chapter 5

Binding Theory

0. INTRODUCTION

Let's leave syntax for a moment and consider some facts about the meaning of NPs in English. There are some NPs that get their meaning from the context and discourse around them. For example, in the sentence in (1), the meaning of the word *Felicia* comes from the situation in which the sentence is uttered:

1) Felicia wrote a fine paper on Zapotec.[1]

If you heard this sentence said in the real world, the speaker is assuming that you know who Felicia is and that there is somebody called Felicia who is contextually relevant. Although you may not have already known that she wrote a paper on Zapotec, this sentence informs you that there is some paper in the world that Felicia wrote, and it's about Zapotec. It presupposes that there is a paper in the real world and that this paper is the meaning of the phrase *a fine paper on Zapotec*. Both *a fine paper on Zapotec* and *Felicia* get their meaning by referring to objects in the world.[2] This kind of NP is called a ***referring expression*** (or ***R-expression***):

[1] Zapotec is a language spoken in southern Mexico.
[2] This is true whether the world being referred to is the actual world, or some fictional imaginary world created by the speaker/hearer.

2) *R-expression*: An NP that gets its meaning by referring to an entity in the world.

The vast majority of NPs are R-expressions. But it is by no means the case that all NPs are R-expressions. Consider the case of the NP *herself* in the following sentence:

3) Heidi bopped *herself* on the head with a zucchini.

In this sentence, *Heidi* is an R-expression and gets its meaning from the context, but *herself* must refer back to *Heidi*. It cannot refer to Arthur, Miriam, or Andrea. It must get its meaning from a previous word in the sentence (in this case *Heidi*). This kind of NP, one that obligatorily gets its meaning from another NP in the sentence, is called an ***anaphor*** (as we saw in chapter 1).

4) *Anaphor:* An NP that obligatorily gets its meaning from another NP in the sentence.

Typical anaphors are *himself, herself, themselves, myself, yourself,* and *each other*.

Types of Anaphors

There are actually (at least) two different kinds of anaphors. One type is the ***reflexive pronouns*** like *herself, himself,* and *themselves*. The other kind are called ***reciprocals***, and include words like *each other*. For our purposes, we'll just treat this group like a single class, although there are minor differences between the distribution of reflexives and reciprocals.

There is yet another kind of NP. These are NPs that can optionally get their meaning from another NP in the sentence, but may also optionally get it from somewhere else (including context or previous sentences in the discourse). These NPs are called ***pronouns***.[3] Look at the sentence in (5):

5) Art said that he played basketball.

In this sentence, the word *he* can optionally refer to Art (i.e., the sentence can mean "Art said that Art played basketball") or it can refer to someone else (i.e. "Art said that Noam played basketball"). Typical pronouns include: *he, she, it, I, you, me, we, they, us, him, her, them, his, her, your, my, our, their, one*. A definition of pronoun is given in (6):

[3] There is some discrepancy among linguists in the use of this term. Some linguists use the term ***pronominal*** instead of pronoun and use the term pronoun to cover both anaphors and pronominals. This distinction, while more precise, is confusing to the beginner, so for our purposes we'll just contrast pronouns to anaphors, and avoid the term pronominal.

6) *Pronoun*: An NP that may (but need not) get its meaning from another word in the sentence.

Getting back to syntax, it turns out that these different semantic types of NPs can only appear in certain syntactic positions that are defined using the structural relations we developed in the last chapter. Anaphors, R-expressions, and pronouns can only appear in specific parts of the sentence. For example, an anaphor may not appear in the subject position of sentence:

7) *Herself bopped Heidi on the head with a zucchini.

The theory of the syntactic restrictions on where these different NP types can appear in a sentence is called ***Binding Theory*** and is the focus of this chapter and makes reference to the structural relations we learned about in the previous chapter. This chapter thus will be your first exposure to why structural relations are so important to linguists.

