictions are corroborated by the facts. In (16a), *a song* is the cognate object—the noun that heads this phrase is formed from the same root $\sqrt{sing}$ as the verb *sing*. In (16b), the noun *laugh* and the verb *laugh* are obviously morphologically related. Both sentences are grammatical, as predicted.

(16) a. John sang a song. *unergatives*
b. Mary laughed a hearty laugh.

Likewise, in (17a), *a big break* is a a cognate object for the unaccusative verb *break*—both the noun and the verb are formed from the same root $\sqrt{break}$. If it occurs in the sentence, the result is ungrammatical, since *the vase* is base-generated in the complement position that the cognate object *a big break* is trying to occupy. Likewise, in (17b), the noun *freeze* is a cognate object of the verb *freeze*. *The water* is selected as the complement of *freeze*, ruling out the possibility of generating the cognate object *a big freeze* in the same position.

(17) a. The vase broke (*a big break). *unaccusatives*
b. The water froze (*a big freeze).

'(*x)' means that *x* is prohibited. Some sentence that includes a string like '(*x)' is an abbreviation for a paradigm with two sentences, one with the string and one without, the former being ungrammatical. (17a), for instance, is a shorthand for the following paradigm:
✓ *The vase broke.*
✗ *The vase broke a big break.*

In brief, what *(i)* resultatives, *(ii)* adjectival formation, and *(iii)* the licensing of cognate objects. tell us is that the subject vs. object distinction that these constructions are sensitive to is reproduced in the contrast between the intransitive predicates that can only select one or another.

Exercise

Using at least two diagnostics above, explain why *arrive* is an unaccusative verb, while *laugh* is an unergative verb.

(18) a. Jeynaba arrived.
b. Jeynaba laughed.

Exercise

Explain the adjectival modification contrast below:

(19) The singer sang a song.
a. the frequently sung song / a song sung by millions
b. * the frequently sung singer / a singer sung by millions

Having established that there are two varieties of intransitive predicates, next, we turn to how other languages distinguish between external and internal arguments and how this distinction can be used to classify intransitive predicates in these language. Based on the English data in this section and the data in the next sections, the distinction between unaccusatives and unergatives, already previewed in (5–6) will be further formalized.

5.4 Crosslinguistic evidence

5.4.1 *Be* vs. *have* auxiliary selection

A classic diagnostic to distinguish among intransitive verbs is auxiliary selection in languages like Italian, French, and German, the latter of which is illustrated below. These languages use *be* (20a) with some intransitive verbs and *have* (20b) with others.

(20) a. Maria **ist** angekommen. (*German*)
Maria is arrived
'Maria has arrived.
b. Maria **hat** telefoniert.
Maria has telephoned
'Maria has telephoned.'

In both (20a) and (20b), the verb only takes one argument (viz. *Maria*). Nonetheless, the auxiliary differs in each sentence. There is nothing else that is different between these two sentences, which lead us to conclude that the difference in auxiliary choice and the nature of the verb must be correlated.

In the previous discussion, we conjectured that there is *theoretical* reason to distinguish among different classes of intransitive predicates, given the space within the VP (or any other non-verbal predicate) afforded by X-Bar Theory: a sole argument that is selected by some predicate could be generated at either the Spec or the complement position. The German data in (20) provides an *empirical* indication that this suspicion is on the right track. Naturally, the next question to ask is, what is the nature of the distinction between different types of intransitive predicates, a distinction that German auxiliary selection is sensitive to?

Data from absolute participles in Brazilian Portuguese and classifier floating in Japanese will demonstrate that the distinction has to do with the θ-role that an intransitive predicate assigns to its only argument. In other words, these phenomena will lead us to conclude that the distinction between unaccusative and unergative predicates lies in whether that argument is internal or external.

5.4.2 Absolute participles in Brazilian Portuguese

In Brazilian Portuguese, there is a type of clause called 'absolute participle' (21), where the verb occurs in participial form (i.e. *li-d-o* 'read-PART-MASC.SG' in (21)). Such a clause is adjoined to the main clause and has a temporal or causal reading.[3,4]

(21) [Li-do o livro], a Ana começou a responder o
read-PART.MASC.SG the book the Ana began to answer.INF the
questionário.
questionnaire
'After reading the book/Because she read the book, Ana began to answer the questionnaire.'
(Literally: 'Read the book, Ana started answering the questionnaire.')

In the absolute clause (represented in brackets), the verb in past participial form occurs in the first position and it is followed by a DP (in (21), *o livro* 'the book').

This DP is the internal argument of the past participle verb. We see in (22a) that *ler* 'read' is a transitive verb. If an absolute participle is formed not with the internal argument (21) of the verb, but with the external argument (22b), the result is ungrammatical.

(22) a. A Ana leu o livro.
the Ana read.PST the book
'Ana read the book.'
b. * [Li-da a Ana], ...
read-PART.FEM.SG the Ana
Intended: 'After/Because Ana read ....'

[3] Abbreviations used in the Brazilian Portuguese data: FEM = feminine, INF = infinitive, MASC = masculine, PART = participle, PST = past

[4] The verb in past participle form agrees in gender and number with the DP that follows it in Brazilian Portuguese, but this detail does not need to concern us.

From the contrast between (21) and (22b), we can conclude that absolute participle formation in Brazilian Portuguese is sensitive to a distinction between internal and external arguments, such that only the former are allowed in these constructions.

With this background in mind, consider what happens with intransitive predicates. First, note that *chegar* 'arrive' and *telefonar* 'telephone' are intransitive predicates in Brazilian Portuguese:

(23) a. A Jeynaba chegou. *unaccusative*
the Jeynaba arrived
'Jeynaba arrived.'

b. A Jeynaba telefonou. *unergative*
the Jeynaba telephoned
'Jeynaba telephoned.'

If we use the same verbs in absolute participles, only the *chegar* 'arrive' sentence is grammatical:

(24) a. [Chega-da a Ana], ... *unaccusative*
arrive-PART.FEM.SG the Ana
'After/Because Ana arrived, ...'

b. * [Telefona-da a Ana], ... *unergative*
telephone-PART.FEM.SG the Ana
Intended: 'After/Because Ana telephoned, ...'

Given our conclusion that absolute participles target only internal arguments, it must be the case that *a Ana* 'the Ana' in (24a) is an internal argument, while the same DP is an external argument in (24b), rendering this sentence ungrammatical. In other words, the same reason that makes (21) grammatical also makes (24a) grammatical: the DP that follows the verb in participial form is selected as as internal argument of that verb. By the same token, the same reason that makes (22b) ungrammatical also makes (24b) ungrammatical: the DP that follows the verb in participial form is selected as an external argument of that verb.

The German paradigm in (20) above drew our attention to the fact that there must be *some* distinction between intransitive predicates which yields a distinction in auxiliary selection. The Brazilian Portuguese data examined in this section allows us to pinpoint the precise nature of this distinction: there are intransitive predicates such as *chegar* 'arrive' which select an internal argument, while intransitive predicates such as *telefonar* 'telephone' select an external argument.

As foreshadowed above, intransitive predicates that select only an internal argument or object are called **unaccusative**, while intransitive predicates that select only an external argument are called **unergative**.[5] Using the newly introduced terminology, we can describe the restrictions imposed by the absolute participle construction in Brazilian Portuguese as follows: only an internal argument can be targeted this construction. Both transitive (21) and unaccusative (24a) predicates

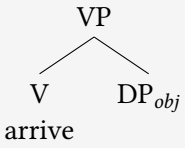
[5]Unfortunately, the terminology is not very transparent. The choice of terms can be traced back to particular points of the history of Generative Grammar, but this is far beyond the scope of this book.

select such an argument—in the case of unaccusatives, this is the only type of argument that is selected—, which is why absolute participles constructed from these verbs result in a grammatical sentence. However, external arguments cannot be used in absolute participles. This is why the external argument of a transitive verb (22b) and the sole argument selected by an unergative verb (24b) cannot be targeted by this construction.

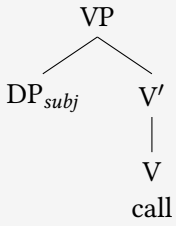
We can represent the internal structure of the VPs projected by these two types of intransitive predicate as follows:

Definition 18

(25) *Unaccusative predicate*



(26) *Unergative predicate*



The sole argument of an unaccusative predicate such as *arrive* (25) is base-generated as the complement position, whereas the sole argument of an unergative predicate such as *call* (26) is base-generated at the Spec position.

The structure proposed for unergative predicates (26) contains a non-branching X′ level. Why not simply merge the external argument selected by an unergative predicate with the head? The issue is that the resulting structure would be a VP that immediately dominates its head (viz. the unergative verb) and the DP it selects. But this is exactly the same configuration that an unaccusative VP (25) has: the VP that results from merging the unaccusative predicate and the DP it selects as its internal argument immediately dominates them. Projecting a vacuous (i.e. non-branching) X′ in an unergative VP (26) allows us not only to distinguish between unaccusative and unergative VPs, but also to provide a proper Spec position where the sole argument of an unergative predicate can be generated.

We are now in the position to formulate a hypothesis about the nature of the distinction that German auxiliary selection is sensitive. Recall the data from (20), repeated below.

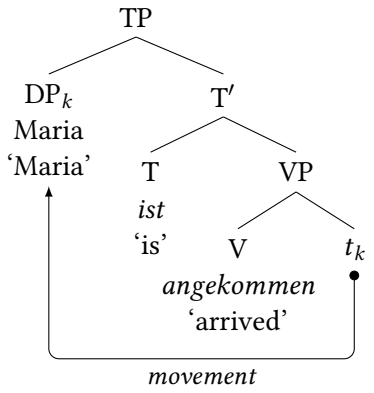
(27) a. Maria **ist** angekommen. (*German*)
Maria is arrived
'Maria has arrived.

b. Maria **hat** telefoniert.
Maria has telephoned
'Maria has telephoned.'

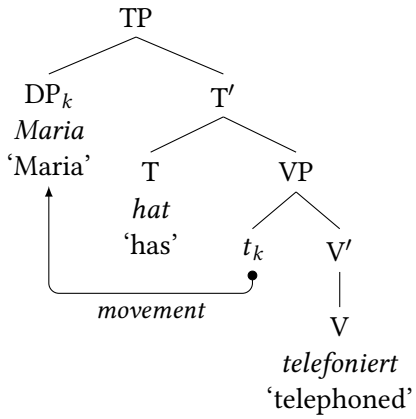
a. When is the auxiliary *be* (27a) selected? When is the auxiliary *have* (27b) selected?
b. Draw trees for the sentences in (27), based on your hypothesis.[6]

Assuming that German *angekommen* 'arrived' in (27a) and *telefoniert* 'telephoned' in (27b) behave in the same way as Brazilian Portuguese *chegar* 'arrive' (24a) and *telefonar* 'telephone' (24b), we can hypothesize that *be* is the auxiliary selected when the main verb is unaccusative, while *have* is selected when the verb is unergative. If this hypothesis is correct, the sentences in (27a–27b) can be represented as follows:

(28) *Derivation of (27a)*



(29) *Derivation of (27b)*



The same auxiliary distinction that we see in German appears in other languages. Consider, for instance, French:

(30) *French*

a. Il { *a / est } venu. *unaccusative*
he has is come
'He came.'

[6] German is a head-final language, but this is obscured in (27). The reason has to do with something called 'V2-movement,' which we will examine a future chapter about head movement and Amalgamation.

b. Il { a / *est } travaillé. *unergative*
he has is worked
'He worked.'

In the next section, we will examine a phenomenon in Japanese that converges on the same conclusion drawn from the Brazilian Portuguese data, i.e. the conclusion that there are two types of intransitive predicates, the difference between them being based on the position of the base-generation of the sole argument that it assigns a θ-role to.

5.4.3 Classifier floating in Japanese

In Japanese, when a numeral merges with a nominal, it must be suffixed by a morpheme whose form is determined by that nominal. Such a morpheme is called a *classifier*. The choice of classifier indicates an underlying categorization of nominals into separate classes. In (31a–31b), a numeral is suffixed with the classifier *-mai* or *-ri*, depending on what nominal the numeral merges with, 'colored paper' and 'guys,' respectively.[7]

(31) a. *pro* irogami-o ni-**mai** tot-ta
1SG.NOM colored.paper-ACC two-CL:SHEET take-PAST
'I took two sheets of coloured paper.'

b. Otoko-ga futa-**ri** ki-ta.
male-NOM two-CL:HUMAN come-PAST
'Two guys came.'

Furthermore, in Japanese, a nominal can appear separately from the numeral and classifier that accompanies it.

(32) a. Gakusei-ga Mary-ni [**hon-o** **ni-satsu**] ageta.
student-NOM Mary-DAT [book-ACC two-CL:VOLUME] gave
'The student gave Mary two books'

b. Gakusei-ga **hon-o** Mary-ni [__ **ni-satsu**] ageta.
student-NOM book-ACC Mary-DAT [two-CL:VOLUME] gave
'The student gave Mary two books'

c. **Hon-o** gakusei-ga Mary-ni [__ **ni-satsu**] ageta.
book-ACC student-NOM Mary-DAT [two-CL:VOLUME] gave
'The student gave Mary two books'

A *baseline* example is a simpler data point that can be compared with another set of minimally different data points. The minimal differences allow us to better grasp the features that characterize a given phenomenon. In (32), for instance, we see a sentence with the canonical sov that characterizes a head-final language such as Japanese. This sentence can then be used as a basis for comparison for the subsequent sentences, where the word order is different, allowing us to conclude that the latter involve some type of displacement.

(32a) is a baseline example where the numeral and classifier occur in adjacency.(32b) has the same interpretation, but 'book' is pronounced separately from the numeral that quantifies over it. Specifically, they are separated by 'Mary.' The same holds of (32c), though in this case 'book' is even farther away from 'two.'

The configuration that results in (32b–32c) is reminiscent of quantifier floating (e.g. *The students have all __ read the book*; see §4.3.1). As such, we can analyze the orders that we see in (32b–32c) as the result of moving 'book,' leaving behind the

[7] Abbreviations used in the Japanese data: ACC = accusative case, CL = classifier, DAT = dative case, NOM = nominative case.

numeral that quantifies over it. In the baseline (32a), no movement takes place, hence why 'book' and the numeral are contiguous.

Nonetheless, the classifier (CL) *satsu* is specific for 'book.' This is how we know that *hon-o* 'book-ASS' is related to *ni-satsu*, even if they appear separately. Floating a nominal away from a numeral and a classifier is, however, not always possible. Specifically, it is possible if the DP they float from is an object. This is the case in (32), since 'book' is the element selected by 'give' and which denotes the entity that undergoes the giving.

In contrast, classifier in Japanese is not possible from the subject position:

(33) a. [**Gakusei-ga** **futa-ri**] Mary-ni hon-o ageta.
[student-NOM two-CL:HUMAN] Mary-DAT book-ACC gave
'Two students gave Mary books.'

b. * **Gakusei-ga** Mary-ni [__ **futa-ri**] hon-o ageta.
student-NOM Mary-DAT [two-CL:HUMAN] book-ACC gave
Intended: 'Two students gave Mary books.'

c. * **Gakusei-ga** Mary-ni hon-o [__ **futa-ri**] ageta.
student-NOM Mary-DAT book-ACC [two-CL:HUMAN] gave
Intended: 'Two students gave Mary books.'

In (33b–33c), 'student' is the external argument of 'give' and moving it, so that the numeral and classifier affixed to it are stranded behind results in an ungrammatical sentence.

In a pattern that should be familiar by now, classifier floating in Japanese distinguishes between the internal and external argument of a predicate. With this conclusion in mind, consider what happens with intransitive predicates:

(34) a. **Kyaku-ga** ryokan-ni [__ **2-ri**] tuita. *unaccusative*
guest-NOM inn-DAT [two-CL:HUMAN] arrived
'Two guests arrived at the inn.'

b. * **Gakusei-ga** zibun-no kane-de [__ **2-ri**]
student-NOM self-GEN money-with [two-CL:HUMAN]
denwa-sita. *unergative*
telephoned
Intended: 'Two students telephoned using their own money.'

Formulate a hypothesis as to why (34a) is grammatical, but (34b) is not, and state explicitly why classifier floating can be used as an unaccusative vs. unergative predicate diagnostic in Japanese.

