Binding Theory

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- Consider the following sentences:

(1) a. Faatu supported Anna. (*Faatu gives support; Anna receives support*)
b. Faatu$_1$ supported herself$_1$.
c. She$_1$ supported Faatu$_1$.

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(1) a. Faatu supported Anna. (*Faatu gives support; Anna receives support*)

b. Faatu$_1$ supported herself$_1$. (*Faatu gives support; Faatu receives support*)

c. * She$_1$ supported Faatu$_1$. (*Faatu cannot be supporter*)

- It is important to pay attention to the subscripted indices. The same string *she–supported–Faatu* can be grammatical or ungrammatical, depending on these indices.

(2) *Same index: e.g. scenario where '1' picks out the individual named 'Faatu'*

* She$_1$ supported Faatu$_1$.

(= Faatu supported Faatu)

(3) *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)

- To drive the point home, consider now the string *Faatu–supported–herself*:

(4) *Same index: e.g. scenario where '1' picks out the individual named 'Faatu'*

Faatu$_1$ supported herself$_1$.

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(5) *Different indices: e.g. scenario where '1' picks out the individual named 'Faatu' and '2' picks out the individual named 'Anna'*

* Faatu$_1$ supported herself$_2$.

(= Anna supported Anna)

Binding Theory Terminology

- If a nominal expression α provides a reference for another nominal expression β, then α is β's **antecedent**.
  - Correference is indicated with subscripted indices (e.g. α_1 or α_k).
- Given that certain conditions are met, we can also say that α **binds** β.[1]

- Using (6) as a model:

(6) Faatu$_1$ supported herself$_1$.

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- Condition A (also referred to as 'Principle A') is the rule of Binding Theory that accounts for the distribution and interpretation of anaphors (also referred to as 'reflexives').[2]

		SG	PL
1		myself	ourselves
2		yourself	yourselves
3	MASC	himself	themselves
	FEM	herself	
	INANM	itself	
	NEUTRAL	themself(ves)	

Table 1: The anaphors in English

[2] INANM = inanimate

- The anaphor's antecedent must match its features:

(7) a. Mary criticized {herself / *ourselves / *…}.
b. I criticized {myself / *yourself / *…}.

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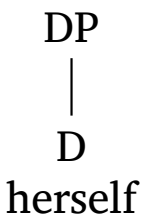

- To start the investigation of anaphors, let's examine the following sentences:

(9) a. Faatu$_1$ supported herself$_1$.

b. It seems to have rained on herself.

c. Faatu$_1$ supported herself$_2$.

- By comparing (9a) and (9b), we can conclude that there must be a DP (i.e. a nominal expression that is a Determiner Phrase) that an anaphor like *herself* must be coindexed with.
  - ➠ With our new terminology, we can now say: there must be an antecedent that binds an anaphor.
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- Given this data, we can formulate the following hypothesis to account for the conditions that must be met in order for an anaphor to be legitimate in a sentence:

  (10) *Condition A* (version 1)

  There must be another nominal phrase in the sentence that an anaphor is coindexed with.

- Let's test this initial version of Condition A against the following data:

  (11) a. Faatu$_1$ believes herself$_1$ to have angered the wrong person.

  b. Seb believes herself$_1$ to have angered Faatu$_1$.

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- Is (10) making the correct prediction about (11b)? ➠ No!

(11) a. Faatu$_1$ believes herself$_1$ to have angered the wrong person.
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- The difference between (11a–11b) is in the linear order:
  - In (11a), the antecedent *Faatu* precedes the anaphor *herself*.
  - In (11b), the antecedent *Faatu* follows the anaphor *herself*.
- Given this generalization, we can revise our initial hypothesis (10), so that it incorporates this precedence difference:

(12) *Condition A* (version 2)

An anaphor must be bound by an antecedent that *precedes* it.

- Hypothesis 2 now explains the difference between (11a) and (11b) because only in (11a) does *Faatu* precede *herself*.

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(13) a. [Faatu's mother]$_k$ supported herself$_k$.

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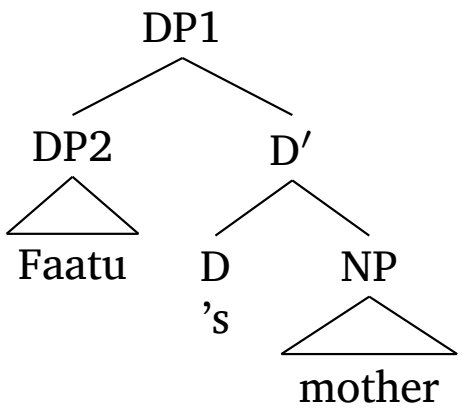
- Is (12) making the correct prediction about (13b)? ➠ No!

(13) a. [Faatu's mother]$_k$ supported herself$_k$.
b. * [Faatu$_k$'s mother] supported herself$_k$.

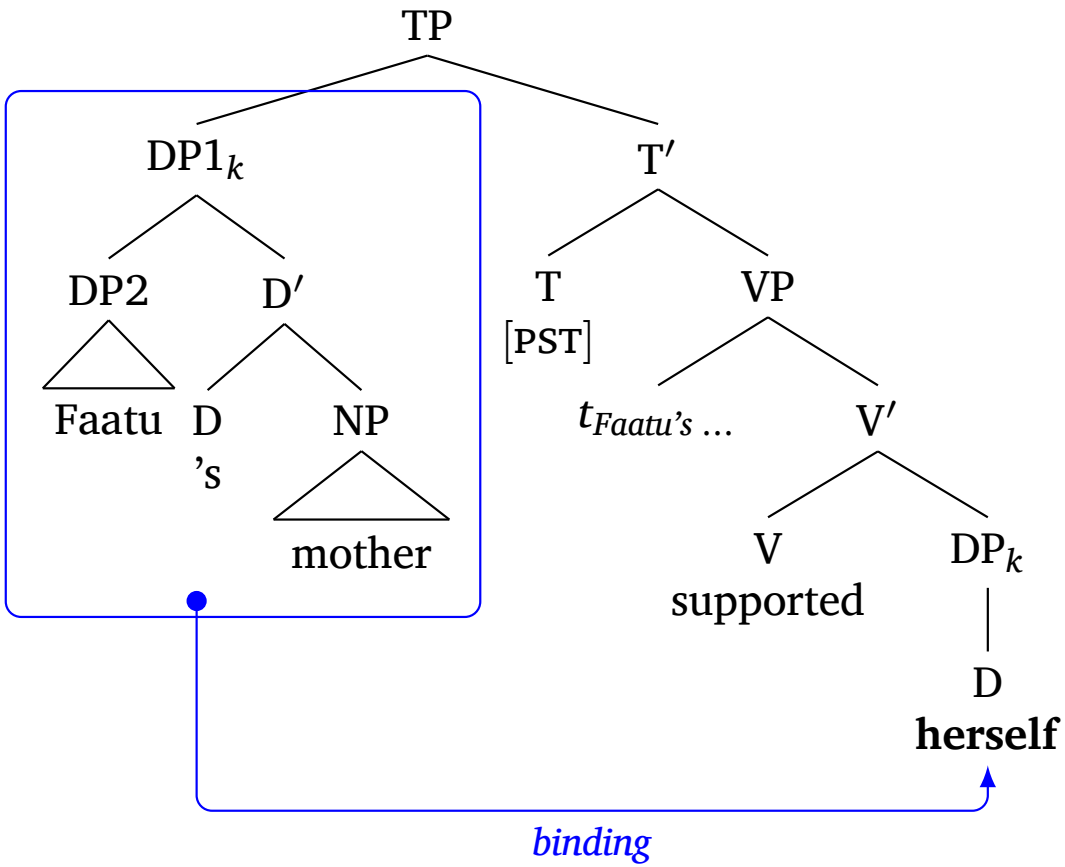
- In order to appreciate the difference between (13a) and (13b), assume the following structure for a possession DP like *Faatu's mother*:

(14)



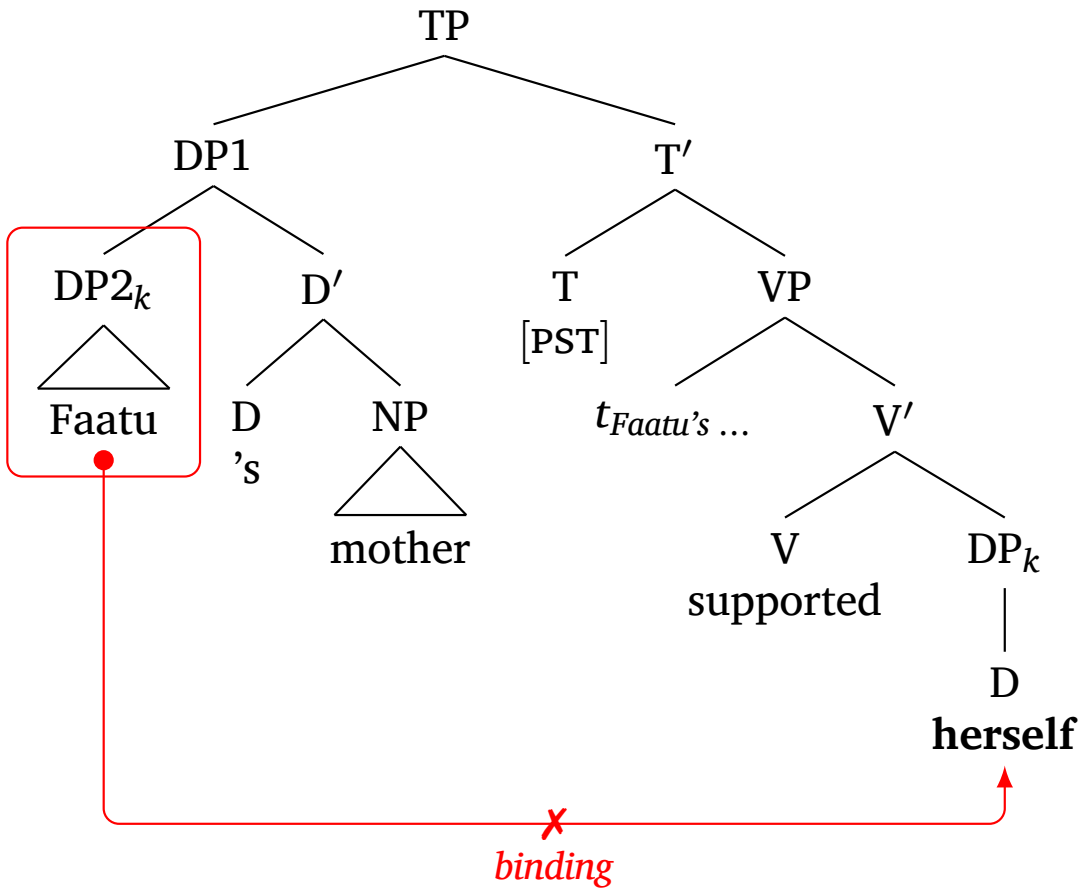
- Let's now compare the structures of the sentences (13a) and (13b).
- Here is the structure for (13a):

(15) [Faatu's mother]$_k$ supported herself$_k$.



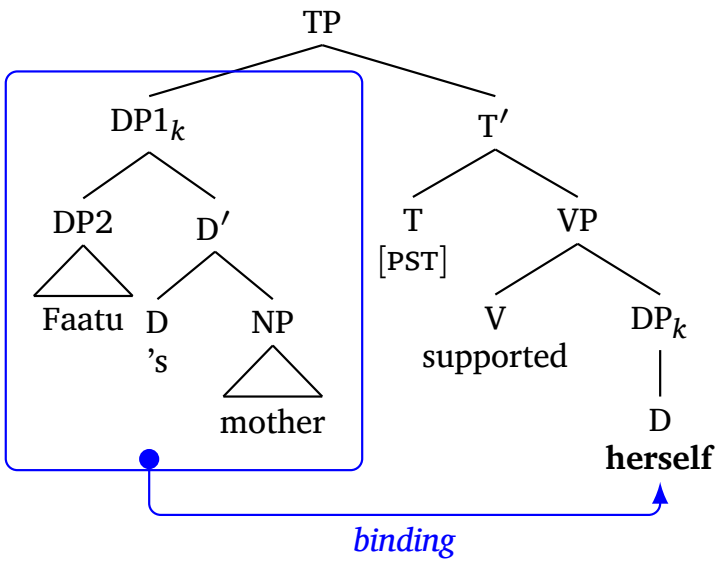
- And here is the structure for (13b):

(16) * [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 (15) and the possessor [$_{DP2}$ *Faatu*] in (16).
- Intuitively, [$_{DP2}$ *Faatu*] in (16) is more "deeply embedded" inside the entire phrase DP1, which is in the subject position.[3]

(15) [Faatu's mother]$_k$ supported herself$_k$.



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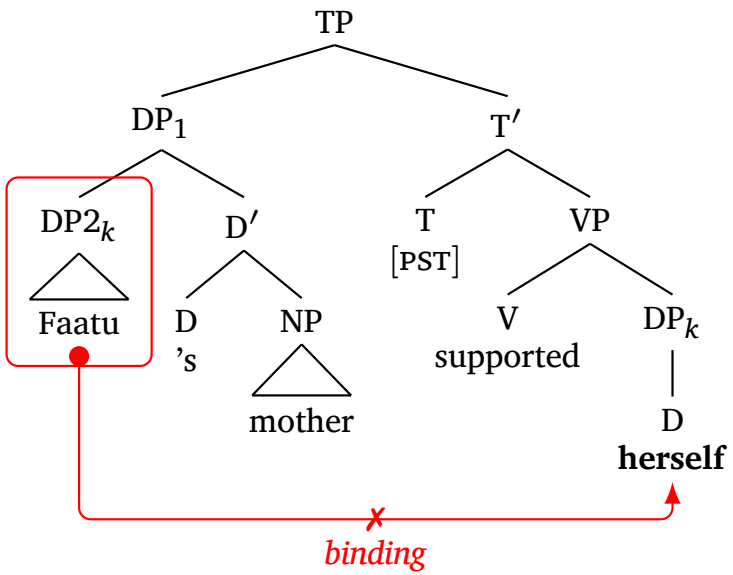
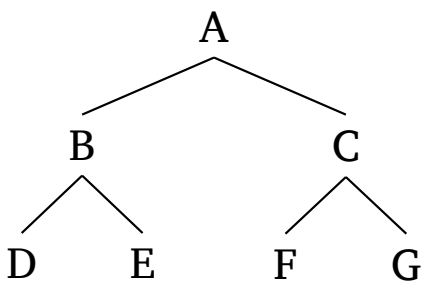


[3] The structures below have been simplified for ease of exposition.

- This difference has to do with a structural relationship between syntactic nodes called **c-command**.
- In order to appreciate what c-command is, we have to know some basic structural relationships between nodes in a tree (i.e. the definition of c-command depends on auxiliary structural relationships between nodes).