You now have enough information to try General Problem Set 1

1. THE NOTIONS *COINDEX* AND *ANTECEDENT*

We're going to start with the distribution of anaphors. First, we need some terminology to set out the facts. An NP that gives its meaning to another noun in the sentence is called the ***antecedent***:

8) *Antecedent*[4]*:* An NP that gives its meaning to another NP.

For example, in sentence (3) (repeated here as 9), the NP *Heidi* is the source of the meaning for the anaphor *herself*, so *Heidi* is called the antecedent:

9) Heidi bopped herself on the head with a zucchini.
   ↑ ↑
   antecedent *anaphor*

We use a special mechanism to indicate that two NPs refer to the same entity. After each NP we write a subscript letter. If the NPs refer to the same entity, then they get the same letter. If they refer to different entities they get different letters. Usually we start (as a matter of tradition) with the letter *i*

[4] In Latin the prefix *ante* means "before." However, in the system we are developing here, antecedents do *not* need to precede the noun they give their meaning to (although they frequently do). In some cases the antecedent may follow the noun that it gives its meaning to: e.g., *Everyone who knows him loves Dan*. *Him* can get its meaning from *Dan*, even though *Dan* follows *him*.

and work our way down the alphabet. These subscript letters are called ***indices*** or ***indexes*** (singular: ***index***).

10) a) $[\text{Colin}]_i$ gave $[\text{Andrea}]_j$ $[\text{a basketball}]_k$.
    b) $[\text{Art}]_i$ said that $[\text{he}]_j$ played $[\text{basketball}]_k$ in $[\text{the dark}]_l$.
    c) $[\text{Art}]_i$ said that $[\text{he}]_i$ played $[\text{basketball}]_k$ in $[\text{the dark}]_l$.
    d) $[\text{Heidi}]_i$ bopped $[\text{herself}]_i$ on $[\text{the head}]_j$ with $[\text{a zucchini}]_k$.

In (10a), all the NPs refer to different entities in the world, so they all get different indexes. The same is true for (10b). Note that with this indexing, the sentence only has the meaning where *he* is not *Art*, but someone else – the pronoun *he* and *Art* have different indexes. Sentence (10c), by contrast, has *he* and *Art* referring to the same person. In this sentence, *Art* is the antecedent of the pronoun *he,* so they have the same index. Finally in (10d), the anaphor *herself*, by definition, refers back to *Heidi* so they get the same index. Two NPs that get the same index are said to be ***coindexed***. NPs that are coindexed with each other are said to ***corefer*** (i.e., refer to the same entity in the world).

11) *Coindexed*: Two NPs are said to be coindexed if they have the same index.

In (10c) *Art* and *he* are coindexed; in (10b) *Art* and *he* are not coindexed.

2. BINDING

The notions of coindexation, coreference, and antecedence are actually quite general ones. They hold no matter what structural position an NP is in the sentence. It turns out, however, that the relations between an antecedent and a pronoun or anaphor must bear particular structural relations. Contrast the three sentences in (12).[5]

12) a) Heidi_i bopped herself_i on the head with a zucchini.
    b) $[\text{Heidi}_i\text{'s mother}]_j$ bopped herself_j on the head with a zucchini.
    c) *$[\text{Heidi}_i\text{'s mother}]_j$ bopped herself_i on the head with a zucchini.

In particular notice the pattern of indexes on (12b) and (12c). These sentences show, that while the word *herself* can refer to the whole subject NP *Heidi's mother*, it can't refer to an NP embedded inside the subject NP, such as *Heidi*. Similar facts are seen in (13).

13) a) $[\text{The mother of Heidi}_i]_j$ bopped herself_j on the head with a zucchini.

[5] In order to account for these sentences we'll have to slightly modify our NP rule:
NP → ({D/NP's}) (AdjP+) N (PP+)

b) *[The mother of Heidi$_i$]$_j$ bopped herself$_i$ on the head with a zucchini.