Classifier floating in Japanese is only possible from internal arguments. (34a) is grammatical because the only argument of unaccusatives is internal, hence floating is possible. (34b), in turn, is ungrammatical because the only argument of unergatives is external, hence floating is impossible. Alternatively said, the same reason that makes (32b–32c) grammatical also makes (34a) ungrammatical: classifier floating in these cases result from moving a DP and stranding a numeral and the classifier affixed to it in the internal argument position, Compl-VP. Likewise,

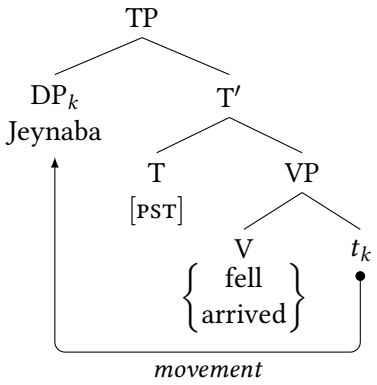
the same reason that makes (33b–33c) ungrammatical also makes (34b) ungrammatical: classifier floating in these cases is attempted from the external argument position Spec-VP, violating a rule imposed on classifier floating in Japanese.

In conclusion, classifier floating in Japanese can be used to distinguish between unaccusatives and unergatives because it distinguishes between internal and external arguments.

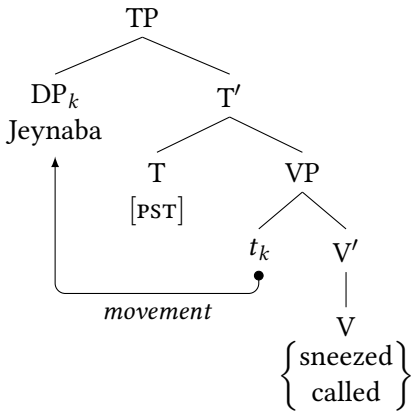
5.4.4 The structure of unaccusative and unergative sentences

We are finally in the position to draw structures for the intransitive sentences we started with in this section:

(35) a. Jeynaba fell/arrived.



b. Jeynaba sneezed/called.



As mentioned in the beginning of this chapter, the surface order of intransitive sentences is misleading: underlying the final sv order can be two underlying structures, which depend on the nature of v: if the predicate is unaccusative s is base-generated at Compl-VP (27), but, if the predicate is unergative, s is base-generated at Spec-VP (27).

Let us wrap up our investigation of different types of predicates and their argument structure with some exercises.

Exercise

In Brazilian Portuguese, verb–subject (vs) order is prohibited in the language, unless the verb is intransitive. However, not all intransitive verbs accept vs order.

(36) a. A Maria comeu a maçã. (*Brazilian Portuguese*)
the Maria eat.PST the aple
'Maria ate the apple.'

b. * Comeu a Maria a maçã.
eat.PST the Maria the aple
Intended: 'Maria ate the apple.'

c. Nasceu o filho da Maria.
be.born.PST the son of.the Maria
'Maria's son was born.'

d. * Riu o filho da Maria.
laugh.PST the son of.the Maria
Intended: 'Maria's son laughed.'

Given what we discussed in the previous sections, construct data with the verbs *nascer* 'to be born' and *rir* 'laugh' to determine whether they are unaccusative or unergative. The participial form of the verbs above are: *comido* 'eaten,' *nascido* 'been born,' and *rido* 'laughed.' Additionally, formulate a generalization about when vs order in Brazilian Portuguese.

We concluded above that absolute participles distinguish between unaccusatives and unergatives in Brazilian Portuguese. As such, if you are eliciting data in Brazilian Portuguese to determine what type of intransitive *nascer* and *rir* are, you would have to construct absolute participle constructions with these verbs.

(37) a. Nascido o filho da Maria, ...
be.born.PART.MASC.SG the son of.the Maria
'After Maria's son was born, ...'

b. * Rido o filho da Maria, ...
laugh.PART.MASC.SG the son of.the Maria
Intended: 'After Maria's son laughed, ...'

(37a) is an absolute participle formed from the predicate used in (36c), while (37b) is an absolute participle formed from the verb used in (36d). Brazilian Portuguese speakers judge (37a) grammatical, but (37b) ungrammtical. Given these judgments, *nascer* 'be born' must be an unaccusative verb, while *rir* 'laugh' must be an unergative verb:

We can now go back to the data in (36), repeated below, and classify the verbs in these sentences.

(38) a. A Maria comeu a maçã. *transitive*
the Maria eat.PST the aple
'Maria ate the apple.'

b. * **Comeu** a Maria a maçã.
eat.PST the Maria the aple
Intended: 'Maria ate the apple.'

c. **Nasceu** o filho da Maria. *unaccusative*
be.born.PST the son of.the Maria
'Maria's son was born.'

d. * **Riu** o filho da Maria. *unergative*
laugh.PST the son of.the Maria
Intended: 'Maria's son laughed.'

The generalization that emerges about VS order in Brazilian Portuguese is that it is only possible with unaccusative verbs. Hence, these data constitute yet another demonstration that languages are sensitive to a distinction between internal and external arguments, as revealed by phenomena that can only target unaccusative predicates, to the exclusion of unergative predicates.

Exercise

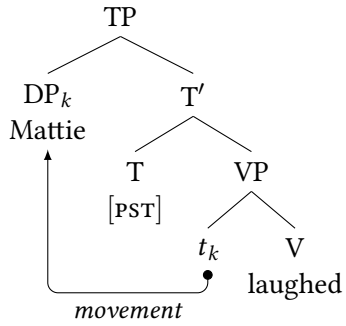
Draw a tree for each of the sentences below. Use arrows to indicate θ-role assignment and EPP movement.

(39) a. The glass will break.
b. Mattie sang in the choir.
c. The soup froze immediately.
d. Hampton said that Mattie called.

Exercise

Identify the mistake in the tree below:

(40)



Hint: take a look at §3.6.

5.5 The Uniformity of Theta-role Assignment Hypothesis

Our starting point was sentences like those in (4), repeated below, where verbs select a single argument.

(41) a. Jeynaba sneezed.
b. Jeynaba will call.
c. Jeynaba fell.
d. Jeynaba arrived.

Inasmuch as these sentences look identical, one could reasonably hypothesize that they have the same syntax. However, further inspection indicated otherwise. Specifically, we examined diagnostics from different languages that are sensitive to an external vs. internal argument distinction, namely:

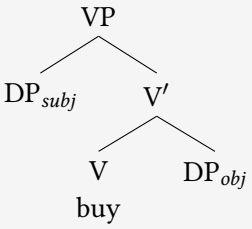
- Auxiliary selection (*be* vs. *have* in e.g. German (20)): there is a two-way division among intransitive predicates and auxiliary-selection is sensitive to it.
- Absolute participles in Brazilian Portuguese (24)): furthering this investigation, this division has to do with a subject vs. object distinction. Specifically, absolute participles in Brazilian Portuguese can only target objects. In other words, absolute participle formation in this language is sensitive to the difference between unaccusative and unergative predicates, only the former of which select an internal argument.
- Classifier floating in Japanese (34)): these data lead to the same conclusion. Much like absolute participle formation in Brazilian Portuguese, classifier floating in Japanese can only target objects and, as such, is sensitive to the unaccusative vs. unergative distinction.

The net result is that we now have three types of predicates, classified with respect to their argument structure. **Transitive predicates** are those which require the presence of two arguments, a subject, usually an AGENT or EXPERIENCER, generated at Spec-VP, and an object, usually a THEME, generated at the complement position of VP. **Unergative predicates** are those whose only argument is a subject, usually an AGENT or EXPERIENCER, which is generated at Spec-VP. Last but not least, **unaccusative predicates** are those whose only argument is an object, usually, a THEME, which is generated at the complement position of VP. These predicates can be schematized as follows:

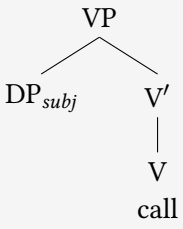
Definition 19

θ-role assignment configurations

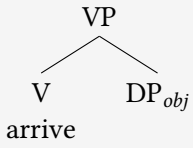
(42) *Transitive*



(43) *Unergative*



(44) *Unaccusative*



We can see from these diagrams that there is a correlation between Θ-roles and syntactic positions: AGENTS and EXPERIENCERS are mapped to a higher position, Spec-VP, while THEMES are mapped to a lower position, the complement of VP. The correlation between a given θ-role and the syntactic position it is assigned to is known as **Uniformity of Theta-Assignment Hypothesis** (UTAH):

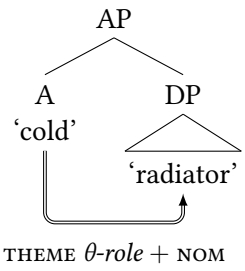
Definition 20

(45) *Uniformity of Theta-Assignment Hypothesis*

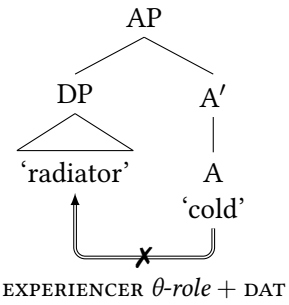
Identical thematic relationships between items are represented by identical structural relationships at the point at which they are first merged.

UTAH was also behind the two structures proposed for Icelandic 'cold' in §4.5.1.1 of the previous chapter:

(46) a.



b. #



To recall, when the argument selected by 'cold' is assigned nominative case, it is interpreted as a passive entity that feels cold (to someone else). However, when it is marked with dative case, it is interpreted as an entity that experiences cold. This is why a DP that denotes an inanimate entity such 'radiator' cannot bear dative case—this is indicated in (46b) with the symbol '#.'

5.6 Summary

In this chapter, we investigated two types of predicates that fulfill the structures expected from X-Bar Theory. More precisely, we compared and contrasted the characteristics of two types of intransitive predicates, namely, *unaccusatives*, which select only an internal argument, and *unergatives*, which select only an external argument.

5.6.1 Active retrieval

Classify the verbs below.

(47) arrive, believe, buy, call (*i.e.* telephone), claim, devour, fall, investigate, laugh, publish, read, receive, say, sing, sneeze

Transitive	Unaccusative	Unergative

Draw the TP skeleton for any sentence with a transitive, an unergative, and an accusative verb. (N.B.: the answer for the latter two is already in (5–6).)

Chapter 6

Binding Theory

6.1 Overview

Recall from §3.7 that a proper name (e.g. *Faatu* in (1)) cannot be correferent with a pronoun (e.g. *she* in (1)) in a configuration such as the following:

(1) * She$_1$ supported Faatu$_1$.

The subscripted indices play a crucial role in the interpretation of this sentence: if *she* is *not* coindexed with *Faatu* in this sentence, the result is grammatical (see (6a–6b)).

Likewise, we also preliminarily investigated the conditions under which an anaphor like *herself* could be licensed in a sentence:

(2) a. Faatu$_1$ supported herself$_1$.
b. * It seems to have rained on herself.

This chapter is dedicated to the investigation of the correference possibilities between different types of nominals in a sentence and across sentences. The component of the grammar responsible for regulating how nominals are interpreted is called **Binding Theory**.

In order to examine why *she* and *Faatu* cannot be coindexed in (1) and why (2a) is grammatical, but (2b) is not, we need to familiarize ourselves with some terms and conventions common in Binding Theory.

(3) If a nominal expression α provides a reference for another nominal expression β, then α is β's **antecedent**. We can also say that α **binds** β.

(4) By convention, correference is indicated with subscripted indices (e.g. α_1 or α_k).

Let us see how these terms can be employed, using the sentence (5) as a model.

(5) Faatu$_1$ supported herself$_1$.

In this sentence, the subscripted indices indicate that *Faatu* and *herself* have the same interpretation. In fact, *Faatu* provides *herself*'s reference. *Faatu* is, thus, *herself*'s antecedent. In other words, *Faatu* binds *herself*.

It is also possible to indicate that two nominals do not have the same reference:

(6) a. She$_1$ supported Faatu$_2$.
b. She$_i$ supported Faatu$_j$. (where $i \neq j$)

It is important to pay attention to the subscripted indices. The same string *she–supported–Faatu* is present in both (1) and (6a)/(6b). But this string can correspond to a grammatical or ungrammatical sentence, depending on the indices assigned to the nominals:

(7) *Same index: e.g. scenario where '1' picks out the individual named 'Faatu'*

* She$_1$ supported Faatu$_1$.

(= Faatu supported Faatu)

(8) *Different indices: e.g. scenario where '1' picks out the individual named 'Anna' and '2' picks out the individual named 'Faatu'*

She$_1$ supported Faatu$_2$.

(= Anna supported Faatu)

Binding theory is concerned with the conditions under which nominals can be coindexed in a sentence. More precisely, it states when three types of nominals can, must, or cannot be coindexed with another nominal in a sentence, namely:

- Anaphors, also called reflexives, e.g. *herself*
- Pronouns, e.g. *her*
- Referential expressions, e.g. proper names such as *Faatu* or definite descriptions such as *the calico cat*

The laws that govern the coindexation possibilities and requirements of anaphors, pronouns, and R-expressions are called Condition A, Condition, and Condition C, respectively. In the following sections, we will examine each rule in turn.

6.2 Condition A

Condition A or **Principle A** is the rule of Binding Theory that accounts for the distribution and interpretation of anaphors/reflexives.[1] The anaphors in English are listed on table 6.1 on p. 125.

In English, the anaphor's antecedent must match its features. For instance, *Faatu* is a 3rd person singular feminine DP, so it is an appropriate antecedent for *herself*. However, the same DP cannot be an antecedent for the 1st person plural anaphor *ourselves*.

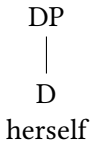
[1]Sometimes, a distinction is drawn between anaphors and reflexives, but these terms will be used in this book interchangeably.

		Singular	Plural
1st person		myself	ourselves
2nd person		yourself	yourselves
3rd person	masculine	himself	themselves
	feminine	herself	
	inanimate	itself	
	gender neutral	themself(ves)	

Table 6.1: The anaphors/reflexives in English

(9) a. Mary criticized {herself/*ourselves}.
b. I criticized {myself/*yourself}.
...

(10) is the structure we will assume for anaphors. Like the pronouns we examined in §3.7, they are DPs without a Spec or Compl.

(10)


Consider again the anaphor data we briefly investigated in the first chapter.

(11) a. Faatu$_1$ supported herself$_1$.
b. * It seems to have rained on herself.
c. * Faatu$_1$ supported herself$_2$.

By comparing (11a) and (11b), we concluded that there must be an appropriate DP that an anaphor like *herself* can be coindexed with. With our new terminology, we can now say that there must be an antecedent (i.e. *Faatu*) that binds the anaphor. In addition, by comparing (11a) and (11c), we concluded that, if there is an appropriate antecedent for an anaphor, the anaphor *must* be coindexed with it.

We then formulated a hypothesis like (12) to account for the conditions that must be met in order for an anaphor to be legitimate in a sentence—though (12) is restated with our new terminology:

(12) *Condition A* (version 1)

There must be another nominal phrase in the sentence that an anaphor is coindexed with.

(12) correctly predicts that (11a) is a grammatical sentence because there indeed is an antecedent that the anaphor *herself* is coindexed with (viz. *Faatu*). Likewise, (11b) is correctly predicted by (12) to be ungrammatical because there is no antecedent for *herself*. Last but not least, (12) correctly predicts that (11c) is ungrammatical because there is an appropriate antecedent for *herself*—*Faatu* is a 3rd

person singular DP, as required by this anaphor—, but the anaphor is not bound by it.

Before we continue, it is worth emphasizing that a prediction that a theory makes should not be mistaken for the grammaticality of a sentence that theory is trying to account for. A sentence of a natural language can be grammatical or ungrammatical. A theory that aims to explains the Faculty of Language must be able to account for both types of facts, inasmuch as a speaker or signer or any language has intuitions about both. Such a theory, in turn, can be correct or incorrect, i.e. it can make predictions that are borne out by facts or not. This yields the four logic possibilities on Tab. 6.2, given any sentence *S*.

Fact to be accounted for	**Theory**	**Evaluation of theory**
Speakers judge *S* grammatical.	Theory claims that *S* is grammatical.	Prediction is correct, since *S* is, indeed, grammatical.
Speakers judge *S* grammatical.	Theory claims that *S* is ungrammatical.	Prediction is incorrect, since *S* is, in fact, grammatical.
Speakers judge *S* ungrammatical.	Theory claims that *S* is ungrammatical.	Prediction is correct, since *S* is, indeed, ungrammatical.
Speakers judge *S* ungrammatical.	Theory claims that *S* is grammatical.	Prediction is incorrect, since *S* is, in fact, ungrammatical.