(17)

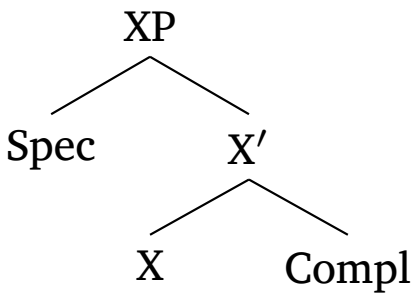


- A is B's mother and A is C's **mother**.
  - There is only one descending line from A to B (and likewise for A to C).
  - A **immediately dominates** B and A **immediately dominates** C.
- Because B and C have the same mother (viz. A), B and C are **sister** nodes.
- There are only descending lines between A and {D, E, F, G}. However, the path from A to {D, E, F, G} passes through other nodes (viz. the nodes B and C).
  - {D, E, F, G} are **descendants** of A, though not its daughters.
  - A also **dominates** {D, E, F, G}, though not immediately.

Exercise

In (18), we see a basic tree that follows X-Bar Theory.

(18)



1. Which node is the Spec's mother?
2. Which node is the Compl's mother?
3. Does the maximal projection dominate both its Spec and Compl?

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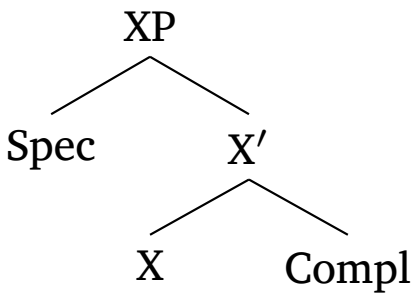

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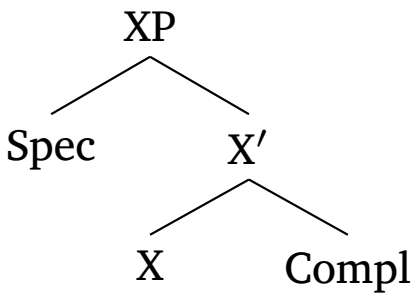

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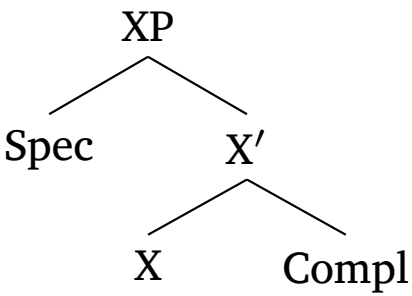

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3. Does the maximal projection dominate both its Spec and Compl?
   - ➠ Yes, but XP immediately dominates only the Spec.

Dominance

(19) 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.

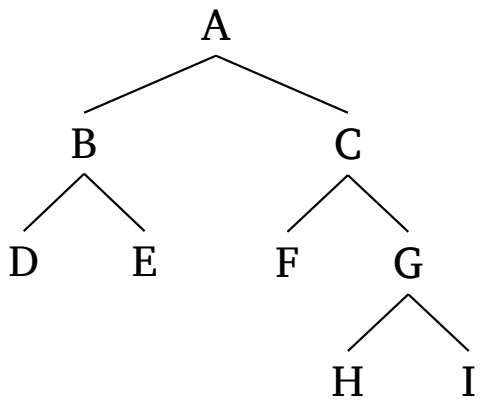
C-command

(20) α c-commands β iff:

a. α is γ's sister and γ dominates β, or

b. α is β's sister.

(21)



- B and C are sisters (i.e. they are both immediately dominated by A, their mother).
  - B and C are in a mutual or symmetric c-command relationship, i.e. B c-commands C and C c-commands B.
- {F, G, H, I} are C's descendants.
  - B, which is C's sister, asymmetrically c-commands {F, G, H, I}.

Exercise

Which nodes does D c-command? Does D c-command C? Does D c-command any of C's descendants?

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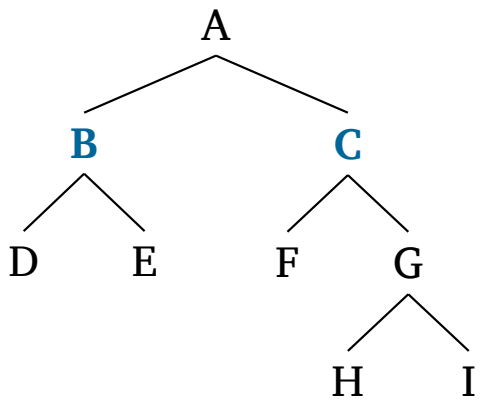

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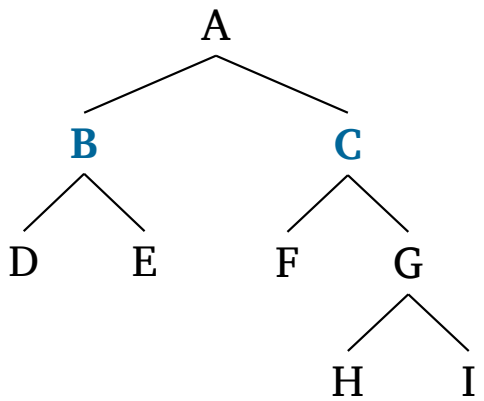

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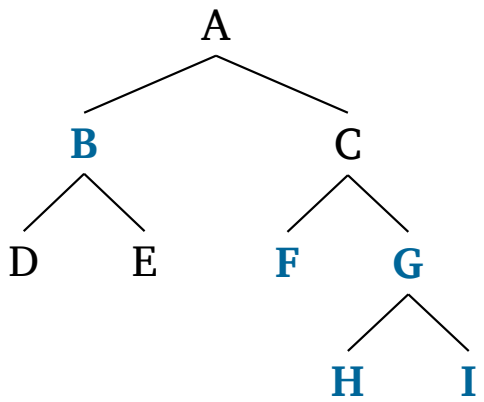

- B and C are sisters (i.e. they are both immediately dominated by A, their mother).
  - B and C are in a mutual or symmetric c-command relationship, i.e. B c-commands C and C c-commands B.
- {F, G, H, I} are C's descendants.
  - B, which is C's sister, asymmetrically c-commands {F, G, H, I}.

Exercise

Which nodes does D c-command? Does D c-command C? Does D c-command any of C's descendants?

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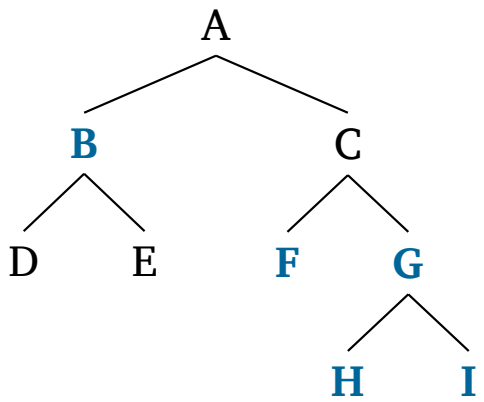

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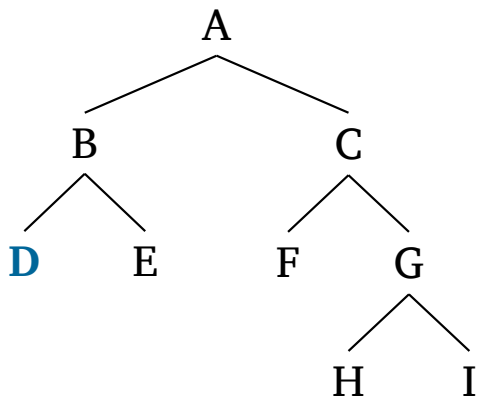

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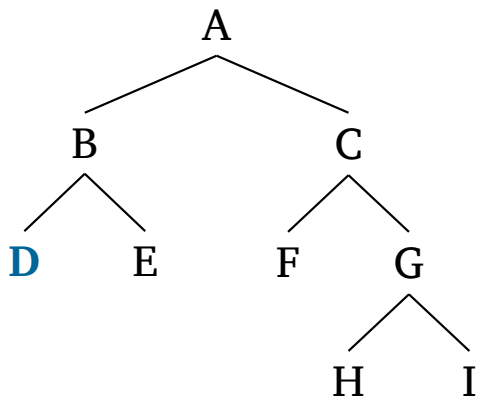

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Which nodes does D c-command? Does D c-command C? Does D c-command any of C's descendants?