A Quick Note on Notation

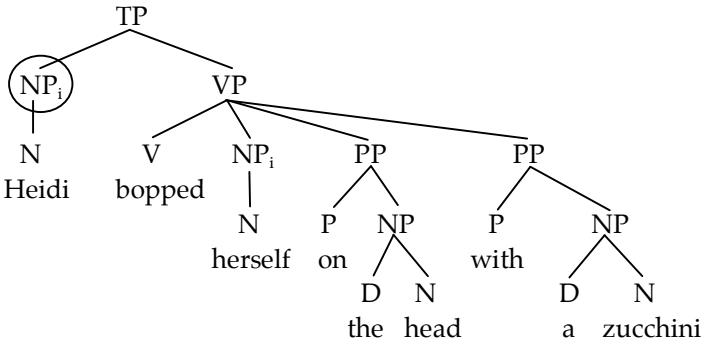
Syntacticians will sometimes abbreviate two sentences that are otherwise identical, but have different indices. The two possible indices are separated by a slash (/) and the index that would make the sentence ungrammatical is marked with an asterisk (*). So the abbreviated form of the two sentences in (13) would be:

13') [The mother of Heidi$_i$]$_j$ bopped herself$_{j/*i}$ on the head with a zucchini.

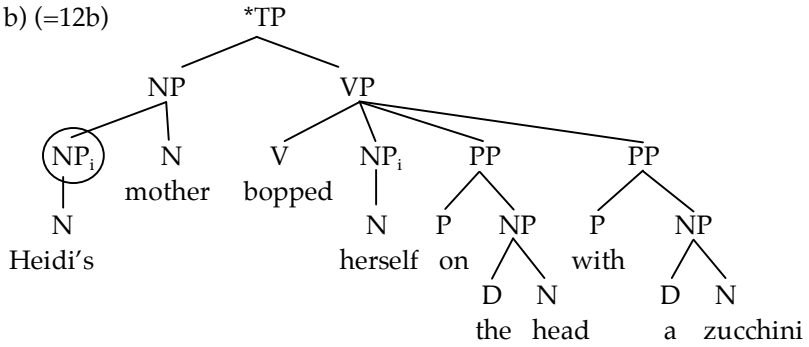
This means that that the version of this sentence where *herself* is indexed j (i.e., coindexed with *[the mother of Heidi]$_j$*) is grammatical; but when it is indexed i (i.e., coindexed with *[Heidi]$_i$*) it is ungrammatical.

Look at the trees for (12a and b), shown in (14a and b) below, and you will notice a significant difference in terms of the position where the NP immediately dominating *Heidi* is placed.

14) a) (=12a)



b) (=12b)



In (14a) the circled NP c-commands the NP dominating *herself*, but in (14b) it does not. It appears that the crucial relationship between an anaphor and its

antecedent involves c-command. So in describing the relationship between an anaphor and an antecedent we need a more specific notion than simple coindexation. This is ***binding:***

15) *Binds*: A binds B if and only if A c-commands B *and* A and B are coindexed.

Binding is a kind of coindexation. It is coindexation that happens when one of the two NPs c-commands the other. Notice that coindexation alone does not constitute binding. Binding requires *both* coindexation and c-command.

You now have enough information to try General Problem Set 2 and Challenge Problem Set 1

Now we can make the following generalization, which explains the ungrammaticality of sentences (16a) (=7) and (16b) (=12c):

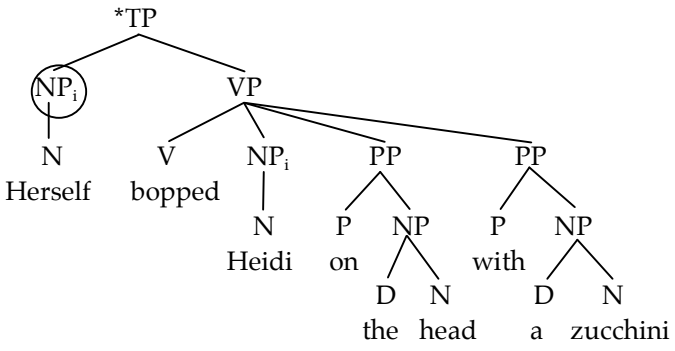
16) a) (=7) *Herself$_i$ bopped Heidi$_i$ on the head with a zucchini.
b) (=12c) *[Heidi$_i$'s mother]$_j$ bopped herself$_i$ on the head with a zucchini.