Table 6.2: *(Un)grammatical sentence* x *(in)correct prediction*

The conflation between a grammatical sentence and a correct prediction, or between an ungrammatical sentence and an incorrect prediction is likely due to the fact that linguistic science has language as its object (i.e. what it aims to investigate and explain) and also as its metalanguage (i.e. the formalization it uses to do so). Metalanguage and language as an object of study are, nonetheless, still distinct.

Going back to (12), consider now how this initial hypothesis would fare with respect to the following data:

(13) a. Faatu$_1$ believes herself$_1$ to have angered the wrong person.
b. * Seb believes herself$_1$ to have angered Faatu$_1$.

While (12) makes a correct predictions about the sentences in (11), it makes an incorrect prediction about the ungrammatical sentence (13b). Condition A, as currently stated in (12), correctly predicts that (13a) is grammatical, since there is another nominal that *herself* is coindexed with, just as in (11a). However, (12) incorrectly predicts that (13b) should be grammatical, since, in this sentence, there is also a nominal that the anaphor *herself* is coindexed with (viz. *Faatu*).

To recall, in order to account for (13b), we proposed an amendment to Condition A so that it included a *linear order* component ((14) is also restated in terms of our new terminology):

(14) *Condition A* (version 2)

An anaphor must be bound by an antecedent that *precedes* it.

The revised Condition A (14) explains the difference between (13a) and (13b) because only in (13a) does the antecedent *Faatu* precede the anaphor *herself*. (14) is also able to account for the sentences that (12) already did, i.e. the sentences in (11).

Let's now submit our new version of Condition A to scrutiny.

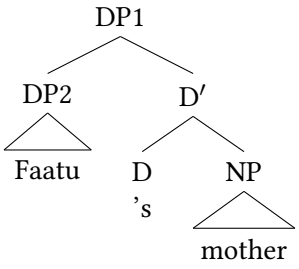
(15) a. [Faatu's mother]$_k$ supported herself$_k$.
b. * [Faatu$_k$'s mother] supported herself$_k$.

In (15a), the index *k* is outside of the brackets, indicating that it picks out the individual denoted by the entire DP, viz. the individual who is a parent to Faatu. In contrast, in (15b), the index is inside the brackets, indicating that it picks out the DP that it is contiguous to, viz. the individual whose name is *Faatu*—and that individual alone, not their mother.

(14) makes the correct prediction about (15a), since there is antecedent for the anaphor *herself* (viz. *Faatu's mother*) and it precedes it. However, the intended antecedent for the anaphor in (15b) is *Faatu* and it also precedes it. Why, then, is (15b) ungrammatical?

In order to appreciate the difference between (15a) and (15b), we will assume the following structure for a DP that expresses possession, i.e. a relationship between a possessor (e.g. *Faatu*) and a possessum (e.g. mother).

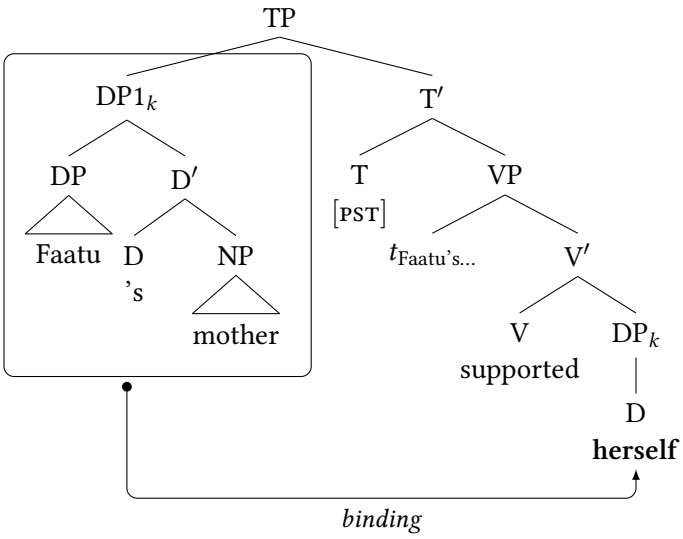
(16)



The DP is headed by the Saxon genitive *'s*. The possessor *Faatu* occupies Spec-DP position, while the possessum occupies the complement position of the DP.

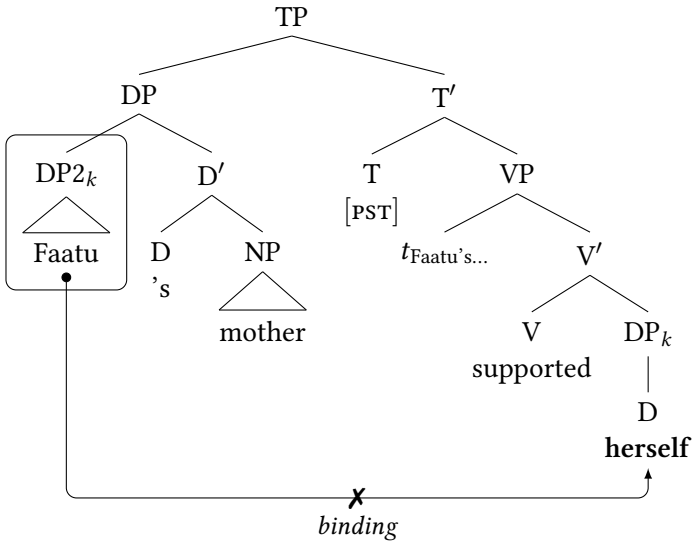
Now, we can compare the structures of the sentences (15a) and (15b). For convenience, the representations for (15a) and (15b) will not include VP nor movement of the subject from Spec-VP to Spec-TP. This is just to simplify the diagrams, so that we can focus on the relevant structural relationships. Here is the structure for (15a):

(17) [Faatu's mother]$_k$ supported herself$_k$.



And here is the structure for (15b):

(18) * [Faatu$_k$'s mother] supported herself$_k$.

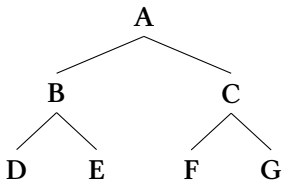


There is a crucial difference between the structural position of the entire DP [$_{DP1}$ *Faatu's father*] in (17) and the possessor [$_{DP2}$ *Faatu*] in (18). Intuitively, [$_{DP2}$ *Faatu*] in (18) is more "deeply embedded" inside the entire phrase DP1, which is in the subject position. This difference has to do with a structural relationship between syntactic nodes called **c-command**. In order to appreciate what c-command is, first we have to know some basic structural relationships between nodes in a tree.

6.2.1 Structural relationships

In (19), the node A is B's **mother** and also C's mother. Alternatively said, B and C are A's **daughters**. The reason is that there is only one descending line from A to B (and likewise for A to C). We can also say that A **immediately dominates** both B and C. Because B and C have the same mother (viz. A), B and C are **sister** nodes.

(19)

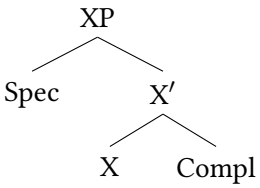


There are only descending lines between the node A and the nodes D, E, F, and G. However, the path from A to D, E, F, and G passes through other nodes (viz. the nodes B and C). The nodes D, E, F, G are, thus, **descendants** of A, though not its daughters. The node A does dominate D, E, F, and G, though not immediately.

Exercise

In (20), we see a basic tree that follows X-Bar Theory.

(20)



a. Which node is the Spec's mother?
b. Which node is the Compl's mother?
c. Does the maximal projection dominate both its Spec and Compl?

XP dominates Spec and is, therefore, its mother. On the other hand, it is X′ which is the complement's mother. XP dominates both its Spec and its complement, though it only *immediately* dominates the former.

Dominance can be formalized as follows:

Definition 21

(21) a. α dominates β *iff* β is contained in a branch that originates from α, i.e. α is β's mother or β is a descendant of α, though not necessarily its daughter.
b. α *immediately* dominates β *iff* β is contained in a branch that originates from α, i.e. α is β's mother.

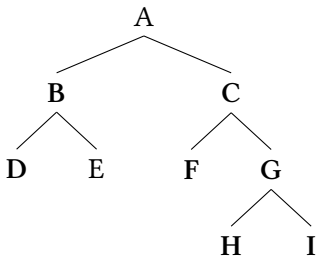
We are now in the position to define c-command:

Definition 22

(22) α c-commands β iff:
a. α is γ's sister and γ dominates β, or
b. α is β's sister.

To illustrate this structural relationship, let us examine the arbitrary tree in (23).

(23)



B and C are **sisters** (i.e. they are both immediately dominated by A, their mother). B and C are, thus, in a **mutual** or **symmetric** c-command relationship, i.e. B c-commands C and C c-commands B. The nodes F, G, H, and I are C's descendants. B, which is C's sister, **asymmetrically c-commands** F, G, H, and I. By the same token, D and E are B's descendants and, therefore, are c-commanded by B's sister, viz. C.

Exercise

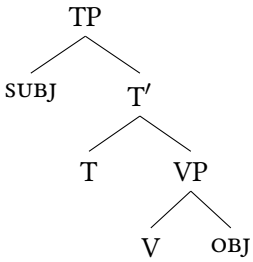
a. In (23), which nodes does D c-command?
b. Does D c-command C?
c. Does D c-command any of C's descendants?

The only node that D c-commands is E. D does not c-command C nor any of C's descendants (viz. F, G, H, and I), since none of these nodes is D's sister or a descendant of D's sister.

Exercise

(24) is a basic schema for the structure of a clause. (vish and movement of the subject to Spec-TP are set aside for ease of exposition.)

(24)



a. Which nodes does the subject c-command?
b. What c-command relationship is there between the subject and the object?

The subject at Spec-TP c-commands all other nodes, except for the topmost node, TP. The subject asymmetrically c-commands the object.

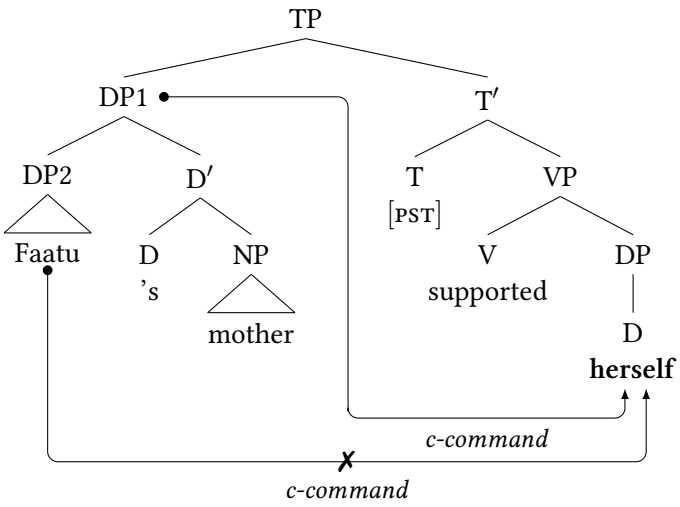
Now that we know what c-command is, we can finally go back to the contrast between (15a) and (15b), which are repeated below.

(25) a. [Faatu's mother]$_k$ supported herself$_k$.
b. * [Faatu$_k$'s mother] supported herself$_k$.

The contrast between these two sentences boils down to what part of the subject is the antecedent of the anaphor in the object position, the whole subject *Faatu's mother* or part of it, *Faatu*.

We can represent this difference as follows:

(26)



As we can see in (26), the crucial difference between (25a–25b) is that the whole DP [$_{DP1}$ *Faatu's mother*] c-commands *herself*, but the phrase encapsulated inside it [$_{DP2}$ *Faatu*] does not.

Recall that out our current version of Condition A, repeated in (27), makes a prediction about (25b) that is not borne out by the facts, i.e. it predicts that the ungrammatical sentence (25b) should be grammatical: the antecedent *Faatu* does precede the anaphor *herself*, as required by (27). This prediction about an ungrammatical sentence is, thus, incorrect.

(27) *Condition A* (version 2)

An anaphor must be bound by an antecedent that *precedes* it.

The problem with (27) is that it incorporates linear precedence. What can we replace it with in order to account for the difference between (25a–25b)? Formulate a revised version of Condition A that can account for this difference.

Linear precedence can be replaced with *c-command*. A new version of Condition is, thus, as follows:

(28) *Condition A* (version 3)

An anaphor must be bound by an antecedent that **c-commands** it.

According to this new definition, (25a) is predicted to be a grammatical sentence because the antecedent *Faatu's mother* c-commands the anaphor *herself*. This prediction is borne out by facts (i.e. (28) is making a correct prediction about a grammatical sentence). (25b), in turn, is predicted by (28) to be ungrammatical, because the intended antecedent *Faatu* does not c-command *herself*. This prediction is also corroborated by facts (i.e. (28) is making a correct prediction about an ungrammatical sentence). In all other sentences we examined thus far (viz. (11) and (13)), the intended antecedent (when there was one) was not contained in a larger structure, so no c-command issue arose and (28) can also account for them without any problem.

We can finally define **binding**:

Definition 23

(29) α binds β iff:

i. α and β are coindexed, and

ii. α c-commands β.

(30) If β is not bound, we say that β is **free**.

As the reader can easily verify, in all grammatical sentences in (11), (13), and (25), the reflexive has an antecedent that is coindexed with it and which c-commands it. As such, in all these sentences, the antecedent binds the reflexive.

Exercise

The two conditions in (29) are both necessary for binding to go through. If at least one of these conditions is not met, binding is not possible.

Identify the binding condition that is not met in the sentences below.

(31) a. * Solfrid$_1$ followed herself$_2$.

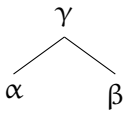
b. * Solfrid$_1$'s competitor followed herself$_1$.

c. * Solfrid$_1$'s competitor followed herself$_2$.

A structural relationship such as c-command are the backbone of Generative Syntax. As such, make sure to complete the exercises in this section, including the one below, before making your way through the rest of this chapter.

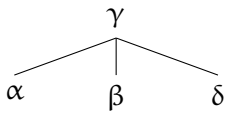
Exercise

Recall the definition of *Merge* (see Definition 8 in chapter 3):

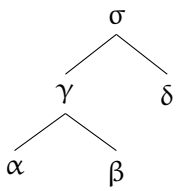
(32) $Merge(\alpha, \beta) \longrightarrow$ 

No restriction has been imposed on the number of elements that can be in the input to this operation—in (32), *Merge* operates over two elements, viz. α and β.

In principle, there is nothing wrong with *Merge* operating over e.g. three elements, as we see in (33) below:[2]

(33) $Merge(\alpha, \beta, \delta) \longrightarrow$ 

Because *Merge* is binary in (32), adding a third element δ in the structure requires recursion, as we see in (34) below. In contrast, δ can simply be part of the input, along with α and β, when *Merge* is ternary, as we have already see in (33).

(34) $Merge(Merge(\alpha, \beta), \delta) \longrightarrow$ 

The goal of this exercise is to compare the c-command relationships in the binary and ternary structures in (34) and (33), respectively.

a. In both (33–34), what is the c-command relationship between α and β?
b. Describe the c-command differences between α (or β) and δ in (33) and (34).

When answering these questions, bear in mind that c-command can be symmetrical (or mutual) or asymmetrical.

6.2.2 Binding Domain

Let's scrutinize our formulation of Condition A, repeated below, one final time.

(35) *Condition A* (version 3)

An anaphor must be bound by an antecedent that c-commands it.

[2] More generally, hypothetically, *Merge* could operate over any number *n* of elements. In (32), *n* =2 and, in (33), *n* =3.

To do so, consider the sentences below:

(36) a. Faatu$_1$ supported herself$_1$.
b. * Faatu$_1$ believed [that Ricardo supported herself$_1$].

The conditions imposed by Condition A in (35) are all satisfied in (36b). *Faatu* is the subject of the higher clause, so it c-commands everything else in the sentence, including the anaphor *herself*. Because *Faatu* and *herself* are coindexed and the former c-commands the latter, according to the definition of binding in (29), *Faatu* binds *herself*. Hence, all requirements in (28) are satisfied. (35), then, is making an incorrect prediction about (36b)'s ungrammaticality. How can we fix this problem?

Recall that predicates can select a clause as an argument. If a verb *V1* selects a clause *C* as its complement, then *V1* is called a 'main/matrix verb.' *C*, in turn, is an embedded/subordinate clause.

