chapter 15

Advanced Topics in Binding Theory

0. A Quick Review of Chapter 5 Binding Theory

In chapter 5, we sketched out a brief version of the binding theory that allowed us to see the utility of structural relations and to give us a tool to probe the c-command structures in a tree. That chapter contained a number of simplifications. It isn't very hard to find counter examples to the theory proposed there. In this chapter, we give binding relations a slightly more nuanced look.

First let us review some of the basics from chapter 5. Binding theory concerns the distribution of types of DPs with respect to each other. It is partly a semantic study (looking at coreference) and partly a syntactic study (looking at the structural considerations that govern the coreferential possibilities). Recall that coreference is defined in terms of binding which is both coindexing and c-command. When a DP is both c-commanded by and coindexed with another DP, we say the first DP is bound by the second. We have three major types of DPs. R-expressions are full DPs that get their reference from external sources and may not be bound (Principle C); Anaphors are DPs that must get their meaning from another local DP in the sentence (i.e., must be bound) and are governed by Principle A. Pronouns lie between the two. Pronouns may be coreferent with another DP in the sentence, but need not be. To the extent that they may be coreferent they must find their antecedent outside the clause they are contained in (Principle B). In chapter 5, we defined locality in finding an antecedent by making reference to the clause as

the binding domain. In this chapter, this is perhaps the most major part of the theory that we'll have cause to revise. Just as we defined the MLC relativistically by the type of element we were moving, we will define binding domain relativistically according to the type of DP that is involved. We will also consider the question of what level of representation the binding principles hold at in the model of the grammar we've been exploring.

The version of the binding theory I give you here is loosely based on the one found in Chomsky's (1986b) *Knowledge of Language*, but with an eye towards more recent developments in the theory.

1. LEVELS OF REPRESENTATION

In chapter 5, we claimed that the binding domain was a clause (CP). This nicely accounts for the ungrammaticality of sentences like (1) below:

1) *Chris$_i$ said [$_{CP}$ that himself$_i$ was appealing].

However, on the face of it, this runs into trouble with sentences such as:

2) Chris$_i$ wants himself$_i$ to be appealing.

Assuming that *himself* is the subject of the predicate *to be appealing*, here the binding relation seems to cross clause boundaries. However, the analysis we developed of subject to object raising in the previous chapter solves this problem. If the DP *himself* moves to the specifier of the AgrOP for case reasons it moves out of the CP where it gets its theta role. Once it is part of the higher clause structure its new binding domain contains the antecedent *Chris*. In (3) the old binding domain is shown with the rightmost arc. The raising of the DP extends this to the higher CP

3) [$_{CP}$ Chris$_i$ wants [$_{AgrOP}$ himself$_i$ [… [$_{CP}$ … t$_{himself}$ to be appealing]]]].

binding domain after movement

binding domain before movement

This fact then suggests that the binding principles hold after movement has applied. Given the model that we sketched in chapter 12, this would be the level of LF. This makes a fair amount of sense, since binding is at least partly a semantic relation and LF is the level that interacts with the conceptual/semantic component of the grammar.

Were things so simple however! If you did general problem set 2 in chapter 11, you will have learned that there is at least some evidence that binding principles hold before movement. Take the sentence in (4):

4) [Which pictures of himself$_i$] did Chris$_i$ like?

The *wh*-moved DP here contains an anaphor (*himself*). This anaphor is only c-commanded by its antecedent ***before*** the movement:

5) $C_{[+Q,+WH]}$ Chris$_i$ did like [which pictures of himself$_i$] (D-structure)

In chapter 11, this was taken to be evidence that the binding principles held at D-structure, before movement.

So we have an apparent contradiction here. Raising sentences such as (2) provide an argument for the claim that the binding principles happen after movement, but *wh*-questions such as (4) suggest that binding principles happen before movement. The theory of movement we have, however, provides a straightforward solution, if we make a minor adjustment to our assumptions. We have up to now been marking the source of movement with a *t* for trace. Let us consider the possibility that these traces have more to them than this. Chomsky (1993) suggested that movement was really an operation of copying, where you don't pronounce the original copy. So for example, when we do *wh*-movement in a sentence like (4), the LF of the sentence is really as in (6) where the DP in outline font is the trace and isn't pronounced.

6) [Which pictures of himself$_i$] did Chris$_i$ like [Which pictures of himself$_i$]?

In this view, movement consists of two parts, a copying operation which duplicates part of the tree and then puts the copy somewhere in the tree and then an operation that (usually) silences the original. The technical name for the two DPs in (6) is the ***chain***. Chains are the combination of the moved copy and any silent originals (traces) they leave behind.

With this technology in hand we have a simple account of the timing dilemma we sketched above. Binding principles all hold at LF. We can claim that at LF at least one link in the chain (one copy or original) is subject to the binding principles. In a sentence like (6), the version of the anaphor in the trace is c-commanded by *Chris*, this version is present at LF, it just isn't pronounced. Binding principle A is met because one copy of the anaphor is c-commanded by a local antecedent.