In neither of these sentences is the anaphor bound. In other words, it is not c-commanded by the NP it is coindexed with. This generalization is called ***Binding Principle A***. Principle A determines the distribution of anaphors:

17) *Binding Principle A (preliminary)*: An anaphor must be bound.

Remember, bound means coindexed with an NP that c-commands it. If you look at the tree in (14b) you'll see that the anaphor *herself*, and the NP *Heidi* are coindexed. However they are not bound, since $[_{NP}$ *Heidi]* does not c-command $[_{NP}$ *herself]*. The same is true in the tree for (16a) (=7) shown in (18):

18)



Even though the two NPs are coindexed, they do not form a binding relation, since the antecedent doesn't c-command the anaphor. You might think

that *Heidi* binds *herself*, since the anaphor c-commands the antecedent.[6] But notice that this is not the way binding is defined. Binding is *not* a symmetric relationship. The ***binder*** (or antecedent) must do the c-commanding of the ***bindee*** (anaphor or pronoun), not the reverse.

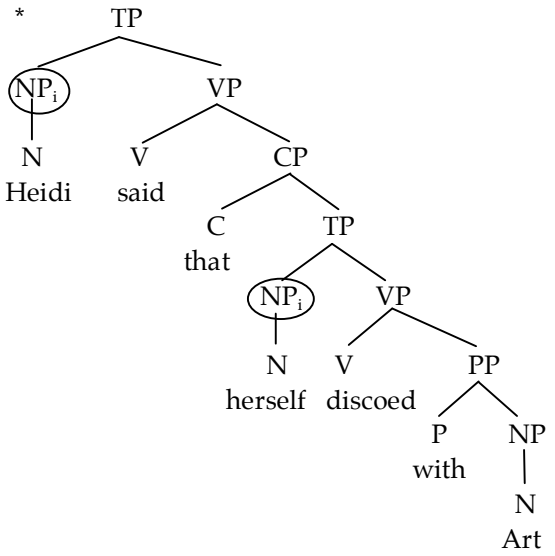
3. LOCALITY CONDITIONS ON THE BINDING OF ANAPHORS

Consider now the following fact about anaphors:

19) *Heidi$_i$ said that herself$_i$ discoed with Art.
(cf. Heidi$_i$ said that she$_i$ discoed with Art.)

A tree for sentence (19) is given below:

20)



As you can see from this tree, the anaphor is bound by its antecedent: *[$_{NP}$Heidi]* c-commands *[$_{NP}$ herself]* and is coindexed with it. This sentence is predicted to be grammatical by the version of Principle A presented in (17), since it meets the requirement that anaphors be bound. Surprisingly, however, the sentence is ungrammatical. Notice that the difference between a sentence like (19) and a sentence like (12a) is that in the ungrammatical (19), the anaphor is in an embedded clause. The anaphor seems to need to find its antecedent in the same clause. This is called a ***locality constraint***. The ana-

[6] In fact, in this tree *herself* binds *Heidi*, and therein lies the problem; anaphors must be bound, they aren't the binders.

phor's antecedent must be near it or "local" in some way. The syntactic space in which an anaphor must find its antecedent is called a ***binding domain***. For the moment let's just assume that the binding domain is the clause (TP).

21) *Binding domain*: The clause containing the NP (anaphor, pronoun, or R-expression).

With this in mind, let's revise Principle A:

22) *Binding Principle A (revised):* An anaphor must be bound in its binding domain.

This constraint says that anaphors must find an antecedent within the clause that immediately contains them.