The observable difference between (36a) and (36b) is that, in (36a), there is one single clause, while in (36b), there is a matrix and an embedded clause. In other words, the difference between (36a) and (36b) is that, in the latter, the anaphor and its antecedent are separated by a *clausal boundary*. It is, then, reasonable to hypothesize that an anaphor must be bound by its antecedent in the same clause:

(37) *Condition A* (version 4)
An anaphor must be bound by an antecedent *within the same clause*.

(37) correctly predicts that (36a) is grammatical, since there is just one clause and the anaphor *herself* is bound by *Faatu* within that clause. Conversely, in (36b), *Faatu* and *herself* belong to separate clauses, so the anaphor is not being bound by its antecedent within the same clause. This is a violation of the requirements imposed in (37), so (37) predicts that this sentence should be ungrammatical. This prediction is corroborated by the facts, since this sentence is, indeed, ungrammatical. All the previous sentences that we investigated above (viz. (11), (13), and (25)) are monoclausal, so the additional restriction in (37) does not affect them and this version of Condition A can still account for them correctly.

As the name suggests, a sentence is *monoclausal* when it contains only one clause. In a language like Standard English, this means that there is only one main/lexical verb in the sentence. A sentence is *biclausal* when it consists of two clauses, which can be roughly equated with the occurrence of two lexical verbs.

How would our new version of Condition A in (37) fare against the sentences in (38)?

(38) a. * Faatu$_1$ believed [that Ricardo supported herself$_1$].
b. Faatu$_1$ believes [herself$_1$ to be a private person].

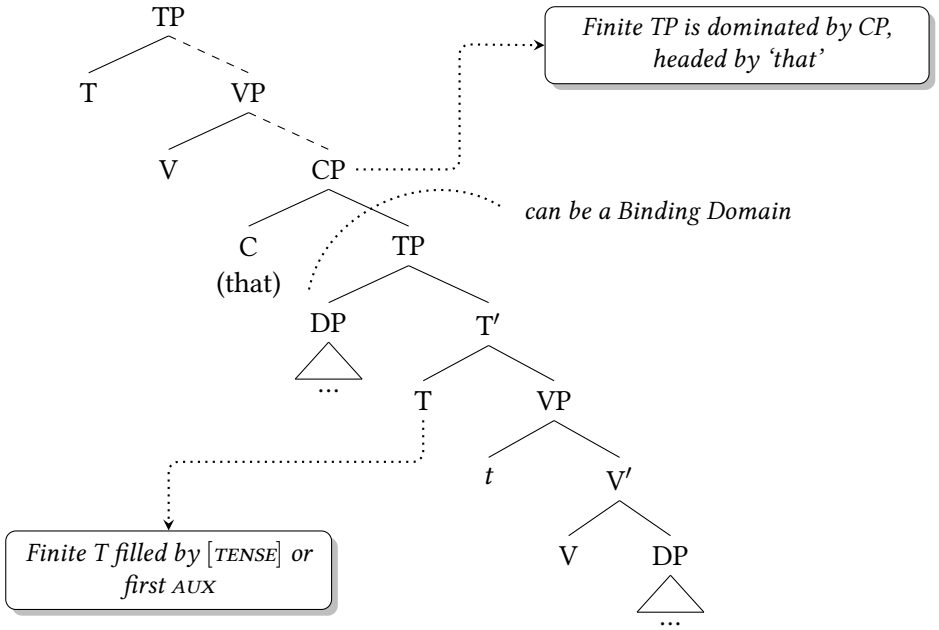
The theory stated in (37) predicts that the sentence (38b) should be as ungrammatical as (38a), since, in both, the antecedent *Faatu* and the anaphor *herself* belong to different clauses. However, unlike (38a), (38b) is a grammatical sentence. As a a result, (37) makes an incorrect prediction about (38b).

But there is a crucial difference between (38a) and (38b) that (37) does not capture. In (38a), the embedded clause where the anaphor is located is **finite**, while the embedded clause in (38b) is **nonfinite**.

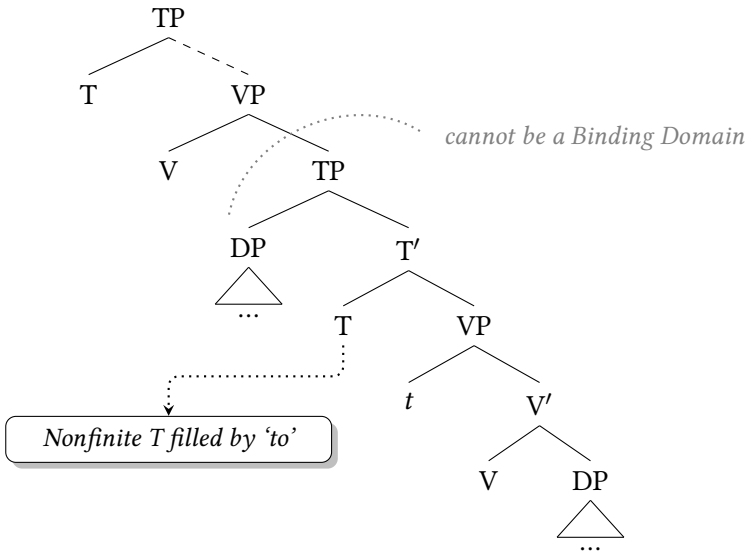
- Finite clauses have a verb that is inflected for tense and/or agreement, depending on language-specific properties, and it may also have a complementizer (e.g. English *that*).
- Nonfinite clauses have a verb that is not inflected. An example of nonfinite clause in English is an infinitival clause, the verb of which is preceded by *to*.

These properties are highlighted in the diagrams below. The matrix clause has been simplified, since our focus here is on their embedded counterpart.

(39) a. *Embedded finite clause*



b. *Embedded nonfinite clause*



The verb in a finite clause is inflected. In English, can be seen in e.g. present

tense, when the subject is [3SG], and in past tense (40a). Conversely, no inflectional morphology is allowed in infinitival clauses (40b).

(40) a. Gary proved [that Sarah is/was guilty].
b. Gary proved [Sarah to be/*is/*was guilty].

What (38) shows is that the binding of an anaphor cannot take place in just any portion of the syntactic structure. Rather, the binding of an anaphor has to occur within a **Binding Domain**.

A *syntactic domain* is a particular portion of the syntactic structure. It is defined as a set of nodes that are dominated by a given node.

DEFINITION 24

(41) A **Binding Domain** is the smallest finite TP that contains a nominal expression that can or must be bound.

With this definition in place, we are finally able to formulate the final version of Condition A:

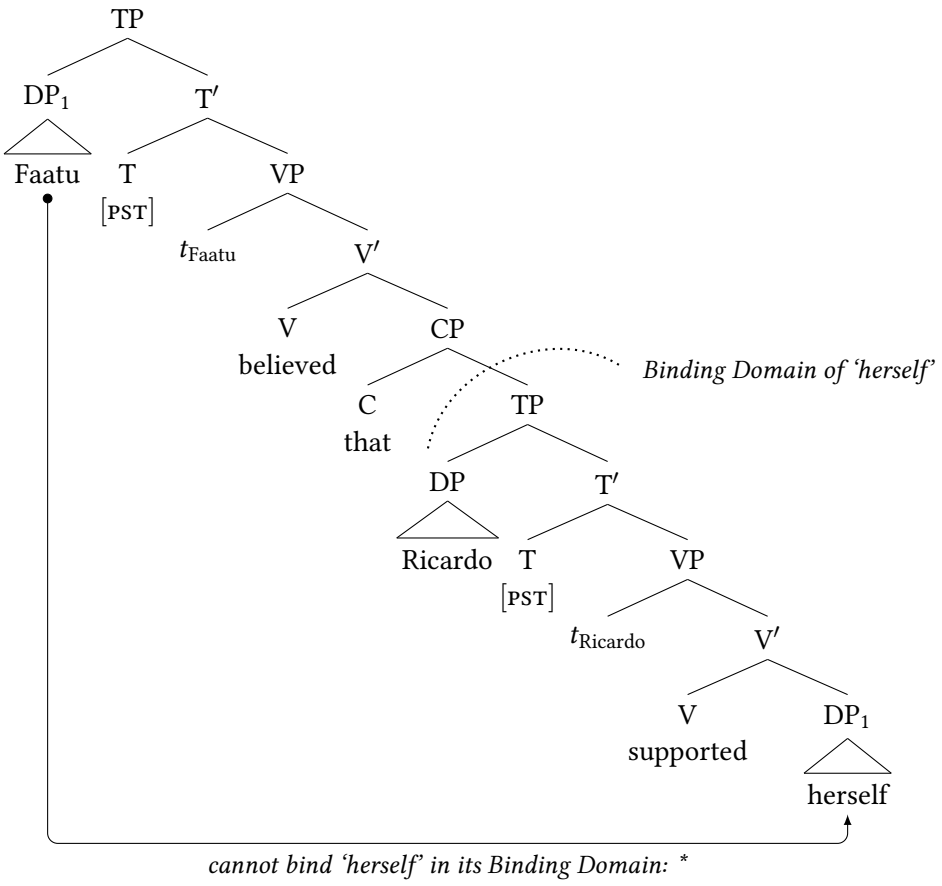
DEFINITION 25

(42) **Condition A**
An anaphor must be bound in its Binding Domain.

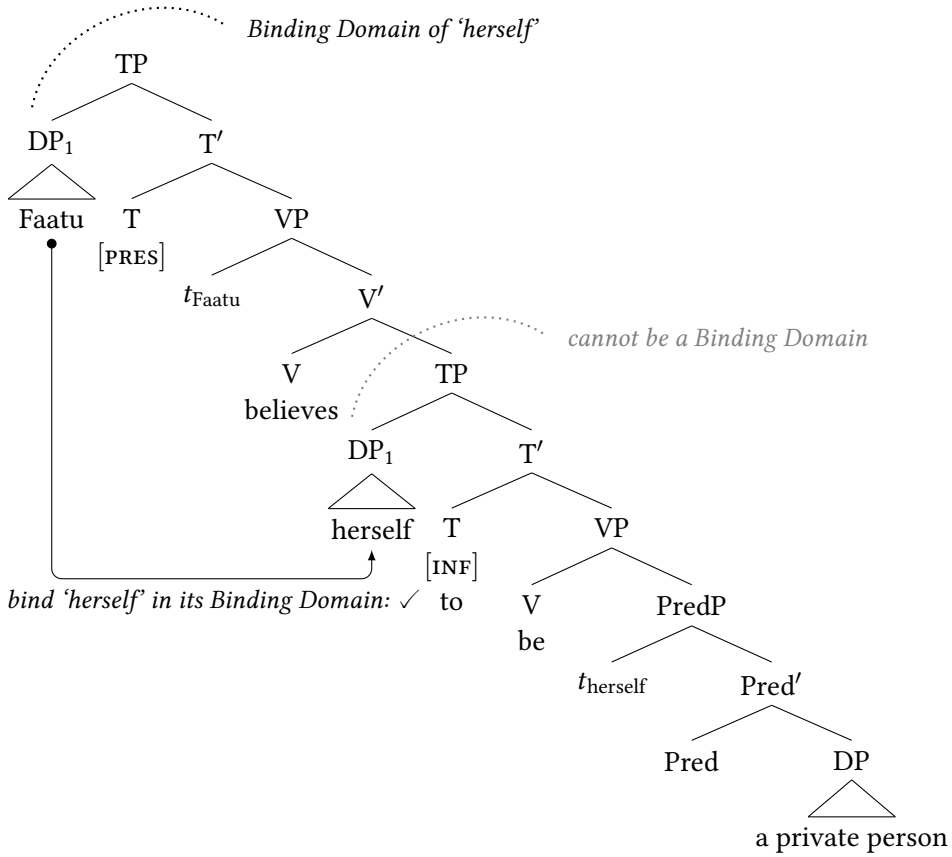
(42) provides an explanation for the contrast between (38a) and (38b). (38a) is ungrammatical because *herself*'s Binding Domain is the embedded finite clause between brackets. In this domain, the anaphor is not bound (i.e. it is free). This is a violation of Condition A (42). In (38b), on the other hand, *herself*'s Binding Domain is the entire sentence, since the embedded clause is nonfinite. Within that domain, *herself* is bound by *Faatu*. As such, (42) is complied with. (38a) and (38b) can be represented as (43) and (44), respectively.[3]

[3]Movement generates a trace *t* that is coindexed with the moved constituent. However, to avoid confusion, since indices are also used to indicate coindexation, movement traces are subscripted with a label that is identical to the moved constituent.

(43) * Faatu$_1$ believed [that Ricardo supported herself$_1$].



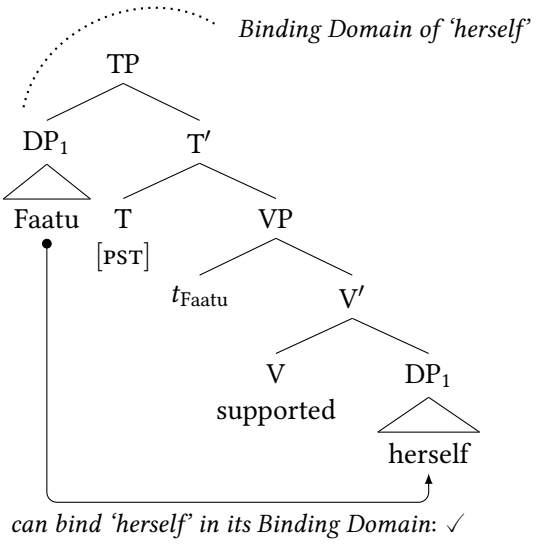
(44) Faatu$_1$ believes [herself$_1$ to be a private person].[4]



In monoclausal sentences, the entire sentence is the Binding Domain of an anaphor contained in it, since this is trivially the smallest finite clause that contains the anaphor. A sentence like (45) has the representation below.

[4]We saw in chapter 4 that different types of grammatical category can be predicates (e.g. V, A, N, etc). For concreteness, assume that *PredP* 'Predicational Phrase' is an XP that turns the DP in its complement position into a predicate. The external argument of the predicate thus formed is generated at Spec-PredP. PredP is selected by a VP headed by the verb *be* (just like predicate APs are).

(45) Faatu$_1$ supported herself$_1$.



6.2.3 Interim summary

We investigated the conditions under which anaphors can be bound by an appropriate antecedent. For an antecedent α to bind an anaphor β:

- α must match β's feature (e.g. person, gender, and number, in English).
- α must c-command β.
- α must be in β's Binding Domain (i.e. the smallest finite clause that contains β).
- α must be the closest potential antecedent to β, with Closeness defined in terms of c-command.

Before we proceed, let's make sure these conditions are well understood.

Exercise

a. Draw a tree for each of the sentences below, indicating binding with an arrow.

(46) a. The child$_1$ hugged herself$_1$.

b. The suspect$_1$ (unwittingly) proved themselves$_1$ to be a criminal.

b. Explain why the sentences below are ungrammatical. Include tree diagrams in your answer.

(47) a. * The statue of themselves stoked widespread interest.

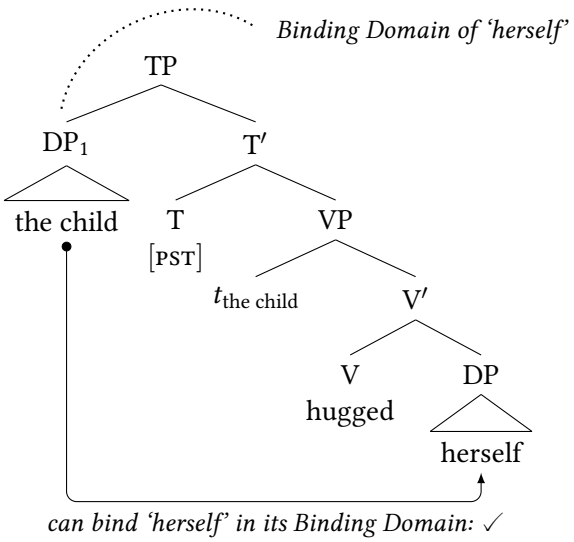
b. * Mary thinks that it will snow on herself.

Make the following assumptions:

- *Of themselves* is a PP adjoined to the NP *statue*.
- *Snow* projects a VP without a Spec or a Compl.
- *On herself* is a PP adjoined to *snow*'s VP.
- *It* is an expletive base-generated at Spec-TP so that the Extended Projection Principle (EPP) can be complied with.