- 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 any of these nodes is D's sister or a descendant of D's sister.

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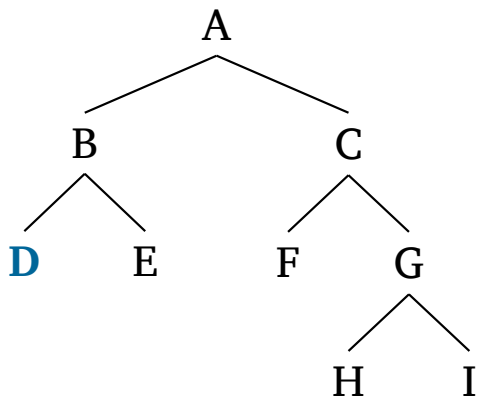

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(22) is a basic schema for the structure of a clause.

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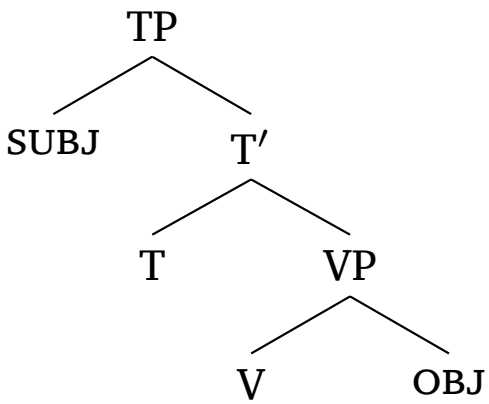

1. Which nodes does the subject c-command?
2. What c-command relationship is there between the subject and the object?

(The EPP trace of the subject in Spec-VP was omitted to simplify the diagram.)

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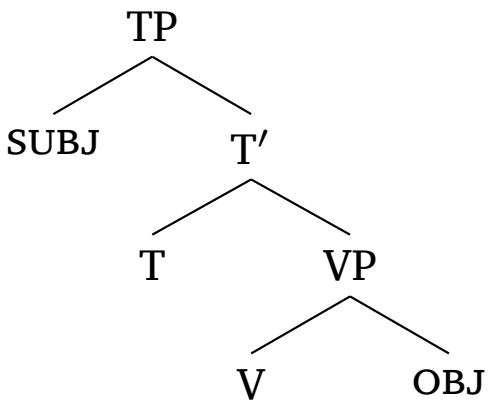

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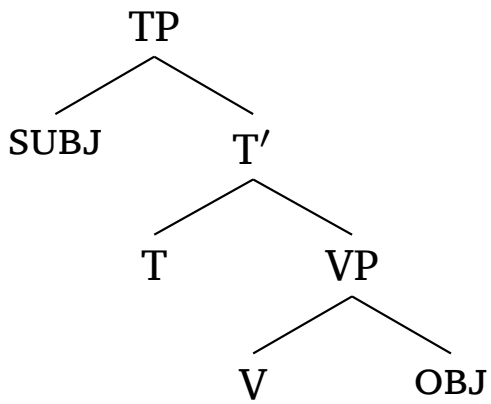

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   - ➠ The subject asymmetrically c-commands the object.

(The EPP trace of the subject in Spec-VP was omitted to simplify the diagram.)

- Now that we know what c-command is, we can finally go back to the contrast between (13a) and (13b).

(13) a. [Faatu's mother]$_k$ supported herself$_k$.
b. * [Faatu$_k$'s mother] supported herself$_k$.

- The difference 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*.

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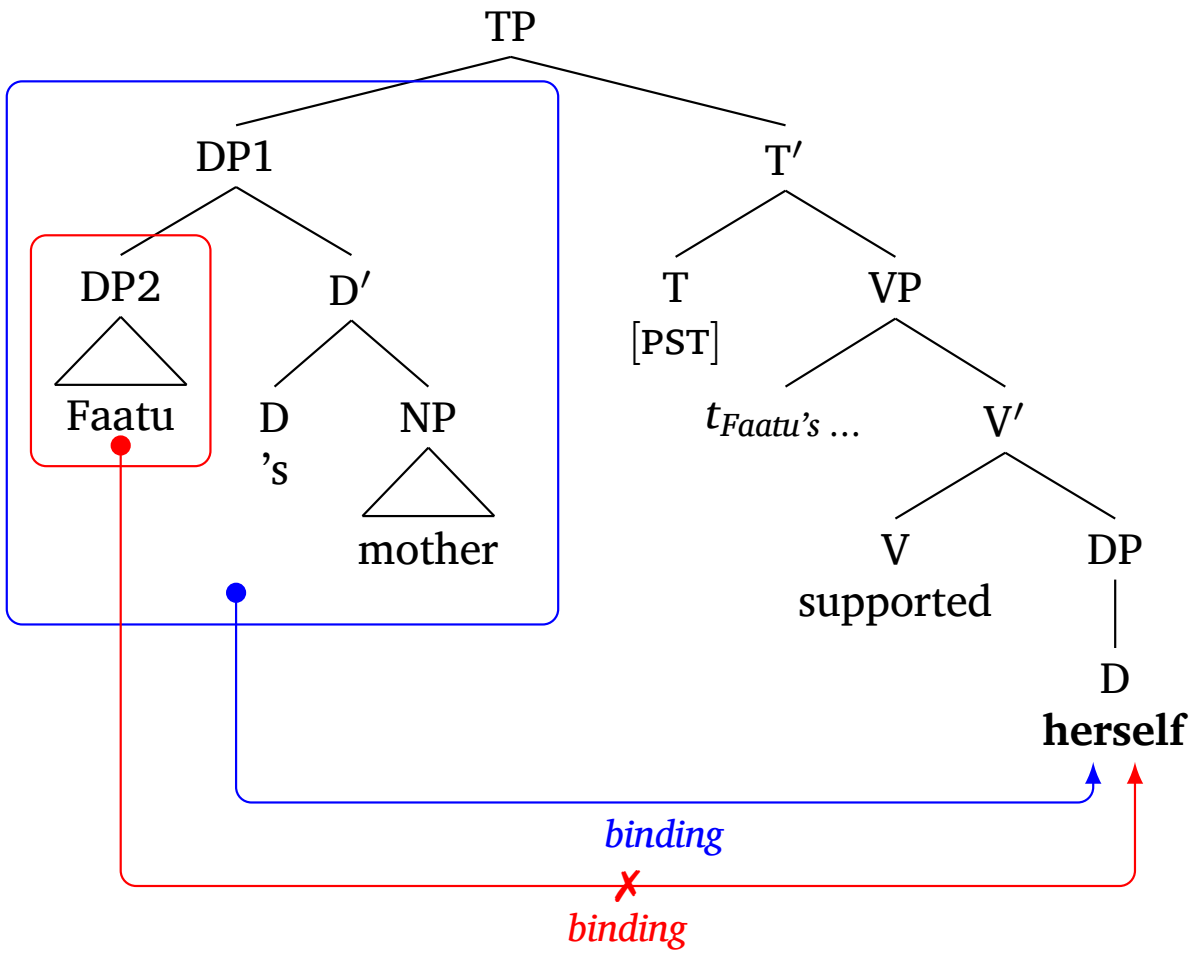
- We can represent this difference as follows:

(23)



Exercise

There is a difference in the structural relationship between *Faatu's mother* and *herself* and that between *Faatu* and *herself*. This difference is based on c-command. What is this difference?