Binding Domain

The definition we've given here for "binding domain" is clearly over-simplistic. For example, when there is an NP that contains an anaphor and an NP marked with 's, that NP seems to function as a binding domain:

i) Heidi$_i$ believes any description of herself$_i$.
ii) *Heidi$_i$ believes Martha$_j$'s description of herself$_i$.
iii) Heidi$_i$ believes Martha$_j$'s description of herself$_j$.

The literature on this is extensive and beyond the scope of this chapter. But you should be aware that the definition given here needs extensive revision, we will return to this in chapter 15.

You now have enough information to try General Problem Set 3

4. The Distribution of Pronouns

Anaphors are not the only NP type with restrictions on their syntactic position. Pronouns can also be restricted in where they may appear:

23) a) Heidi$_i$ bopped her$_j$ on the head with the zucchini.
b) *Heidi$_i$ bopped her$_i$ on the head with the zucchini.

Pronouns like *her* in the sentences in (23) may not be bound. (They may not be coindexed by a c-commanding NP.) The sentence in (23) may only have the meaning where the *her* refers to someone other than *Heidi*. Contrast this situation with the one in which the pronoun is in an embedded clause:

24) a) Heidi$_i$ said [$_{S'}$ that she$_i$ discoed with Art].
b) Heidi$_i$ said [$_{S'}$ that she$_k$ discoed with Art].

In this situation, a pronoun may be bound by an antecedent, but it doesn't have to be. It can be bound as in (24a), or not bound as in (24b). Unlike the case of anaphors, (which *must* be bound in a particular configuration), pronouns seem only to have a limitation on where they *cannot* be bound. That is, a pronoun cannot be bound by an antecedent that is a clause-mate (in the same immediate clause). You'll notice that this is exactly the opposite of where anaphors are allowed. This restriction is called ***Principle B*** of the binding theory. It makes use of the term free. ***Free*** is the opposite of bound.

25) *Free*: Not bound.
26) *Principle B*: A pronoun must be free in its binding domain.

Given that the binding domain is a clause, the ungrammaticality of (23b) is explained. Both *Heidi* and *her* are in the same clause, so they may not be bound to each other. The pronoun must be free. In (24) both indexings are allowed by Principle B. In (24b) the pronoun isn't bound at all (so is free within its binding domain). In (24a), the situation is a little trickier: The pronoun is bound, but it isn't bound within its binding domain (the embedded clause). Its binder lies outside the binding domain, so the sentence is grammatical.

You now have enough information to try Challenge Problem Sets 2 & 3

5. THE DISTRIBUTION OF R-EXPRESSIONS

R-expressions have yet another distribution. R-expressions don't seem to allow any instances of binding at all, not within the binding domain and not outside it either.

27) a) *Heidi$_i$ kissed Miriam$_i$.
b) *Art$_i$ kissed Geoff$_i$.
c) *She$_i$ kissed Heidi$_i$.[7]
d) *She$_i$ said that Heidi$_i$ was a disco queen.

[7] Note that this sentence is *not* a violation of Principle B. *Heidi* does not bind *she* here, even though they are coindexed. This is because *Heidi* does not c-command *she*. Note that *[Even her$_i$ enemies] love Heidi$_i$* is well-formed, because neither NP c-commands the other, so there is no binding, even if they are coindexed. Remember coindexation is not the same thing as binding.

In none of these sentences can the second NP (all R-expressions) be bound by a c-commanding word. This in and of itself isn't terribly surprising, given the fact that R-expressions receive their meaning from outside the sentence (i.e., from the context). That they don't get their meaning from another word in the sentence (via binding) is entirely expected. We do have to rule out situations like (27). The constraint that describes the distribution of R-expressions is called ***Principle C***.

28) *Principle C*: An R-expression must be free.

Notice that Principle C says nothing about a binding domain. Essentially R-expressions must be free everywhere. They cannot be bound at all.

A Common Mistake.
Consider the sentence *She_i loves $Mary_i$. Which of the two NPs in this sentence is the antecedent? Common sense might tell us that *Mary* is. But common sense is wrong. The antecedent here is *she* is. This is because *she* c-commands *Mary*, and not vice versa.