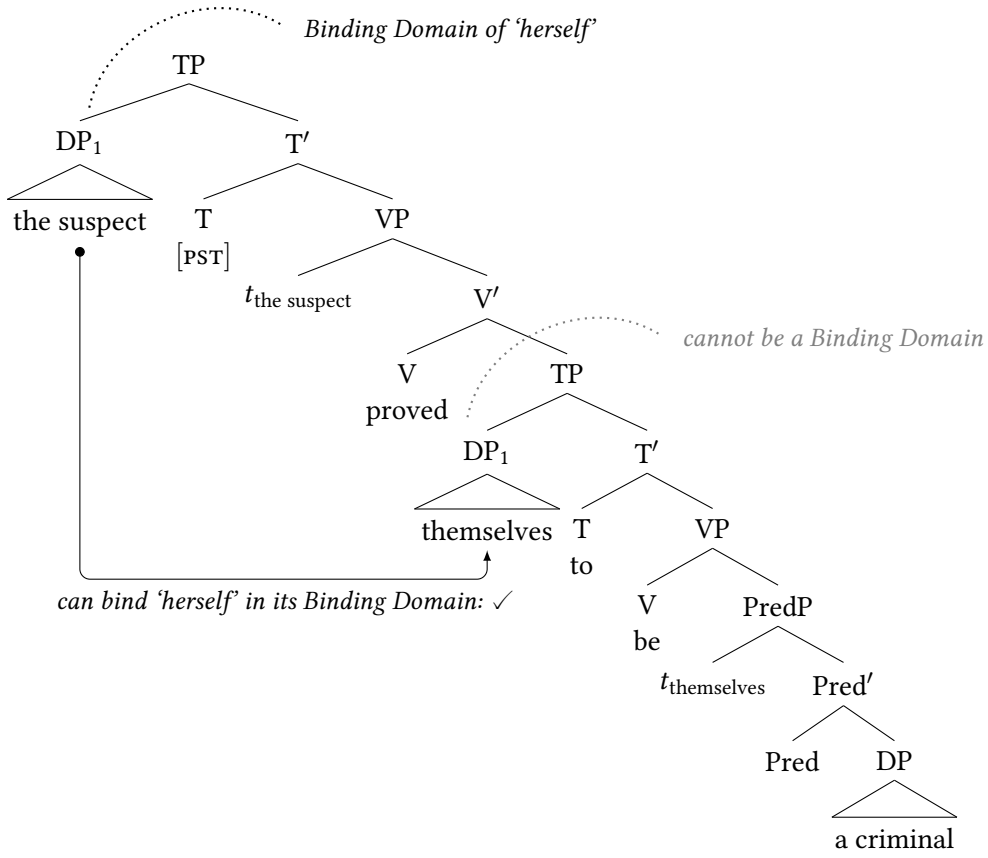
The representation of (46a) is as follows:

(48)



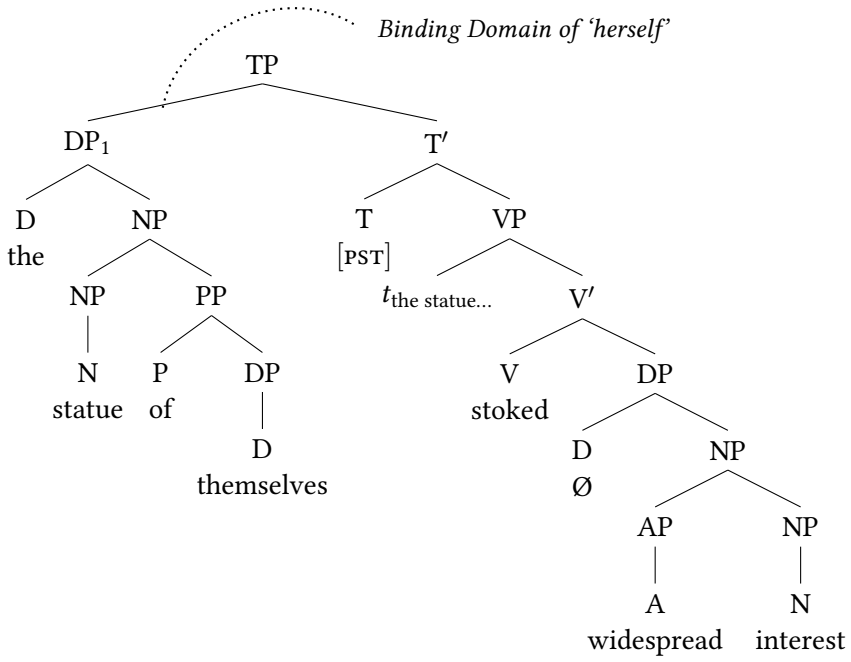
(46b), in turn, can be diagrammed as follows:

(49)



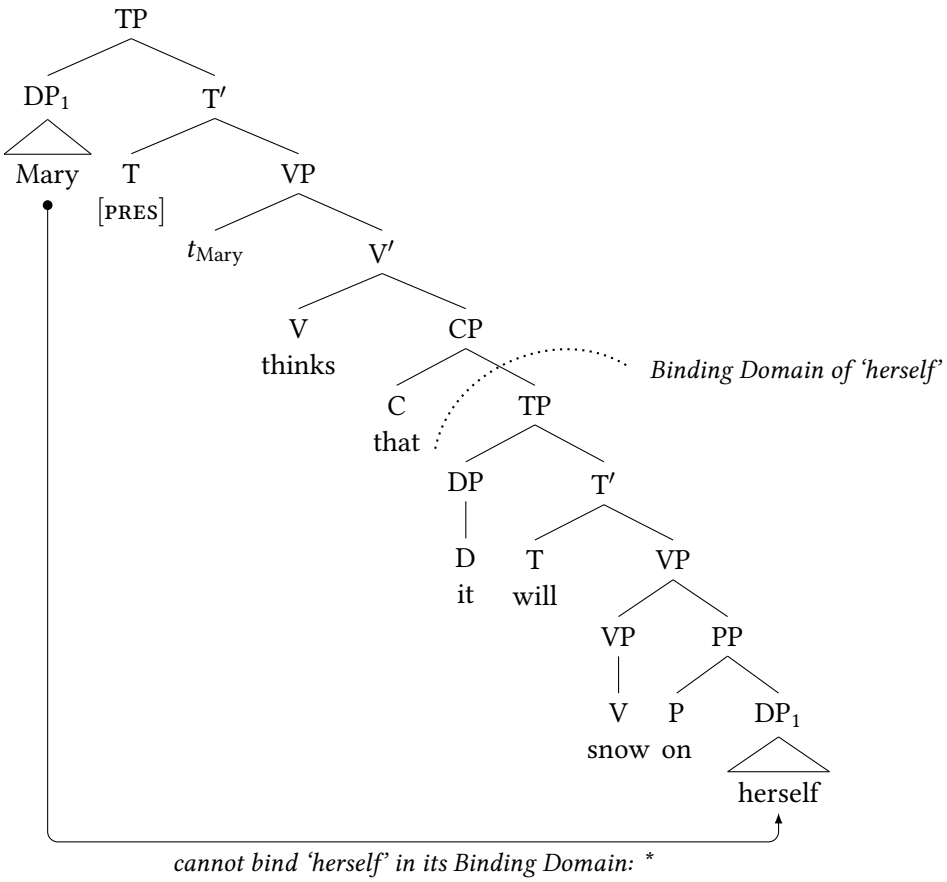
(47), represented in (50) below is ungrammatical because there is no antecedent to bind the anaphor *themselves*.

(50) *



Finally, the sentence (47b), which is represented in (51), is ungrammatical because the anaphor *herself* is not bound in its Binding Domain. More precisely, in this sentence, the Binding Domain of the anaphor is the embedded clause [*that will snow on herself*], a finite clause. There is no antecedent for *herself*, in violation of Condition A. *Mary*, being the subject of the sentence, c-commands everything else in structure, but it cannot bind the anaphor because it sits outside of its Binding Domain.

(51)



This concludes our investigation of the conditions that must be satisfied in order for anaphors to be bound in a sentence. Next, we turn to the conditions that govern the coindexation possibilities of pronouns and how they compare to the licensing conditions imposed by anaphors.

6.3 Condition B

Recall the anaphor data in (36), repeated below as (52), and compare it with (53), where the anaphor was replaced with a matching pronoun (i.e. a pronoun that is also [3SG] and [FEM], just like *herself*).

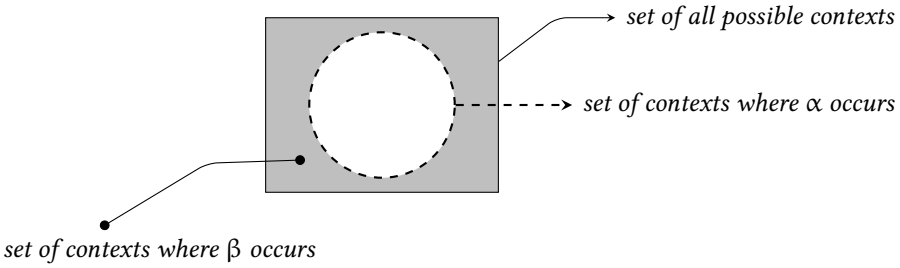
(52) a. Faatu$_1$ supported **herself**$_1$.
b. * Faatu$_1$ believed [that Ricardo supported **herself**$_1$].

(53) a. * Faatu$_1$ supported **her**$_1$.

b. Faatu$_1$ believed [that Ricardo supported **her**$_1$].

While (52a) is grammatical, (53a) is ungrammatical. The opposite holds of (52b) and (53b). This means that the contrast between (52) and (53) shows us that anaphors and pronouns are in **complementary distribution**. If α and β are in complementary distribution, α occurs in all contexts where β does not occur (and vice-versa). Schematically:

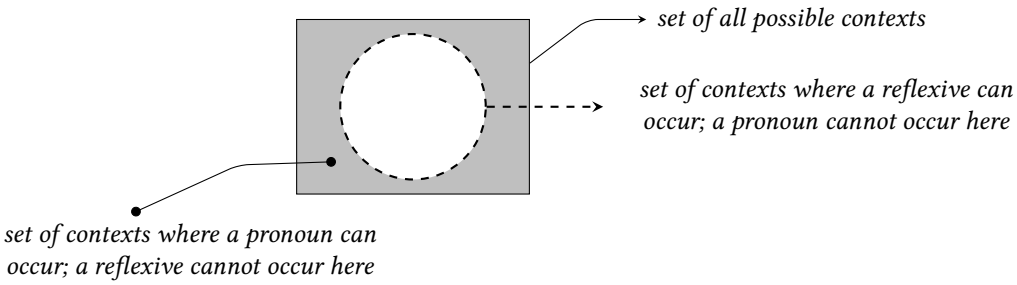
(54)



The dashed circle in (54) represents the set of contexts where some element α occurs. This is, of course, a subset of all the possible contexts, which is represented by the outermost rectangle. Because α and β are in complementary distribution, the set of contexts where β occurs comprises the gray portion inside the rectangle that is not already taken up by α's dashed circle.

Going back to the asymmetry between anaphors and pronouns indicated by (52–53), we can say that, in every context where reflexives occur, a pronoun cannot occur, and vice-versa:

(55)



Condition B is the component of Binding Theory that accounts for the distribution and interpretation of pronouns. It must defined in such a way that it accounts for the complementarity of the distribution of reflexives and anaphors.

The singular and plural pronouns in English are as follows:[5, 6]

[5]We will not talk about possessive pronouns in English (e.g. *my*, *their*, etc), since they do not uniquely obey either Condition A or Condition B.

[6]NOM and ACC stand for 'nominative' and 'accusative' case, respectively. We will talk about case in a later chapter. For now, it suffices to say that nominative is the form of a nominal when it occurs in the subject position, while accusative is the form of a nominal when it occurs in the object position.

		Singular	
		Subject (NOM)	Object (ACC)
1st person		I	me
2nd person		you	you
3rd person	MASCULINE	he	him
	FEMININE	she	her
	INANIMATE	it	it
	GENDER NEUTRAL	they	them

Table 6.3: Singular pronouns in English

	Plural	
	Subject (NOM)	Object (ACC)
1st person	we	us
2nd person	you	you
3rd person	they	them

Table 6.4: Plural pronouns in English

(56) is the structure of pronouns. As we saw in §3.7, they are DPs without a Spec or a complement.

(56)


We concluded in the previous section that anaphors must have an antecedent in the same Binding Domain. On the other hand, given the same environment, pronouns *cannot* have an antecedent—in (57a–57b), the environment where reflexives such as *herself* and pronouns such as *her* are in complementary distribution is a monoclausal sentence.

(57) a. Faatu$_1$ supported herself$_1$.
b. * Faatu$_1$ supported her$_1$.

Furthermore, we saw that not only does an anaphor need an antecedent, the antecedent must c-command the anaphor:

(58) a. [Faatu's mother]$_k$ supported herself$_k$.
b. * [Faatu$_k$'s mother] supported herself$_k$.

The equivalent data for pronouns is as follows. Once again, we the complementarity in distribution between anaphors and pronouns.

(59) a. * [Faatu's mother]$_k$ supported her$_k$.
b. [Faatu$_k$'s mother] supported her$_k$.

Likewise, we concluded that, not only does an anaphor require an antecedent, the antecedent has to be contained in the anaphor's Binding Domain. To recall, a Binding Domain was defined in terms of the smallest finite clause that contains the relevant nominal. (60) is biclausal sentence where the embedded clause contains the anaphor *herself*. Because this clause is finite, this is the anaphor's Binding Domain. *Herself*'s intended antecedent is the matrix subject *Faatu*, which is outside of the anaphor's Binding Domain. (60) is, thus, ungrammatical due to a Condition A violation: the anaphor *herself* is not bound within its Binding Domain.

(60) * Faatu$_1$ believed [that Ricardo supported herself$_1$].

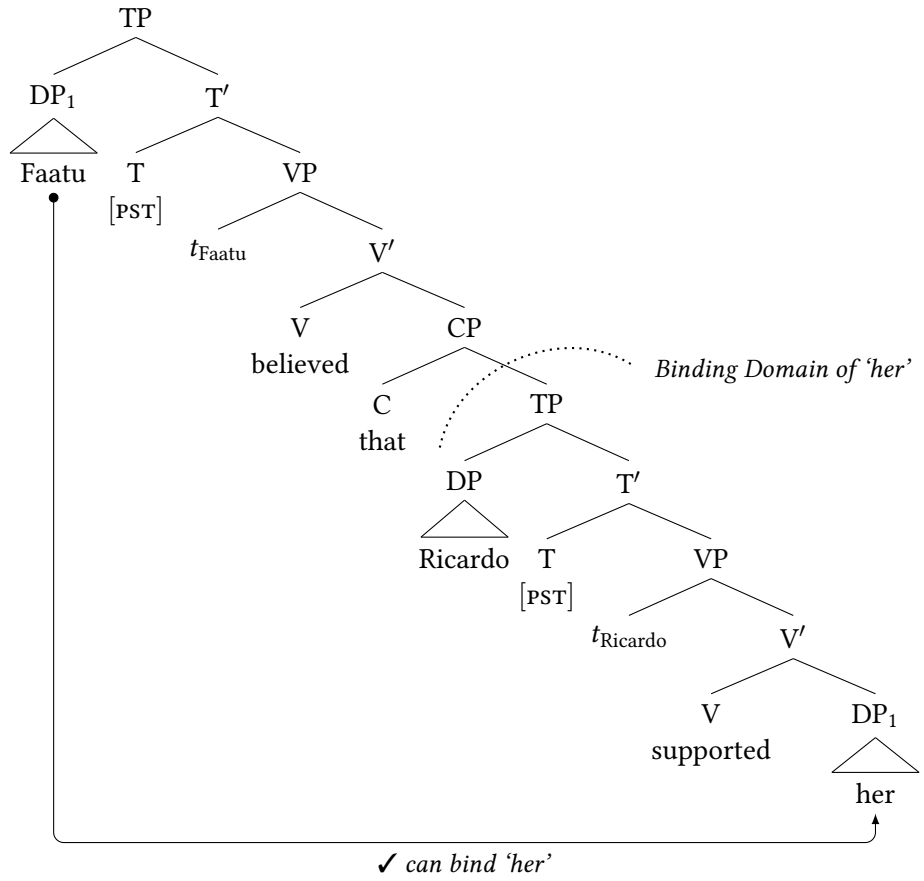
In contrast, pronouns *can* have an antecedent that is outside of its Binding Domain. To emphasize, a Binding Domain is defined uniformly for all types of nominals, including not only anaphors, but also pronouns. In (61), the Binding Domain of the pronoun *her* is, thus, also the embedded finite clause.