- The crucial difference is that [$_{DP1}$ *Faatu's mother*] c-commands *herself*, but [$_{DP2}$ *Faatu*] does **not** c-command *herself*.

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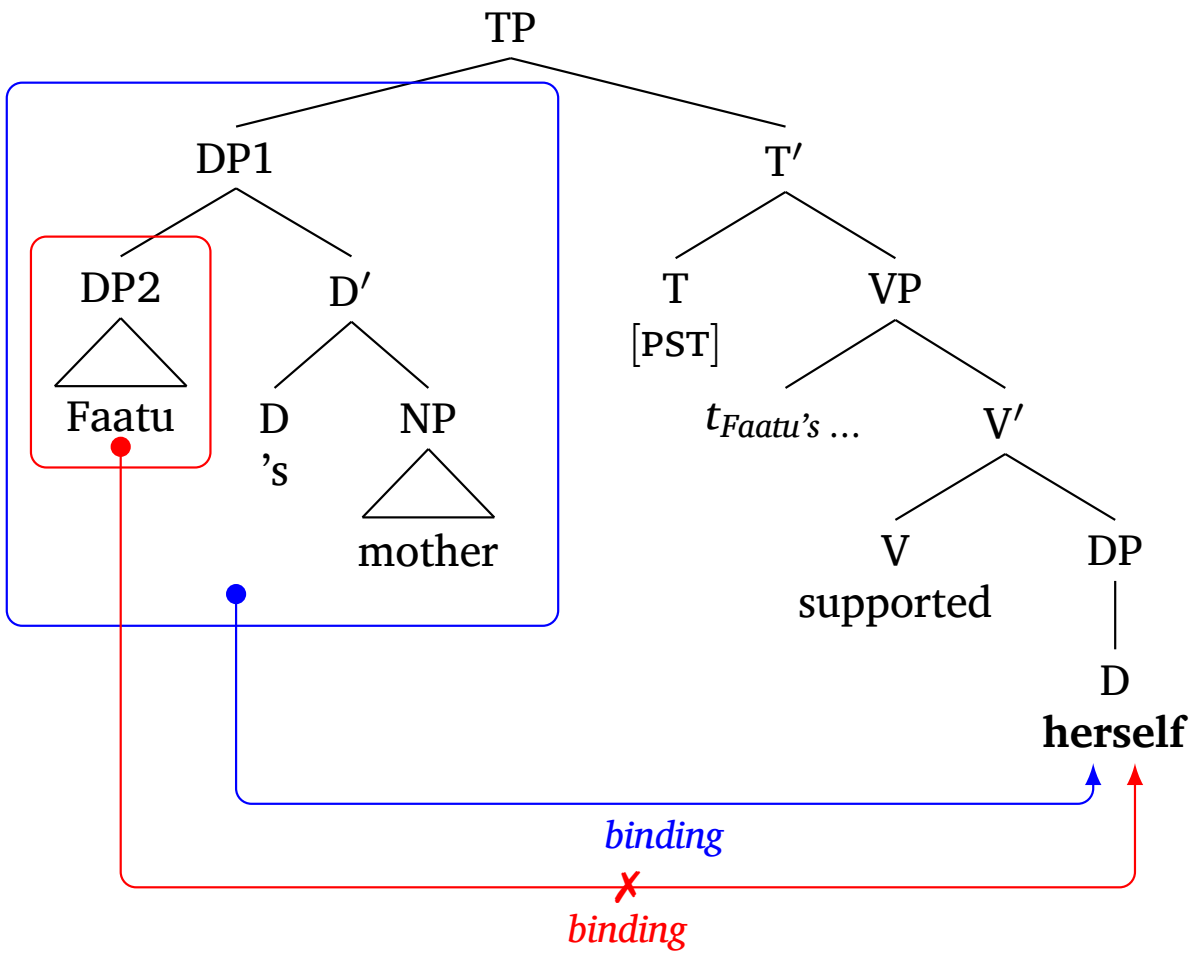

(12) *Condition A* (version 2)

An anaphor must be bound by an antecedent that precedes it.

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The problem with (12) was the linear relationship precedence. What can we replace it with in order to account for the difference between (13a) and (13b)?

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- We are now in the position to define *bind*.

Binding

(25) α binds β iff:

i. α and β are coindexed.

ii. α c-commands β.

(26) If β is not bound, we say that β is **free**.

- Let's scrutinize our formulation of Condition A once again.

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- To do so, consider the following sentences:

(27) a. Faatu$_1$ supported herself$_1$.

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- Are the conditions imposed by (24) satisfied in (27b)?

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  - *Faatu* is the subject of the higher clause and 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 in (25), *Faatu* binds *herself*.
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- Is (24) making the correct prediction about (27b)'s ungramaticality? ➠ No!

(27) a. Faatu$_1$ supported herself$_1$.
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- The observable difference between (27a) and (27b) is that, in (27a), there is one single clause, while in (27b), there is a matrix and an embedded clause.
- In other words, the difference between (27a) and (27b) is that, in the latter, the anaphor and its antecedent are separated by a clausal boundary.
- We could then hypothesize that an anaphor must be bound by its antecedent in the same clause.

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An anaphor must be bound *within the same clause*.

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- We need one last refinement of Condition A.

(29) a. Faatu$_1$ believed [that Ricardo supported herself$_1$].

b. Faatu$_1$ believes [herself$_1$ to be a private person].

- (29b) is a grammatical sentence, even though the antecedent *Faatu* and the anaphor *herself* belong to different clauses.
- (29b) would be a violation of (28), repeated below, just like (29a) is.

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- There is a crucial difference between (29a) and (29b).
- In (29a), the embedded clause where the anaphor is located is **finite**, while the embedded clause in (29b) is **nonfinite**.

Finiteness

Clauses can be divided into *finite* and *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*).

  (30) [Jeynaba believes/proved [$_{CP}$ **that** [$_{TP}$ Anna is a genius]]].

- **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*.

  (31) [Jeynaba believes/proved [$_{TP}$ Anna [$_{T'}$ **to** be a genius]]].

(29) a. * Faatu$_1$ believed [that Ricardo supported herself$_1$]. *finite embedded clause*
b. Faatu$_1$ believes [herself$_1$ to be a private person]. *nonfinite embedded clause*

- What (29) shows is that the binding of an anaphor cannot be in 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.

Binding Domain

(32) A Binding Domain is the smallest finite clause that contains a nominal expression that can or must be bound.