One easy way to avoid this mistake is not to think in terms of antecedent and anaphor/pronoun, but in terms of ***binder*** and ***bindee***. The binder here is *she* because it is coindexed with *Mary* and c-commands *Mary*. *Mary* is the thing being bound (the bindee). Note that binding is typically an asymmetric relationship.

You now have enough information to try General Problem Set 4 and Challenge Problem Sets 4–6

6. CONCLUSION

In this chapter, we looked at a very complex set of data concerning the distribution of different kinds of NPs. We saw that these different kinds of NPs can appear in different syntactic positions. A simple set of Binding Principles (A, B, and C) governs the distribution of NPs. This set of binding principles is built upon the structural relations developed in the last chapter.

In the next chapter, we are going to look at how we can develop a similarly simple set of revisions to the phrase structure rules. The constraints developed in this chapter have the shape of locality constraints (in that they require local, or nearness, relations between certain syntactic objects). In later chapters, we'll see a trend towards using locality constraints in other parts of the grammar.

The constraints developed in this chapter account for a wide range of data, but there are many cases that don't work; In particular there is a problem with our definition of binding domain. You can see some of these problems by trying some of the challenge problem sets at the end of this chapter. We return to a more sophisticated version of the binding theory in chapter 15 in the last part of this book.

IDEAS, RULES, AND CONSTRAINTS INTRODUCED IN THIS CHAPTER

i) ***R-expression***: An NP that gets it meaning by referring to an entity in the world.

ii) ***Anaphor***: An NP that obligatorily gets its meaning from another NP in the sentence.

iii) ***Pronoun***: An NP that may (but need not) get its meaning from another NP in the sentence.

iv) ***Antecedent***: The element that binds a pronoun, anaphor or R-expression. When this element c-commands another coindexed NP, it is a ***binder*** of that NP.

v) ***Index***: A subscript mark that indicates what an NP refers to.

vi) ***Coindexed***: Two NPs that have the same index ($_{i, j, k,}$ etc.) are said to be coindexed.

vii) ***Corefer***: Two NPs that are coindexed are said to corefer (refer to the same entity in the world).

viii) ***Binding***: A binds B if and only if A c-commands B *and* A and B are coindexed. A is the ***binder***, B is the ***bindee***.

ix) ***Locality Constraint***: A constraint on the grammar, such that two syntactic entities must be "local" or near to one another.

x) ***Binding Domain***: The clause (for our purposes).

xi) ***Free***: Not bound.

xii) ***The Binding Principles***
Principle A: An anaphor must be bound in its binding domain.
Principle B: A pronoun must be free in its binding domain.
Principle C: An R-expression must be free.

FURTHER READING

Aoun, Joseph (1985) *A Grammar of Anaphora*. Cambridge: MIT Press.
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GENERAL PROBLEM SETS

1. NP TYPES.
[Application of Skills; Very Basic]
Identify the type of NP (Anaphor, Pronoun, R-expression) of each of the following:

their, each cat, folk dancing, oneself, each other, she, her, themselves

2. C-COMMAND AND BINDING.
[Application of Skills; Basic]
Draw the trees for each of the following sentences and for the bolded NPs indicate whether (i) there is a binding relationship between the two nouns, and (ii) if there is relationship, which noun is the binder and which is the element that is being bound; if there is no binding relationship explain why (i.e., state which part of the definition of "binding" is not met). Note, this is not a question about the binding conditions (A, B, C) but about the definition of binding itself.

a) [The book about **[the president]$_i$**]$_k$ didn't bother **him$_i$**.
b) **[The book about [the president]$_i$]$_k$** didn't bother **him$_i$**.
c) **[The book about [the president]$_i$]$_k$** sold **itself$_k$**.
d) [**Andy$_i$**'s constant lack of effort]$_k$ dismayed [**his$_i$** father]$_m$.
e) [**Andy$_i$**'s constant lack of effort]$_k$ dismayed [**his$_n$** father]$_m$.