(61) Faatu$_1$ believed [that Mary supported her$_1$].

To complete the discussion, *her* cannot be coindexed with *Mary*. We will see that the reason is the same one that explains why (57b) is ungrammatical.

(61) can be diagrammed as follows (cf. (43)):

(62)



While (61) shows that a pronoun can have an antecedent that is outside the pronoun's Binding Domain, the sentences in (63) below show that a pronoun does not have to have an antecedent at all.

(63) a. It seems to her that it will rain.
b. Ricardo supported you.

Compare these sentences with their anaphoric counterparts:

(64) a. * It seems to herself that it will rain.
b. * Ricardo supported myself.

The differences between the licensing conditions of anaphors and of pronouns are summarized on table 6.5.

	Anaphor	Pronoun
There must be an antecedent	yes	no
The antecedent must be in the Binding Domain	yes	no
The antecedent must be c-commanding	yes	no

Table 6.5: Licensing conditions: anaphors vs. pronouns

In order to account for all these differences, Condition B is formulated as follows:

Definition 26

(65) **Condition B**
A pronoun must be free in its Binding Domain.

Recall that 'free' is defined as the opposite of being bound (see (29–30)).

To ensure that the concepts of binding and Binding Domain are firmly understood, the reader is tasked with concluding this section about Condition B. The following exercises illustrate the workings of this principle, as well as its comparison with Condition A.

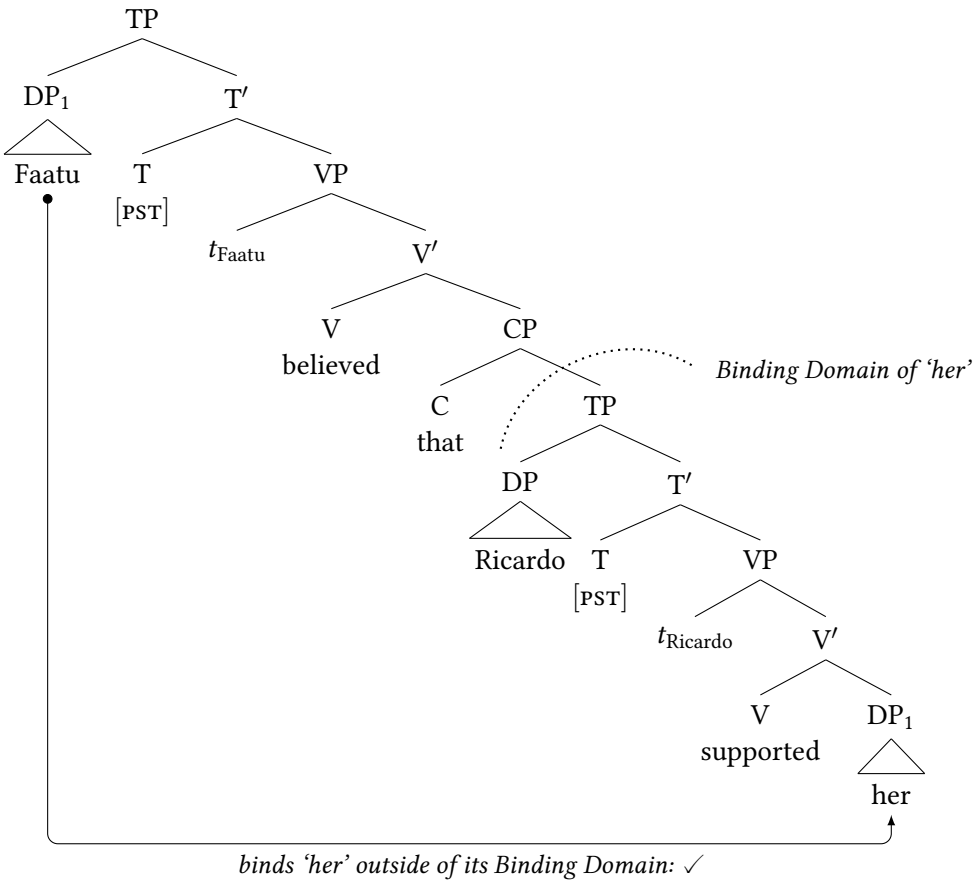
Exercise

Based on (65), provide an explicit explanation for the (un)grammaticality of the sentences we examined (with minor modifications, for clearer contrasts):

(66) a. Faatu$_1$ believed [that Ricardo supported her$_1$].
b. Ricardo$_1$ supported him$_2$.
c. * Ricardo$_1$ supported him$_1$.

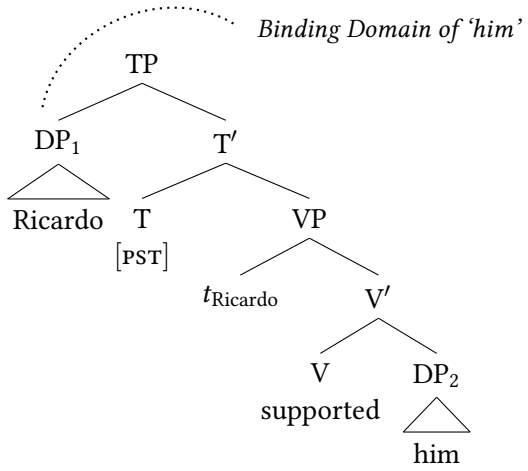
The sentence (66a) is represented in (67). The Binding Domain of the pronoun *her* is the embedded finite TP. The pronoun's antecedent (viz. *Faatu*) is the subject of the matrix clause, which means that the pronoun's antecedent is outside of its Binding Domain. (66a) is, thus, grammatical because the pronoun is free in its Binding Domain, as dictated by Condition (65) of Binding Theory.

(67)



The pronoun *him* in (66b), which is diagrammed in (68), is also free, though this sentence is grammatical for different reasons. The Binding Domain of the pronoun in this case is the entire sentence, since it is monoclausal. The DP subject *Ricardo* has matching features, c-commands *him*, and is placed within its Binding Domain. However, *Ricardo* and *him* have different indices (*1* and *2*, respectively). Because binding requires coindexation, the pronoun *him* is free in its Binding Domain, as required by (65).

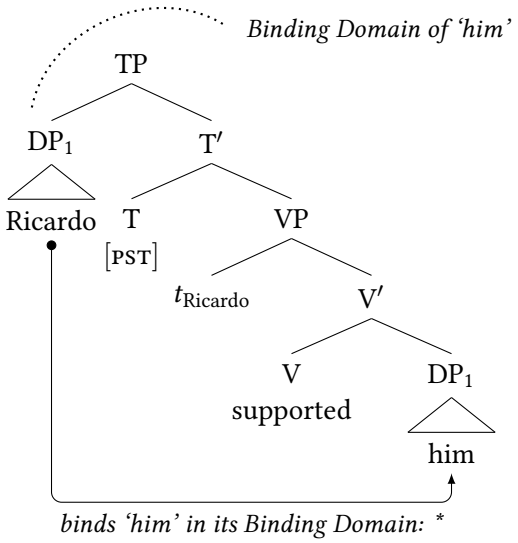
(68)



Finally, (66c) is an identical sentence, except that, now, *Ricardo* and *him* are

coindexed, rendering it ungrammatical. More precisely, the pronoun's antecedent c-commands it in its Binding Domain, in violation of Condition B.

(69)



Exercise

Explain why there is a grammaticality contrast between (70a) and (70b).

(70) a. * [Faatu$_k$'s mother] supported herself$_k$.
b. [Faatu$_k$'s mother] supported her$_k$.

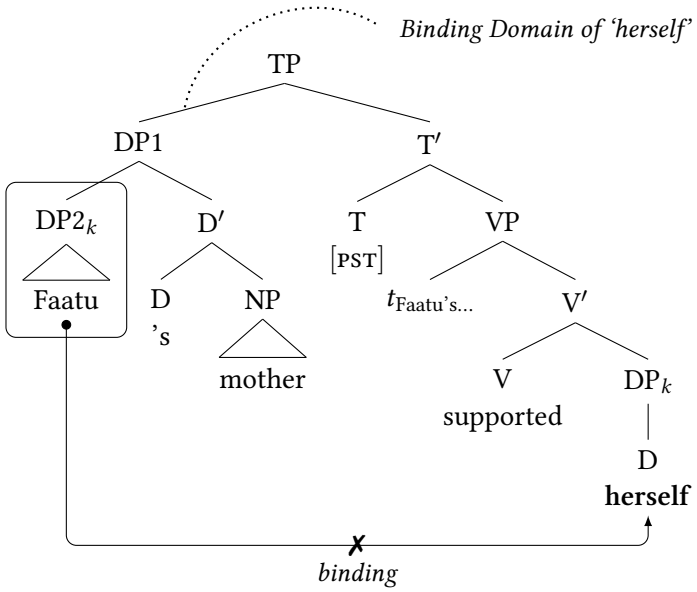
Why is (70) grammatical if the pronoun *her* and its antecedent are in the same Binding Domain?

As we saw before, (70a) is ungrammatical because an anaphor like *herself* must be bound in its Binding Domain, with binding requiring c-command. (70b) has the same structure, except that the anaphor in (70a) is replaced with a pronoun. To recall, Condition B requires that a pronoun be free in its Binding Domain. Since there is no c-command between the pronoun *her* and its antecedent *Faatu* in (70b), the pronoun *her* is not bound. The fact that the antecedent *Faatu* is part of the same Binding Domain as the pronoun *her* does not induce a violation of Condition B precisely due to the lack of c-command and, thus, of binding.

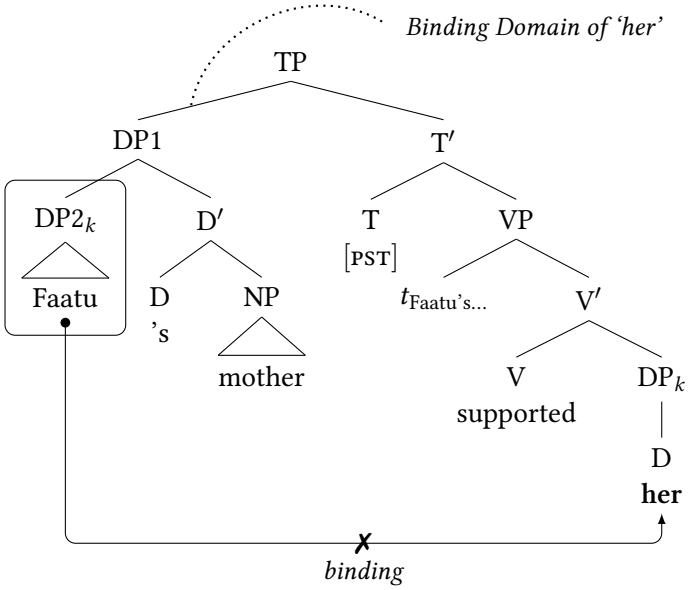
The structures of (70a–70b) are below for comparison.[7]

[7] These representations add a step of movement to Spec-TP, missing in (26), where the focus was, as mentioned, the c-command configuration.

(71) * [Faatu$_k$'s mother] supported herself$_k$.



(72) [Faatu$_k$'s mother] supported her$_k$.



6.3.1 The complementarity in distribution between anaphors and pronouns

We can now put Conditions A and B side-by-side to compare them:

(73) a. *Condition A*: an anaphor must be bound in its Binding Domain.
b. *Condition B*: a pronoun must be free in its Binding Domain.

Think about the similarities and differences between how (73a–73b) are stated. Focusing on how being free and being bound are defined, explain how the way Conditions A and B are phrased accounts for the complementarity in distribution between anaphors and pronouns.

(73a–73b) have the same general format: some nominal expression must be bound or free in its Binding Domain. As we saw, Binding Domains are defined uniformly (see Definition 24), so both Condition A and Condition B govern the behavior of anaphors and pronouns with respect to the same domain, viz. the smallest finite TP that contains them. The crucial difference is, of course, whether the nominal expression in question must be free or bound in that domain. As we saw in Definition 23, being free is defined as the negation of being bound. Condition A is based on the latter, whereas Condition B is based on the former. In other words, one of these principles of Binding Theory is stated in terms of the opposite of the other. This is exactly what complementarity in distribution means.

In this section, we saw that empirically, whenever an anaphor is legitimate in one sentence sentence, a pronoun renders the same sentence ungrammatical, and vice-versa. This is captured by the fact that Conditions A (73a) and B (73b) are stated in opposite terms.

6.3.2 Deictic vs. bound reading

We concluded that Condition A requires that an anaphor be bound in its Binding Domain. This is why (74) is ungrammatical.

(74) * Faatu$_1$ supported **herself**$_2$.

Spell out the reason why (74) is ungrammatical.

Almost all conditions necessary for the binding of an anaphor are met in (74). *Faatu* c-commands *herself* and they are both contained in the latter's Binding Domain, which is the entire monoclausal sentence. However, these DPs are not coindexed. As such, *Faatu* does not, in fact, qualify as a proper antecedent for *herself*, so that Condition A is violated.

Given the complementarity in distribution between anaphors and pronouns, we expect that (74) should be grammatical if we replace the anaphor in this sentence with a pronoun. This prediction is borne out by the facts:

(75) Faatu$_1$ supported **her**$_2$.

Explain how Condition B is being complied with in (75). Reflect on how Condition B being stated as a requirement of a pronoun to be free contributes to the possibility of contraindexation in (75).

Because Condition A requires binding of the anaphor, this amounts to the requirement of the presence of an antecedent in the appropriate position (i.e. within the

Nominal	Person	Bound	Deictic
Anaphor	[1]	✓	✗
	[2]	✓	✗
	[3]	✓	✗
Pronoun	[1]	✗	✓
	[2]	✗	✓
	[3]	✓	✓

Table 6.6: Deictic vs. bound reading

same Binding Domain as that of the anaphor it binds, in addition to the c-command requirement). Condition B, on the other hand, simply requires that a pronoun be free—nothing is said about the need for an antecedent. If there is an antecedent for the pronoun, all Condition B requires is that this antecedent be outside of the pronoun's Binding Domain, so that the pronoun is indeed free in its Binding Domain. This is what we saw in e.g. (66a) above, which is schematized below:

(76) [Faatu$_1$ believed [that *pronoun's BD, where it is free* [$_{TP}$ Ricardo supported her$_1$]]]

binds pronoun, but outside its BD

In a monoclausal sentence like (75), the pronoun is free and its interpretation may be provided by the discourse context, e.g.:

(77) Do you remember Merisa? Faatu supported her.

In (77), there are two separate sentences in this utterance. The first one (viz. *Do you remember Merisa?*) makes the individual named Merisa salient in the discourse. The pronoun *her* in the second sentence can then pick up this antecedent.

Whenever the interpretation of a nominal expression such as a pronoun is provided by the discourse, we say that it has a **deictic** reading. 1st and 2nd person pronouns are exclusively deictic: the "I" and "you" of the discourse are only determined with respect to the discourse. 3rd person pronouns, on the other hand, can have a deictic or bound reading. In the latter case, Condition B (65) must be complied with, so that its antecedent is outside of the pronoun's Binding Domain. Anaphors, on the other hand, can only have a bound interpretation, as dictated by Condition A (42).

A comparison between the possible readings of anaphors and pronouns is provided in tab. 6.6. As mentioned above, anaphors only allow for a bound reading and can never have a deictic interpretation, irrespective of [person]. In contrast, [1] and [2] pronouns only have a deictic construal. Last, but not least, [3] pronouns can have either a deictic or a bound reading.

It is important to emphasize that a deictic interpretation is provided by extrasentential means. Consider the following pair of sentences:

(78) a. Merisa$_1$ remembered [that she$_1$ will be in town next week].
b. Remember Merisa? She will be in town next week.

(78a) is a biclausal sentence where the pronoun *she* is free in its Binding Domain (viz. the embedded finite TP, which is contained in the bracketed clause in (78a)). This allows the matrix subject *Merisa* to bind it without a Condition B violation. In (78b), however, we see two *separate* sentences in the same discourse utterance. *She* is interpreted as *Merisa*, since the individual named by this DP is made salient in the discourse in the first sentence of the utterance (viz. *Remember Merisa?*). This is, nonetheless, a separate sentence, so *Merisa* is not binding *she*: the correference is achieved here deictically and not via binding.