- We are finally able to formulate the final version of Condition A:

Condition A

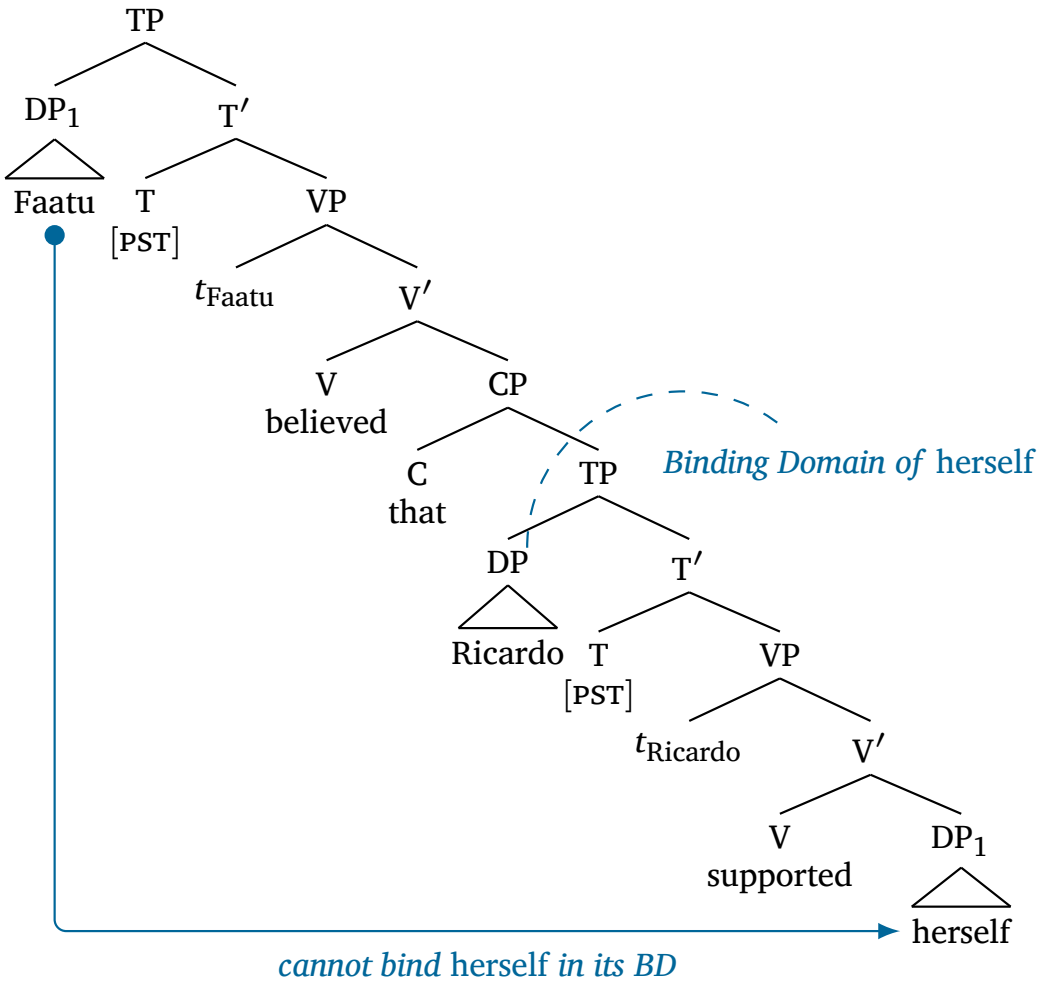
(33) An anaphor must be bound in its Binding Domain.

- (33) provides an explanation for the contrast between (29a) and (29b).

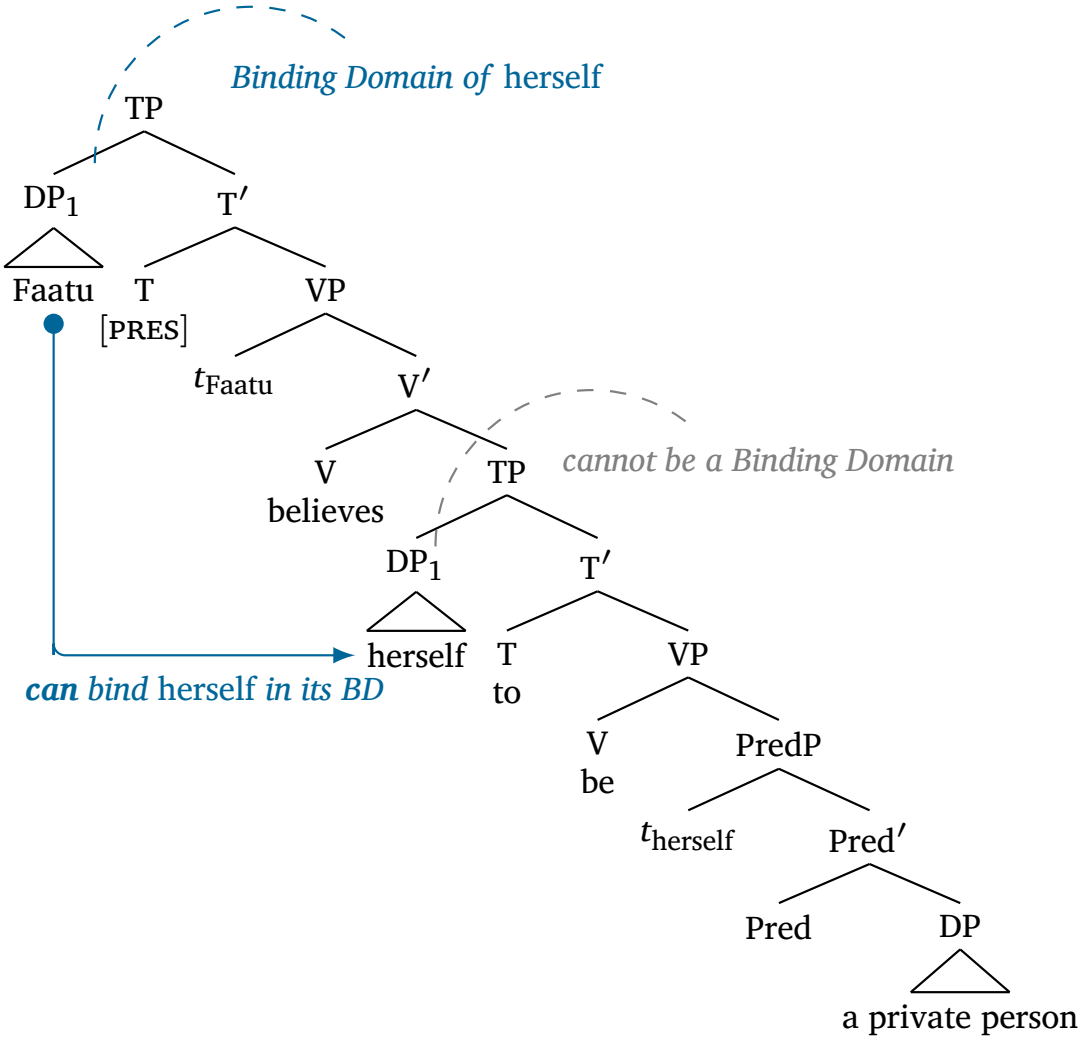
(29) a. * Faatu$_1$ believed [that Ricardo supported herself$_1$].
b. Faatu$_1$ believes [herself$_1$ to be a private person].

  - (29a) 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 (33).
  - In (29b), *herself*'s Binding Domain is the entire sentence, since the embedded clause is nonfinite. Within that domain, *herself* is bound by *Faatu*. As such, (33) is complied with.