3. BINDING DOMAIN
[Application of Skills; Basic]
Draw the tree for each of the following sentences. In your tree circle the binding domain for the boldfaced noun:

a) The students told **themselves** that the exam wouldn't be too hard.
b) The students told their professor that **they** weren't worried about binding theory.
c) Michael said **the binding judgments** were wrong.

4. BINDING PRINCIPLES
[Application of Skills, Data Analysis; Intermediate]
Explain why the following sentences are ungrammatical. For each sentence, say what the binding domain of the NP causing the problem is, if it is c-commanded by its binder (antecedent), and name the binding condition that is violated.

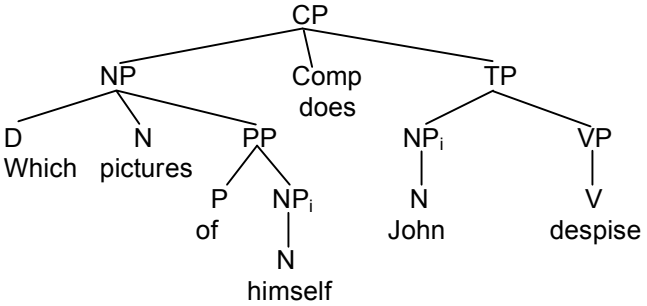
a) *Michael$_i$ loves him$_i$.
b) *He$_i$ loves Michael$_i$.
c) *Michael$_i$'s father$_j$ loves himself$_i$.
d) *Michael$_i$'s father$_j$ loves him$_j$.
e) *Susan$_i$ thinks that John should marry herself$_i$.
f) *John thinks that Susan$_i$ should kiss her$_i$.

CHALLENGE PROBLEM SETS

CHALLENGE PROBLEM SET 1:* WH-*QUESTIONS
[Critical Thinking; Challenge]
What problem(s) does the following sentence make for the binding theory as we have sketched it in this chapter? Can you think of a solution? (Hint: consider the non-question form of this sentence *John despises these pictures of himself*.)

Which pictures of himself$_i$ does John$_i$ despise?

Assume the following tree for this sentence:



CHALLENGE PROBLEM SET 2: BINDING DOMAIN

[Critical Thinking; Challenge]

The following sentence with the assigned indexing is predicted by the theory we have given so far to be ungrammatical. But it is actually ok. Explain why our theory says this should be ungrammatical.

Andy$_i$ dismayed [**his$_i$** father]$_m$.

CHALLENGE PROBLEM SET 3: PERSIAN[8]

[Critical Thinking; Challenge]

Does the binding theory account for the following data? Explain. (*Râ* means "the" when following object NPs. 3SG means "third person singular.")

a) Jân$_i$ goft [$_{S'}$ ke [$_S$ Mery$_k$ ketâb-â ro be xodesh$_{i/k}$ bargardune]].
John said that Mary book-PL râ to himself/herself return
"John said that Mary (should) return the books to him/herself."

b) Jân$_i$ goft [$_{S'}$ ke [$_s$ Mery$_j$ ketâb-â ro be xodesh$_{i/j}$ barmigardune]].
John said that Mary book-PL râ to himself/herself return3SG.FUT
"John said that Mary will return the books to him/herself."

Now consider (c) and (d): in these examples, *xod* "self", instead of *xodesh* "himself", is used. How do you explain the contrast between (a and b) and (c and d)? Note that (a and b) are taken from the spoken language, whereas (c and d) represent the formal written variant.

c) Jân$_i$ goft [ke [$_S$ Mery$_k$ ketâb râ barâye xod$_{*i/k}$ bexânad]].
John said that Mary book râ for self read3SG
"John said that Mary (should) read the book to *himself/herself."

d) Jân$_i$ goft [ke [$_S$ Mery$_k$ ketâb râ barâye xod$_{*i/k}$ negahdârad]].
John said that Mary book râ for self keep3SG
"John said that Mary (should) keep the books for *himself/herself."