Exercise

In the sentences below, does the boldfaced pronouns have a bound or deictic reading?

(79) a. **I** thought **you** may want to watch the 2021 championships in Tashkent.

b. Akhbar$_1$ knows **he**$_1$ has a good chance to win.

c. I bet on Akhbar. I know **he** has a good chance to win.

d. * Akhbar$_1$ bet on **him**$_1$.

For extra practice, explain why (79b) is grammatical but (79d) is not.

Exercise

Consider the following joke:

(80) The village blacksmith finally found an apprentice willing to work hard for long hours. The blacksmith immediately began his instructions to the lad, "When I take the horseshoe out of the fire, I'll lay it on the anvil; and when I nod my head, you hit **it** with this hammer." The apprentice did just as he told. Now he's the village blacksmith.

The humorous effect of this joke is based on the fact that the boldfaced pronoun ***it*** can make reference to more than one DP in the joke.

a. Regarding the humorous effect of the joke:
   - What are the DPs that ***it*** can be interpreted as?
   - What does the humorous effect of the joke consist of, precisely?
   - What is the contribution of 'Now he's the village blacksmith' at the end of the joke? In other words, which DP that ***it*** could be interpreted as does this conclusion favor?

b. The Binding Domain of ***it*** in the joke is the monoclausal sentence where it appears, viz.:

   (81) [$_{TP}$ You hit **it** with this hammer]

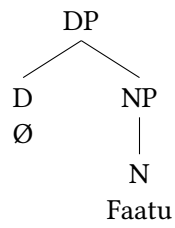
   Condition B (65) only states the conditions under which a pronoun cannot be bound, but it does not state anything about how a pronoun is in fact interpreted. How does this "looseness" contribute to the humorous effect of the joke? Bear in mind that neither DP that ***it*** can be interpreted are contained in its Binding Domain.

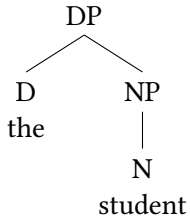
Having investigated the licensing conditions imposed by pronouns and how they compare with those imposed by reflexives, next, we turn to referential expressions.

6.4 Condition C

Condition C is the principle of Binding Theory that accounts for the correference possibilities of **R-expressions**. Semantically, referential expressions are those that denote a particular individual. R-expressions include proper names, e.g. *Faatu*, and definite descriptions, e.g. *the student with a pink shirt*, *this turquoise fountain pen*, or *the wonder of learning*. Unlike anaphors and pronouns, R-expressions have their own denotation.

Syntactically, R-expressions are DPs. As we saw in §3.7, the head of the DP may have null exponence. In English, this is the case, for instance, of proper names—though, as we saw in the aforementioned chapter, in other languages, a proper name may be preceded by a determiner.

(82) a. 

b. 

In order to understand the correference possibilities of R-expressions, let's examine the following sentences:

(83) a. * She$_1$ supported **Faatu**$_1$.
b. * She$_1$ believed [$_{TP}$ Ricardo supported **Faatu**$_1$]

In (83a), we see the environment where an anaphor had to be bound by the subject:

(84) She$_1$ supported **herself**$_1$.

In (83a), however, the R-expression *cannot* be bound by the subject, which indicates that anaphors and R-expressions have different distributions.

But R-expressions must also be different from pronouns, in that (83b) illustrates an environment where a pronoun could be free:

(85) She$_1$ believed [$_{CP}$ Ricardo supported **her**$_1$].

In (85), the Binding Domain of *her* is the embedded finite CP. The matrix subject *she* is outside of domain, which allows it to bind the pronoun without incurring a Condition B violation. As we see in (83b), if the most deeply embedded pronoun is replaced with an R-expression that is bound by the matrix subject, the resulting sentence in ungrammatical.

In order to account for (83a) and (83b), Condition C is stated as follows:

Definition 27

(86) **Condition C**
An R-expression must be free.

Notice an important difference between Condition A (42), B (65), and C (86): unlike the former, the latter does not make any reference to a Binding Domain. This explains why both (83a) and (83b) are ungrammatical: in both sentences, the R-expression *Faatu* is bound. Because there is no reference to a Binding Domain, whether or not the R-expression and its antecedent are separated by a clausal boundary is irrelevant.

As in the previous section, the reader is recruited to work out the details of the effects of Condition C by solving the exercise below, where all three principles of Binding Theory are compared.

Exercise

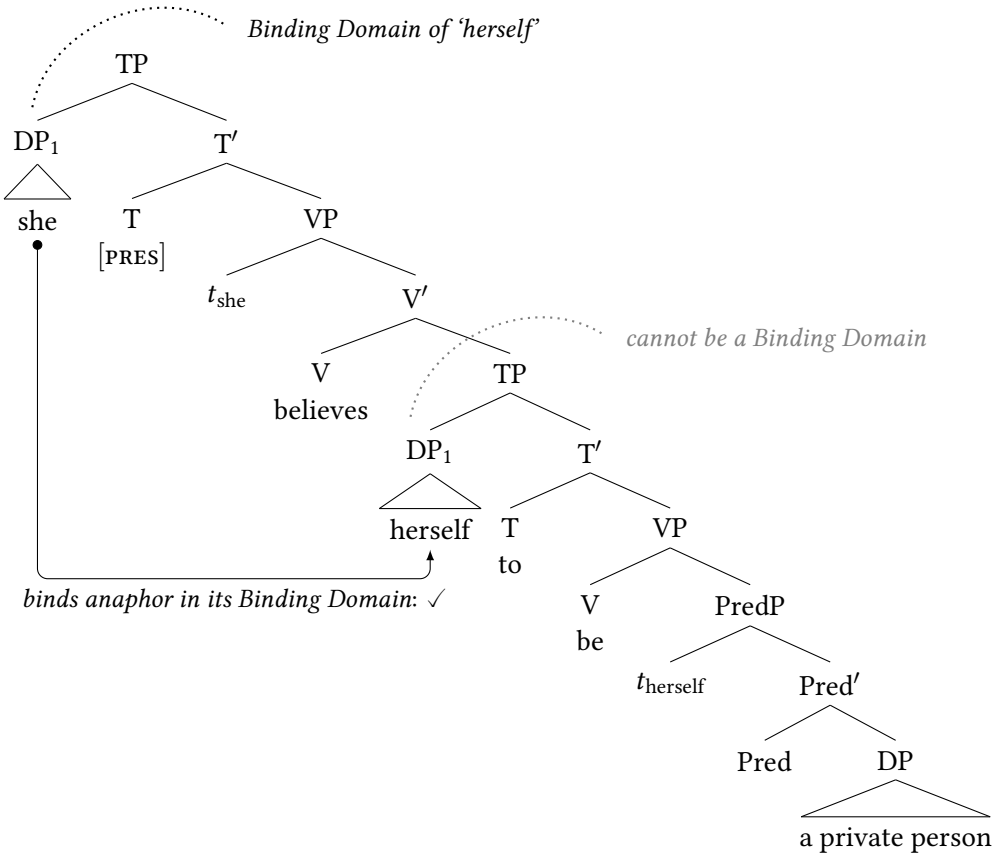
Explain the (un)grammaticality of the sentences below:

(87) a. She$_1$ believes [$_{TP}$ herself$_1$ to be a private person].
b. * She$_1$ believes [$_{TP}$ her$_1$ to be a private person].
c. * She$_1$ believes [$_{TP}$ Faatu$_1$ to be a private person].

These sentences are identical, except for the type of nominal that occupies the embedded subject position. In all three sentences, the matrix verb is *believe*, which takes an nonfinite clause as its complement.

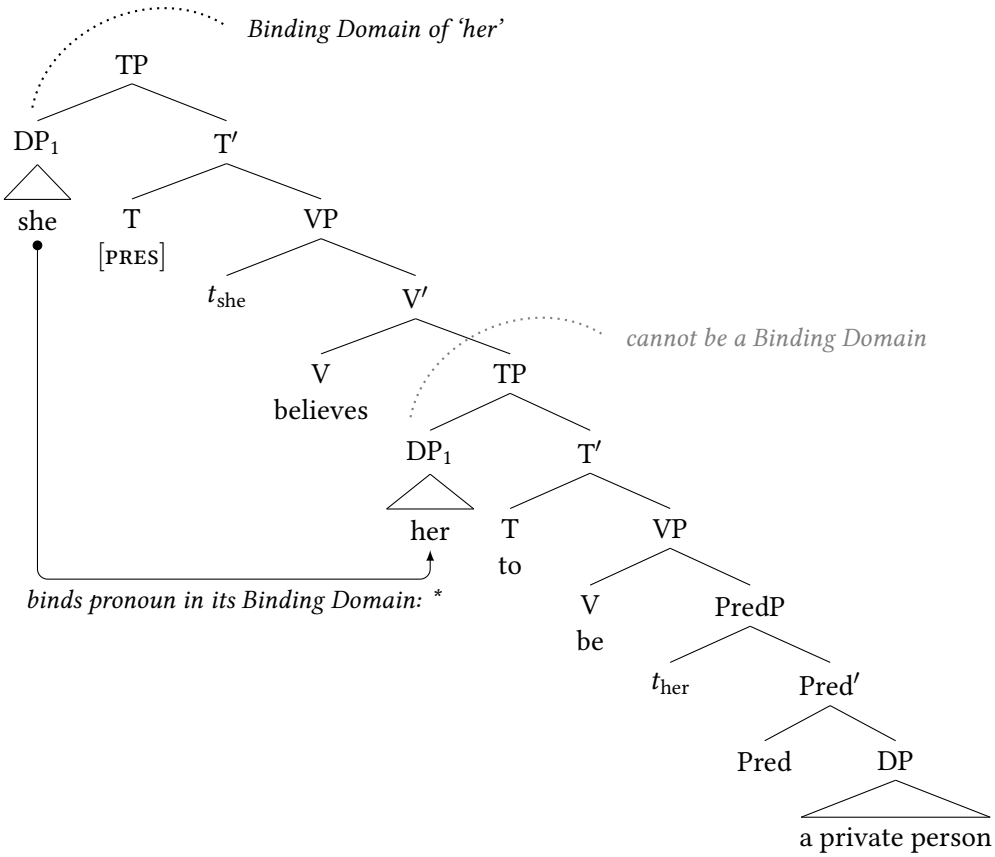
As we saw before, (87a) is grammatical because, since the embedded clause is nonfinite, the Binding Domain of the anaphor *herself* is the entire clause, where it can be bound by the matrix subject.

(88)



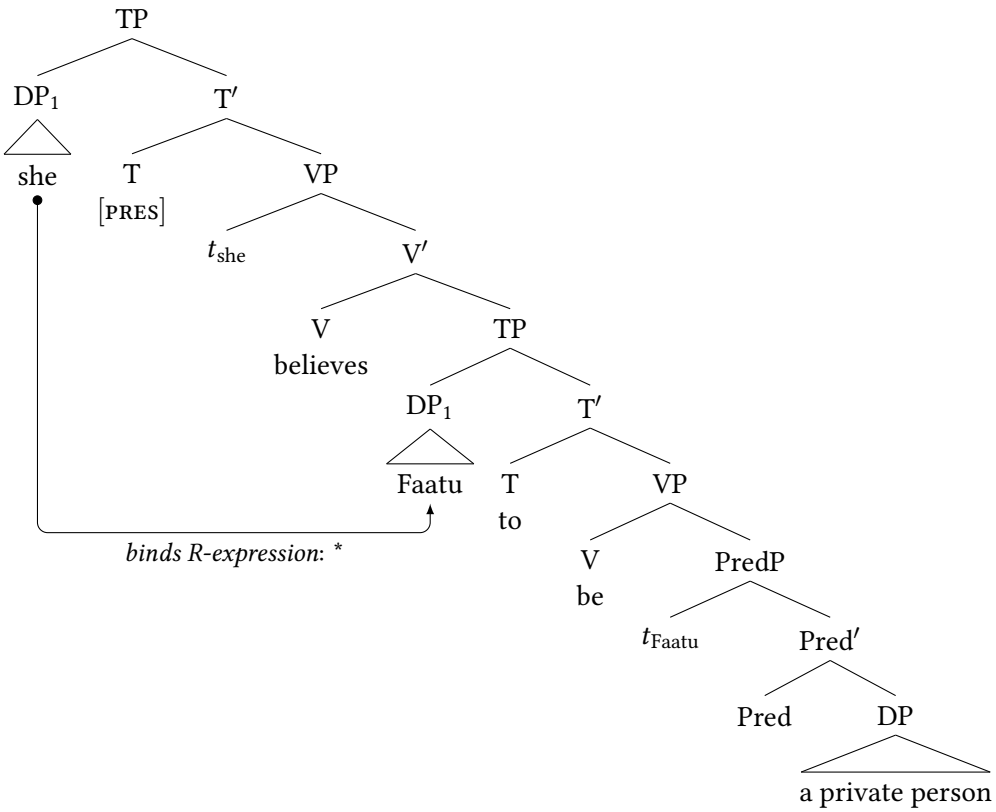
Given the complementary distribution between reflexives and pronouns, it is unsurprising that (87a) is grammatical, while (87b) is not. The same configuration that ensures that an anaphor can be bound also ensures that the pronoun is bound, which causes a violation of Condition B: (87b) is ungrammatical because the pronoun is not free in its Binding Domain.

(89)



Finally, (87c) is ungrammatical because, by Condition C, an R-expression like *Faatu* cannot be bound at all.

(90)



Notice that (83a), (83b), and (87c) are all ungrammatical sentences, despite the fact that each one of these sentences showcase different syntactic configurations (i.e. a monoclausal sentence, a biclausal sentence with a finite complement, and a biclausal sentence with a nonfinite complement, respectively). This illustrates the fact that Condition simply states the requirement that R-expressions be free.

For comparison, consider grammatical sentences where Condition C is not violated:

(91) a. She$_1$ supported Faatu$_2$.
b. She$_1$ believed [$_{CP}$ Ricardo supported Faatu$_2$].
c. Faatu supported Hye-jeong.

All these sentences are grammatical because the R-expressions in them are free. In (91a), *she* c-commands the R-expression *Faatu*, but, since they do not share the same index, there is no binding. This allows Condition C to be complied with. The same holds of (91b). Once again, the addition of a clausal boundary does not affect the licensing conditions of the R-expression: Condition C is an absolute condition that does not make reference to a Binding Domain. Finally, (91c) is trivially grammatical because the subject and object positions are each occupied by an R-expression and they are not coindexed.

6.5 Summary

In this chapter, we investigated Binding Theory, the component of the Grammar that governs the possible or necessary coindexation possibilities within a sentence. A crucial aspect of binding is that it is sensitive to syntactic hierarchy—specifically, binding is defined in terms of c-command, a fundamental structural relationship in the syntax of natural languages.

Exercise

In (92) *she* and *herself* are coindexed, allowing Condition A to be complied with. However, does this coindexation also predict that (92) should be ungrammatical due to a Condition B violation?

(92) She$_1$ high-fived herself$_1$.

In your answer, comment on the structural relationship that is necessary for binding to go through.

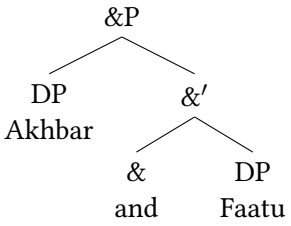
Exercise

Explain the (un)grammaticality of the sentences below:

(93) a. * [Mary and Jair$_1$] supported himself$_1$.
b. [Mary and Jair$_1$] supported him$_1$.
c. [Mary and the idiot$_1$] supported Jair$_1$.

Assume that *the idiot*, which is an epithet, is an R-expression.
Recall the structure for coordinated phrases, illustrated with the coordinated DPs *Akhbar and Faatu*:

(94)



To conclude this chapter, the following exercise invites the reader to reflect on the relevance of structure, as evidence by binding phenomena.