(29) a. * Faatu$_1$ believed [that Ricardo supported herself$_1$]. *embedded finite clause*



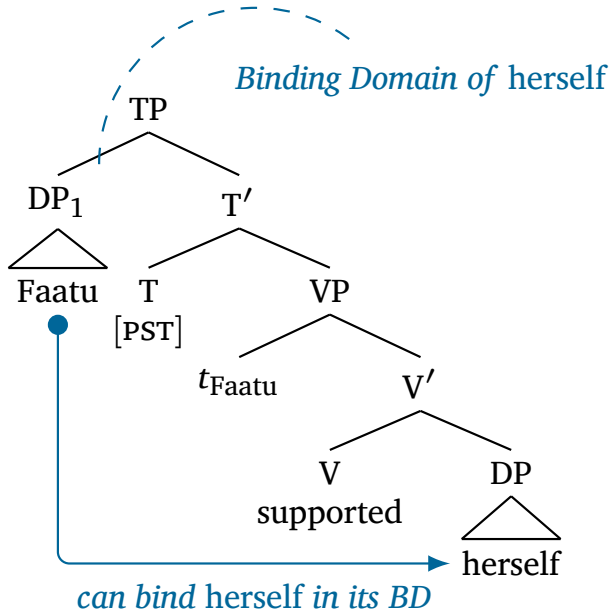
(29) b. Faatu$_1$ believes [herself$_1$ to be a private person].[4] *embedded nonfinite clause*



[4]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).

- 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.

(34) Faatu$_1$ supported herself$_1$.



- 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, Closeness defined in terms of c-command.

Exercise

1. Draw a tree for each of the sentences below.

   (35) a. The child$_1$ hugged herself$_1$.
   b. The suspect$_1$ unwittingly proved herself$_1$ to have committed a crime.

2. Why is (35b) grammatical, but (36), ungrammatical?

   (36) * The suspect$_1$ unwittingly proved that herself$_1$ has committed a crime.

Exercise

Explain why the sentences below are ungrammatical. Include tree diagrams in your answer.

(37) a. * The statue of themselves stoked widespread interest.

b. * Mary$_1$ thinks that it will snow on herself$_1$.

c. * [$_{\&P}$ Carlos and Mihaela$_1$] betrayed herself$_1$.

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.

- Recall the anaphor data in (27) and compare it with (38).

(27) a. Faatu$_1$ supported herself$_1$.
b. * Faatu$_1$ believed [that Ricardo supported herself$_1$].

(38) a. Faatu$_1$ supported her$_1$.
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- (27) illustrates the behavior of anaphors, while (38) illustrates the behavior of **pronouns**.
- We can see from the contrast between (27) and (38) that anaphors and pronouns are in **complementary distribution**.

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(27) a. Faatu$_1$ supported herself$_1$.
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- (27) illustrates the behavior of anaphors, while (38) illustrates the behavior of **pronouns**.
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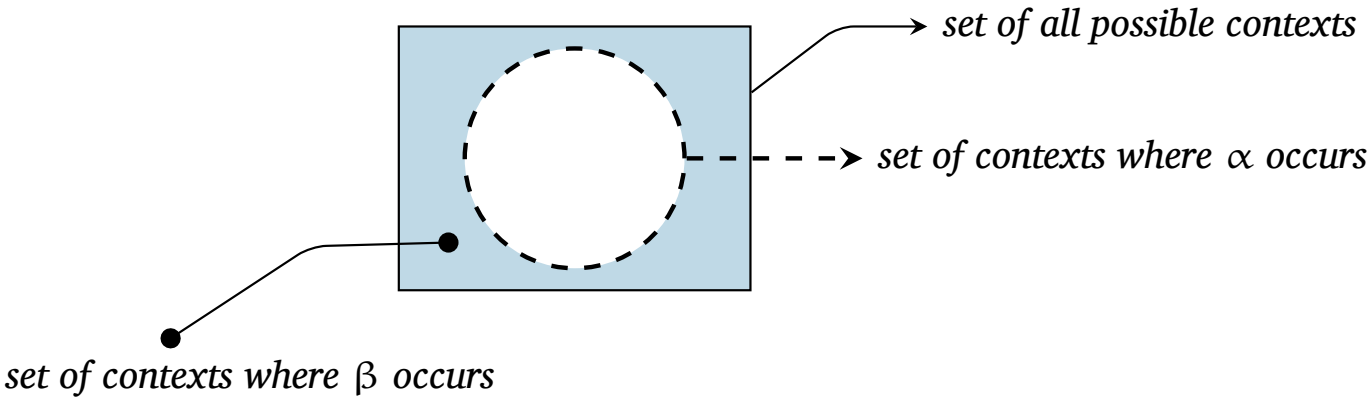
(39) If α and β are in complementary distribution, α occurs in all contexts where β does not occur (and vice-versa).



- **Condition B** is the component of Binding Theory that accounts for the distribution and interpretation of pronouns.[5]
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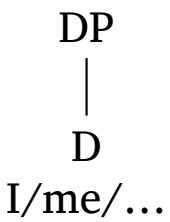

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		SG	
		Subject (NOM)	Object (ACC)
1		I	me
2		you	you
3	MASC	he	him
	FEM	she	her
	INANM	it	it
	NEUTRAL	they	them

Table 2: Singular pronouns in English

	Plural	
	Subject (NOM)	Object (ACC)
1	we	us
2	you	you
3	they	them

Table 3: Plural pronouns in English

- We concluded in the previous section that, besides requiring an antecedent, the antecedent must be inside the anaphor's Binding Domain:

  (27b) * Faatu$_1$ believed [that Ricardo supported herself$_1$].

- Compare this behavior with what happens to pronouns:

  (41) Faatu$_1$ believed [that Ricardo supported her$_1$].

- What (41) shows us is that a pronoun like *her* can have an antecedent (viz., *Faatu*), but it is possible for the antecedent **not** to be in the Binding Domain of the pronoun (i.e. the embedded clause between brackets). The definition of Binding Domain is repeated below:

  (32) *Binding Domain*

  A Binding Domain is the smallest finite clause that contains a nominal expression that can or must be bound.

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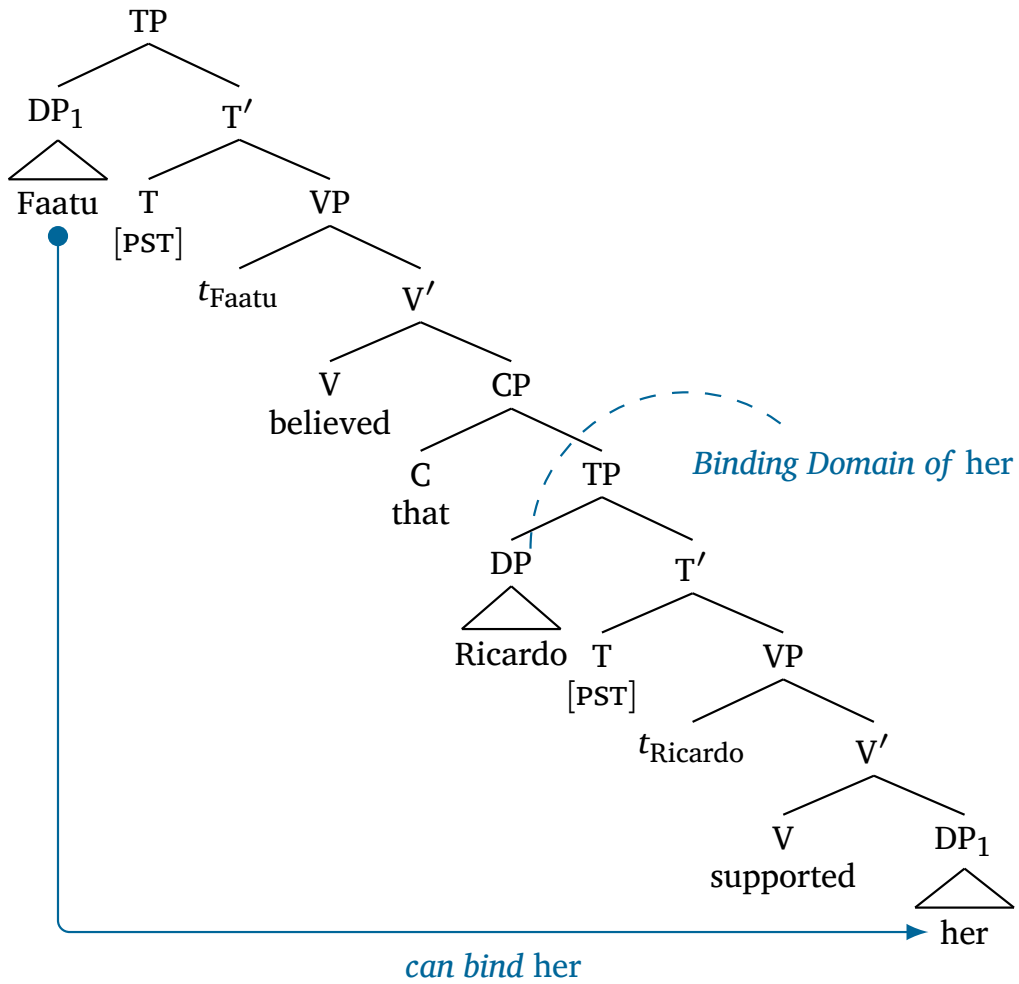