CHALLENGE PROBLEM SET 4: JAPANESE

[Data Analysis and Critical Thinking; Challenge]

Japanese has a number of items that can be called pronouns or anaphors. One of these is *zibunzisin*. For the purposes of this assignment assume that any noun that has the suffix *-wa* c-commands any other NP, and assume that any noun that has the suffix *-ga* c-commands any NP with the suffix *-o*. Consider the following data (Data from Aikawa 1994):

a) Johnwa$_i$ [$_{CP}$ [$_{TP}$ Maryga$_k$ zibunzisino$_{k/*i}$ hihansita] [$_C$ to]] itta.
John Mary zibunzisin criticized that said
"John said that Mary$_k$ criticized herself$_k$."
"*John$_i$ said that Mary criticized himself$_i$."

[8] This problem set was contributed by Simin Karimi.

Question 1: On the basis of only the data in (a) is *zibunzisin* an anaphor or a pronoun? How can you tell?

Now consider this sentence:

b) Johnwa$_i$ [$_{CP}$ [$_{TP}$ zibunzisinga$_i$ Maryo korosita] [$_C$ to]] omotteiru.
John zibunzisin Mary killed that think
"John thinks that himself killed Mary."
(*note:* grammatical in Japanese.)

Question 2: Given this additional evidence, do you need to revise your hypothesis from question 1? Is *zibunzisin* an anaphor, a pronoun or something else entirely? How can you tell?

One more piece of data:

c) *Johnwa$_i$ [$_{CP}$[$_{TP}$ zibunzisinga$_k$ Maryo$_k$ korosita] [$_C$ to]] omotteiru.
John zibunzisin Mary killed that think
"*John thinks that herself$_k$ killed Mary$_k$."

Question 3: Sentence (c) is a violation of which binding principle? (A, B, or C?) Which NP is binding which other NP in this sentence to cause the ungrammaticality?

CHALLENGE PROBLEM SET 5: COUNTEREXAMPLES?[9]

[Critical Thinking and Data Analysis; Challenge]

Each of the following examples is problematic for the binding theory we formulated above. Briefly explain why. For data from languages other than English, your answer should be based on the facts of the target language, and not the English translations. Use the word-by-word glosses to determine whether the Dogrib and Modern Greek NPs should be analyzed as anaphors, pronouns or R-expressions. Your discussion of Dogrib should be based on consideration of both sentences taken together.

a) I have no money on me.
b) John knew that there would be a picture of himself hanging in the post office.

c) *Modern Greek*
O Yanis$_i$ ipe stin Katerina oti i Maria aghapa ton idhio$_i$.
John said to Catherin that Mary loves himself
"John$_i$ told Catherine that Mary loves him$_{i/*k}$."

[9] This problem set was contributed by Betsy Ritter. The Dogrib data come from Saxon (1984).

d) *Dogrib*
(i) John ye-hk'è ha
John 3SG(=him)-shoot future
"John$_i$ is going to shoot him$_{k/*i}$."
(ii) *ye-zha shèeti
3SG(=his)-son ate
"His son ate."

CHALLENGE PROBLEM SET 6: C-COMMAND OR PRECEDENCE?
[Critical Thinking and Data Analysis; Challenge]
In the text above, we proposed that binding required both c-command and coindexation. Consider an alternative: binding requires that the binder precedes (rather than c-commands) and is coindexed with the element is bound. Which of these alternatives is right? How can you tell? You might consider data such as the following:

a) [$_{CP}$ [$_{CP}$ Although he$_i$ loves marshmallows] [$_{TP}$ Art$_i$ is not a big fan of Smores[10]]].
b) [$_{TP}$ [$_{NP}$ His$_i$ yearbook picture] gives Tom$_i$ the creeps].

Be very careful about this data. In particular, do not assume that an R-expression is automatically the binder, pronouns can be binders for the purposes of binding theory.

[10] For those who may not be familiar with the term, Smores are a typical American camp-fire treat. They involve a marshmallow candy cooked over an open fire, squished between two layers of graham cracker along with a layer of dark chocolate candy.