Exercise

Consider the following sentences:

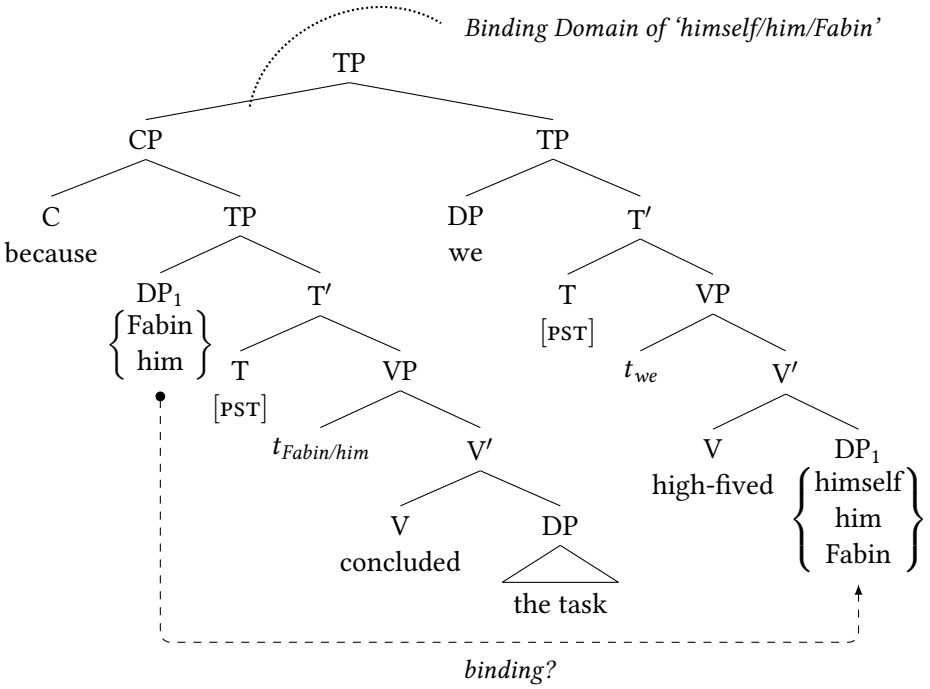
(95) a. * [Because Fabin$_1$ concluded the task], we high-fived himself$_1$.

b. [Because Fabin$_1$ concluded the task], we high-fived him$_1$.

c. [Because he$_1$ concluded the task], we high-fived Fabin$_1$.

Assume that the sentences in (95) have the the configuration in (96), where the main clause is *We high-fived himself/him/Fabin*, to which the *because* clause is adjoined. The latter contains the intended antecedent of *himself/him/Fabin* in the main clause. Assume that the entire sentence, including both the main and adjunct clauses, is the binding domain for the DPs under investigation.

(96)



a. Assuming the c-command-based definition of binding, repeated below from Definition 23, can the (un)grammaticality of the sentences in (95) be accounted for?

(97) α binds β iff:

i. α and β are coindexed, and

ii. α c-commands β.

b. Consider now the hypothetical linear alternative in (98)? What would a theory based on (98) predict regarding the sentences in (95)?

(98) α binds β *iff*:

i. α and β are coindexed, and

ii. α linearly precedes β.

In both questions, make sure to analyze each of the three sentences in (95).

6.5.1 Active retrieval

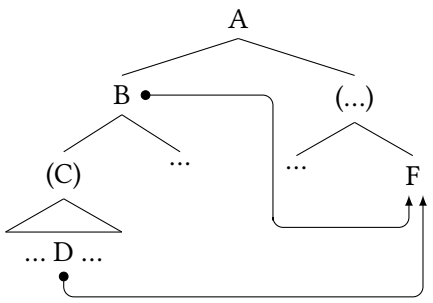
Define in your own words Principles A, B, and C of Binding Theory. (If you would like to check your definitions, see (42), (65), and (86), respectively.)

How is a Binding Domain defined?

What is the difference between a finite and a nonfinite embedded clause in terms of the definition of a Binding Domain?

In the structure below, what is the crucial difference in the c-command relationship from B to F and from D to F?

(99)



Why is there such a difference?

Why are reflexives and pronouns in complementary distribution?

Consider three configurations: *(i)* a monoclausal sentence, *(ii)* a biclausal sentence where the embedded clause is finite, and *(iii)* a biclausal sentence where the embedded clause is nonfinite. In all three configurations, the matrix subject is a pronoun *P* and the most deeply embedded object is an R-expression *R*, and *P* and *R* are coindexed? Is the difference in syntactic configuration correlated with a difference in grammaticality? Why or why not?

Both sentences in (100) are ungrammatical. However, they are ungrammatical for different reasons. Explain what the difference is.

(100) a. * The DA_1 proved the defendant to have incriminated themself$_1$.
b. * The DA_1's partner unwittingly proved themself$_1$ to have incriminated the defendant.

For extra practice, you can draw the trees for the sentences above.

Fill out the table below with the possible interpretations of anaphors and pronouns. You can check your answers against Tab. 6.6.

Nominal	Person	Bound	Deictic
Anaphor	[1]		
	[2]		
	[3]		
Pronoun	[1]		
	[2]		
	[3]		

Glossary

Adjunct A phrase that some category X can but does not have to merge with. In order for an adjunct to be incorporated into a structure, first X merges with its complement and Spec (if any). The maximal projection XP thus formed then merges with the adjunct, forming another XP projection.

Anaphor A nominal such as *myself* or *themselves*, which must have its interpretation provided by being bound by a c-commanding antecedent that is contained in the same Binding Domain, as dictated by *Condition A*. Also referred to as a *reflexive*. See also *pronoun* and *R-expression*.

Antecedent A constituent that provides the interpretation of another constituent.

Argument A phrase that is required by a predicate, typically, a subject or an object. E.g. the verbal predicate *devour* requires an AGENT and a THEME, which are realized as the subject and object, respectively. The adjectival predicate *proud*, in turn, selects and EXPERIENCER and a THEME.

Argument structure The set of arguments that a given predicate selects. It includes the number of arguments (viz. one, two, or three) a predicate selects, the θ-roles assigned to them (e.g. THEME, AGENT, EXPERIENCER, etc), and their grammatical category (e.g. DP, PP, CP, etc).

Binding α binds β *iff (i)* α and β are coindexed and *(ii)* α c-commands β. If β is not bound, we say that β is *free*.

Binding Domain A syntactic domain is a particular portion of the syntactic structure. It is defined as an exhaustive set of nodes that are dominated by a given node. A Binding Domain is the smallest finite clause (i.e. the set of all nodes that a clause consists) that contains a nominal expression (viz. anaphor, pronoun, or R-expression) that can or must be bound.

Branching node A complex node, which, therefore, divided into smaller nodes, which can be terminal or complex themselves. See also *terminal node*.

C-command C-command is a relationship between two nodes in a syntactic structure. α c-commands β iff: *(i)* α is γ's sister and γ dominates β, or *(ii)* α is β's sister .

Complement (Compl) The first phrase that a head merges with. See also *specifier*.

Complementary distribution If α and β are in complementary distribution, α occurs in all contexts where β does not occur (and vice-versa).

Condition A A principle that governs the conditions that must be satisfied in order for an anaphor/reflexive to be legitimate in a sentence. It states that an anaphor must be bound by the closest c-commanding antecedent in the anaphor's Binding Domain. Also referred to as *Principle A*.

Condition B A principle that governs the conditions that must be satisfied in order for a pronoun to be legitimate in a sentence. It states that a pronoun must be free in its Binding Domain. Also referred to as *Principle B*.

Condition C A principle that governs the conditions that must be satisfied in order for an R-expression to be legitimate in a sentence. It states that an R-expression must be free. Also referred to as *Principle C*.

Constituency test (or diagnostic) Some syntactic construction or operation that can only target a string that corresponds to a constituent. Because of this restriction, this construction or operation can used as a diagnostic as to whether or not some string in a sentence under investigation in fact corresponds to a constituent in the underlying hierarchical structure. E.g. topicalization, clefting, proform substitution, and fragment answer.

Constituent Given a node N and a set of nodes $\{\alpha, \beta, \gamma, \dots\}$, then N is a constituent *iff* all members of $\{\alpha, \beta, \gamma, \dots\}$ are dominated by N and there is no node e such that e is dominated by N and e is not a member of N.

Copula A functional verb that is often used in sentences with adjectival predication, e.g. *Olivia is strong*, where the copula is *be*.

Daughter α is β's daughter *iff* α immediately dominates β.

Deictic said of a reading that is provided by the discourse context. See also

Distribution The set of contexts or environments where some linguistic element occurs.

Dominance Dominance is a relationship between two or more nodes in a syntactic structure. α dominates β *iff* β is contained in a branch that originates from α, i.e. α is β's mother or β is a descendant of α, though not necessarily its daughter. α *immediately* dominates β *iff* β is contained in a branch that originates from α, i.e. α is β's mother.

Embedded A clause that is contained in another clause by virtue of being selected by the predicate that heads the latter or a clause that is adjoined to an encapsulating clause. Also referred to as *subordinate* clause. See also *matrix*.

Expletive A "dummy" (i.e. meaningless) element such as English *there* or *it* which is merged at Spec-TP in order for the *Extended Projection Principle* to be complied with.

Extended Projection Principle (EPP) A principle that requires that the grammatical subject position (viz. Spec-TP) be filled. This can occur via movement (e.g. a DP is base-generated within the projections of the VP dominated by the TP and then it moves to Spec-TP) or base-generation (of e.g. an *expletive* such as *there* or *it*.

Finiteness Finite clauses have a verb that is inflected for tense and/or agreement, depending on language-specific properties, and it may also have a complementizer (e.g. English *that*). Nonfinite clauses have a verb that is not inflected. Infinitival clauses are a prototypical example of nonfinite clause. In English, it is indicated by an uninflected verb preceded by *to*, which occupies the head of TP.

Free A constituent α is free if it is not *bound*, i.e. there is no constituent β such that α and β are coindexed, and β c-commands α.

Generative Grammar A particular type of linguistic theory, first proposed by Noam Chomsky in the 1950s, according to which all human beings are endowed with a *Language Faculty*, which allows them to utter and interpret an unlimited amount of sentences. According to this theory, this innate capacity also explains how a child can acquire a fully fledged language, even when the linguistic stimuli they are exposed to is finite, limited, and fragmentary.

Grammatical A sentence is grammatical when it is considered well-formed by native speakers or signers of a given language. In other words, a grammatical sentence abides by the rules that characterize that language. See also *ungrammatical*.

Grammatical category A property of words and the repective projections projected from them that determines its behavior and its distribution. E.g. noun, verb, determiner, complementizer, etc (see (12)). Also referred to as *part of speech*.

Head-final Said of a language where heads (e.g. verbs and prepositions) follow the constituent they select or subcategorize for. A head-final language is also commonly referred to as an SOV language (i.e. a language where the verb V occurs after its object O, the subject S preceding both). See also *head-initial*.

Head-initial Said of a language where heads (e.g. verbs and prepositions) precede the constituent they select or subcategorize for. A head-initial language is also commonly referred to as an SVO language (i.e. a language where the verb V occurs before its object O, the subject S preceding both). See also *head-final*.

Immediate dominance A node α immediately dominates a node β *iff* there is one single descending line between α and β, and there is no node γ such that α dominates γ and γ dominates β.

Intransitive A predicate that selects only on argument, which can be external or internal. A predicate that only selects an external argument is *unergative*, while a predicate that only selects an internal predicate is *unaccusative*.

Language Faculty An innate capacity, i.e. a capacity that any human being is endowed with and which guides children through the process of language acquisition, allowing them to acquire a language (or more than one, depending on the environment where they are raised), despite the *poverty of stimulus*. This inborn capacity also explains why we are able to have robust judgments about sentences we have never encountered before, as well as the ability to interpret and utter a potentially infinite number of sentences.

Level of projection A node of category k that is formed by merging a head of category k with some phrase. There are three levels of projection: minimal projection or head (X), intermediate projection of bar-level (X′), and maximal projection (XP). Only the minimal and maximal projections are required.

Matrix A clause headed by a predicate (e.g. a verb) which selects another clause as either its subject or object. Also referred to as *main* clause. See also *embedded*.

Merge A syntactic operation that applies to two elements α and β, forming a new element, γ. γ immediately dominates α and β (i.e. there is one single uninterrupted descending line that goes from γ to α and from γ to β,

Mother A node α is the mother of a node β iff α immediately dominates β, i.e. there is one single descending line from α to β.

Negative data Ungrammatical sentences, which are missing in the input children are exposed to when acquiring a language. Given the Faculty of Language we are endowed with, the absence of negative data does not prevent us from having clear judgments of ungrammatical sentences.

Parameter A universal rule provided by the innate Faculty of Language which has a limited set of options for languages to complied with it. E.g. a language can be parameterized as *head-initial* or *head-final*. See also *Principle*.

Poverty of stimulus The observation that the linguistic input or stimuli a child is exposed to during language acquisition is finite and, nevertheless, all children are able to acquire a fully-fledged linguistic system (i.e. a particular language, spoken or signed), which allows them to utter and interpret an infinite number of sentences.

Predicate An expression (e.g. a word such as *devour* or a phrase such as *reflect upon* that requires the presence of another or other constituents.

Principle A universal rule provided by the innate Faculty of Language which has to be complied with by any language. See also *Parameter*.

Pronoun A pronoun is a nominal such as *they* or *them*, which can have its interpretation provided by the utterance context or by the sentence that contains the pronoun. In the former case, there is some entity that is salient in the context and which is referred back to by the pronoun. In the latter case, the pronoun's antecedent cannot bind the pronoun in its Binding Domain, as dictated by *Condition B*. See also *anaphor* and *R-expression*.

R-expression A referential expression, i.e. a nominal that denotes a particular entity. R-expressions include proper names (e.g. *Jeynaba*) and definite descriptions (e.g. *the handsome ginger cat*). An R-expression must be free, as dictated by *Condition C*. See also *anaphor* and *pronoun*.

Recursive An operation O is recursive when the output of an application of O can be used as the input of another iteration of the same operation O.

Selectional requirement A requirement that some head imposes on the constituent it merges with. The form of the verb that heads a VP is modeled in chapter 3 as an imposition made by the T or Aux that merges with the VP. For instance, the auxiliary *be* requires that the verb it merges with have an *–ing* form, the abstract feature [PST] requires an *–ed* form, etc.

Sister A node α and a node β are sisters iff α and β are immediately dominated by the same node γ, i.e. there is one single descending node between γ and α and one single descending node between γ and β and, furthermore, there is no node that intervenes between γ and α or between γ and β.

Specifier (Spec) The phrase that combines with the node formed by *Merge*(*X*, *Compl*). If X does not have a complement, then X projects an X′ that dominates only X and then X′ merges with its Spec. See also *complement*.

Structural ambiguity A sentence is structurally ambiguous when there are different ways for its constituents to be arranged, yielding different structures, each with its own meaning. The difference in structure is *not* reflected in how the sentence is realized. Also referred to as *syntactic ambiguity*.

Subcategorization If α subcategorizes for β, then α selects β as a complement/as an internal argument.

Tensed Said of a clause that has its own tense (e.g. present, past, future). In English, this is expressed by a verbal suffix (e.g. *walk-s* or *walk-ed*) or by an auxiliary (e.g. *will*). See also *tenseless*.

Tenseless Said of a clause that lacks tense (as well as agreement) morphology, e.g. an infinitival clause, identifiable in English by a *to* which precedes the verb. See also *Tensed*.

Terminal node A simplex node, which, therefore, does not dominate anything else and which corresponds to a word (or morpheme). See also *branching node*.

Theta-role (θ-role) A semantic requirement that a predicate imposes on each one of its arguments. E.g. the predicate *think* selects an EXPERIENCER as its external argumental, thus requiring that the constituent that fulfills this role denote a sentient individual.

Transitive A predicate that selects two arguments, an external argument (subject) and an internal argument (object), e.g. *choose*, *praise*, *see*, *like*, *buy*, *read*, *finish*, etc.

Unaccusative A predicate that only selects an internal argument. Examples in English: *arrive*, *die*, *exist*, *melt*, *open*, etc.

Unergative A predicate that only selects an external argument. Examples in English: *sneeze*, *dance*, *work*, *sing*, etc.

Ungrammatical A sentence is ungrammatical when it is not considered well-formed by native speakers or signers of a given language. In other words, an ungrammatical sentence does not abide by the rules that characterize that language. A star '*' is used before a sentence to indicate that it is ungrammatical. See also *grammatical*.

VP-Internal Subject Hypothesis The idea that all arguments of a predicates, specially its subjects, are generated inside the projections of the predicate that selects them, even if they may be pronounced in a position that is outside such projections (e.g. Spec-TP, the grammatical subject position).

X-Bar Theory A component of the grammar that regulates the internal composition of phrases and how heads merge with other phrases and where the latter are located within the structure projected by the head.

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