- While (41) shows that a pronoun can have an antecedent that is outside the pronoun's Binding Domain, the sentences in (42) below show that a pronoun does not have to have an antecedent at all.

(42) a. It seems to her that it will rain.
b. Ricardo supported you.

- Compare these sentences with their anaphoric counterparts:

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- So far, we arrived at the following conclusions about pronouns:
  - Unlike anaphors, pronouns can have an antecedent that is outside their Binding Domain.
  - Unlike anaphors, pronouns do not have to have an antecedent at all.

- Yet another difference between anaphors and pronouns is that anaphors must have a local antecedent, as was demonstrated in (9a), while pronouns must *not* have a local antecedent (44):

(9a) Faatu$_1$ supported herself$_1$.

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- In order to account for all these differences, Condition B is formulated as follows:

Condition B

(45) A pronoun must be free in its Binding Domain.

- Recall that 'free' is defined as the opposite of being bound:

(25) α binds β iff:

i. α and β are coindexed.

ii. α c-commands β.

(25) If β is not bound, we say that β is **free**.

Exercise

We now have a formalization of the principle that accounts for the interpretation and distribution of pronouns:

(45) *Condition B*

A pronoun must be free in its Binding Domain.

Based on (45), provide an explicit explanation for the (un)grammaticality of the sentences we examined (with minor modifications, for clearer contrasts):

(46) a. Faatu$_1$ believed [that Ricardo supported her$_1$].

b. Ricardo$_1$ supported him$_2$.

c. * Ricardo$_1$ supported him$_1$.

- These are the formulations of Conditions A and B that we arrived at:

(33) *Condition A*

An anaphor must be bound in its Binding Domain.

(45) *Condition B*

A pronoun must be free in its Binding Domain.

- We started this section with the observation that anaphors and pronouns are in complementary distribution.
- The reason is that anaphors must be bound, while pronouns must be free in the same configuration (i.e. in their respective Binding Domain).

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- Condition B is also less strict than Condition A.

(33) *Condition A*

An anaphor must be bound in its Binding Domain.

(45) *Condition B*

A pronoun must be free in its Binding Domain.

- Condition A (33) states when an anaphor must be bound, while Condition B only states when it must be free.
- In other words, Condition B, unlike Condition A, does not say anything about when a pronoun has to be bound.
  - This is why a pronoun can have an antecedent outside of its Binding Domain.

(41) Faatu$_1$ believed [that Ricardo supported her$_1$].

  - Likewise, a pronoun does not have to be bound at all.

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- A pronoun can have a *bound* or *deictic* reading.
  - A pronoun has a **bound** reading when there is a constituent in the same sentence that it is coindexed with, and which c-commands the pronoun, as dictated by Condition B (45).

    (47) Cedric$_1$ told Harry$_2$ [that he$_{1/2}$ could win the Triwizard Tournament].
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Exercise

Condition B (45) only states that a pronoun must be free. Explain how the way Condition B is stated is behind the humorous effect in jokes with the following setup:

1st scene CHARACTER says: "My dog bit my husband, so it I had to put **him** down."
2nd scene CHARACTER appears dragging the body of a man out of the door.

- Finally, we turn to Condition C, the principle of Binding Theory that accounts for the correference possibilities of **R-Expressions**, i.e. referential expressions such as:
  - Proper names, e.g. *Faatu*
  - Definite descriptions, e.g. *the student with a pink shirt*
- R-Expressions are DPs, whose head may have null exponence.

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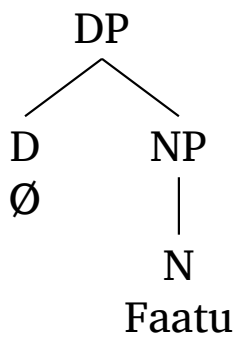

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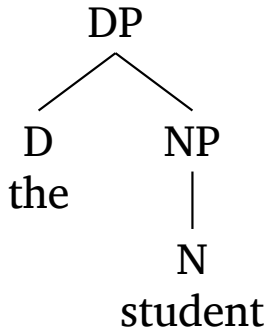

- In order to understand the correreference possibilities of R-Expressions, let's consider the following sentences:

(50) a. She$_1$ supported **Faatu**$_1$.

b. She$_1$ believed [that Ricardo supported **Faatu**$_1$]

- In (50a), we see the environment where an anaphor had to be bound:

(51) She$_1$ supported **herself**$_1$.

- But R-Expressions must also be different from pronouns, in that (50b) illustrates an environment where a pronoun could be free:

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- In order to account for (50a) and (50b), Condition C is stated as follows:

Condition C

(53) An R-Expression must be free.

- Notice that Condition C (53) does not make any reference to a Binding Domain.
  - This is why both (50a) and (50b) 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.

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- For comparison, consider grammatical sentences where Condition C is not violated:

(54) a. She$_1$ supported Faatu$_2$.
b. She$_1$ believed [$_{CP}$ that Ricardo supported Faatu$_2$].
c. Faatu supported Hye-jeong.

- All these sentences are grammatical because the R-expressions in them are free.

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- All these sentences are grammatical because the R-expressions in them are free.

Exercise

Explain the (un)grammaticality of the sentences below:

(55) a. She$_1$ believes [herself$_1$ to have betrayed John].

b. * She$_1$ believes [her$_1$ to have betrayed John].

c. * She$_1$ believes [Faatu$_1$ to have betrayed John].

Binding Theory

(56) a. *Condition A*
An anaphor must be bound in its Binding Domain.
b. *Condition B*
A pronoun must be free in its Binding Domain.
c. *Condition C*
An R-Expression must be free.

Binding

(57) α binds β iff:

i. α and β are coindexed.

ii. α c-commands β.

(58) If β is not bound, we say that β is **free**.

Binding Domain

(59) A Binding Domain is the smallest finite clause that contains a nominal expression that can or must be bound.

C-command

(60) α c-commands β iff:

a. α is γ's sister and γ dominates β, or

b. α is β's sister.

(61)