In the case of sentences like (2), a different copy of the anaphor is locally c-commanded by its antecedent. This time it is the moved copy that meets the binding principle A:

7) Chris$_i$ wants himself$_i$ [… [$_{CP}$ … himself$_i$ to be appealing]]].

Defining the binding principles over the chains of DPs rather than over DPs themselves solves this timing problem. We can claim that the binding prin-

ciples hold of LF representations and that, in the case of anaphors, at least one copy must appear in the right binding configuration:

8) Binding Principle A (revised): One copy of an anaphor in a chain must be bound within its binding domain.

An exercise at the end of the chapter asks you to consider if the same property is true of pronouns and Principle B.

You now have enough information to try Challenge Problem Set 1

2. THE DEFINITION OF BINDING DOMAIN

2.1 A Miscellany of Domain Violations

There is significant reason for thinking that our definition of binding domain in terms of clauses is far too simplistic. Consider the following sentences. In most major dialects of English, sentence (9b) is ungrammatical with coindexation between *Heidi* and *herself*, despite the fact that sentence (9a), which is very similar in structure to (9b) is entirely grammatical. (There is a dialect of English, spoken mainly in the western US, where (9b) is acceptable. If you are a speaker of that dialect, bear with me and assume that the judgments given here are correct. There is a problem set about this alternate dialect at the end of this chapter.)

9) a) Heidi$_i$ believes any description of herself$_i$.
   b) *Heidi$_i$ believes Martha$_k$'s description of herself$_i$.

In both (9a) and (9b), the anaphor is c-commanded by a coindexed antecedent contained in the same clause as the anaphor. By all of the definitions and constraints we have looked at so far (9b) should be acceptable, but it isn't.

The next set of sentences we need to consider has the reverse problem. Recall from chapter 5 that pronouns must be free within their binding domain. (10) is ungrammatical with the coindexation given because the pronoun and its c-commanding antecedent are in the same clause:

10) *Heidi$_i$ likes her$_i$.

But a pronoun inside an embedded CP is okay with coindexation or without it:

11) Heidi$_i$ thinks that she$_{i/k}$ has won.

We explained this phenomenon in terms of the clause serving as the binding domain. Pronouns must be free within their immediate clause. Consider now the following problem sentence:

12) Heidi likes her violin.

(12) is ambiguous in precisely the same way that (11) is. *Her* can be bound by *Heidi* or not:

13) a) Heidi_i likes her_i violin.
b) Heidi_i likes her_k violin.

The interpretation in (13a) is particularly surprising, since *her* and *Heidi* are both dominated by the same CP, so are both in the same binding domain. The indexation in (13a) should be a violation of principle B, yet the sentence is entirely acceptable.

To round off our survey of binding puzzles, consider the sentence in (14). This sentence is acceptable, contrary to all principles of the binding theory:

14) Heidi_i thinks that pictures of herself_i should be hung in the Louvre.

The anaphor is not in the same clause as its antecedent at all. This should be a clear principle A violation, yet the sentence is reasonably acceptable.

2.2 *Anaphors*

The problem in every case that we have looked at has to do with the definition of binding domain. Let us start to probe this question by looking more closely at the difference between (9 a and b). The main difference between the two sentences seems to be the presence of the extra DP *Martha* that intervenes between the anaphor and its antecedent in the unacceptable form. However, not just any intervening DP will do:

15) Heidi_i gave a present to herself_i.

In (15) *a present* intervenes between the antecedent and the anaphor (and furthermore it c-commands the antecedent, but it doesn't intervene in the binding possibilities the way the middle DP does in (9b). The DP that causes the problems seems to be the DP in the specifier of another DP (i.e., the possessor DP). Possessor DPs in the specifier position of another DP are a little like the "subject" of those DPs.

16) a) The army's destruction of the palace
b) The army destroyed the palace.

There seems to be a real parallel between (16a) and (16b). The DP that interferes with binding seems to be the "subject" of the DP. A similar pattern with the subject of a TP is seen in control vs. subject-to-object raising constructions in (17):

17) a) Heidi wants to kiss herself.[1]
b) *Heidi$_i$ wants Fred to kiss herself$_i$.

The ungrammaticality of (17b) seems to be due to the presence of *Fred*. One hypothesis that might work is to claim that the binding domain is either a CP (to account for cases like (9a, 10 or 11) or a DP (as in 9b and 17). But then we are left with the question of determining which one is appropriate in which context. The answer to this seems to make reference to this intermediate "subject." Chomsky (1986b) proposes a revision to the binding theory where the binding domain of an anaphor can change depending upon whether there is a ***potential antecedent*** (= "subject"). What we find when we look at sentences like those in (9) is that the binding domain seems to be a DP, when that DP has a potential antecedent (as in 9b):

9′) b) *Heidi$_i$ believes ([$_{DP}$ Martha$_k$'s description of herself$_i$].
potential antecedent

This sentence is ungrammatical because the DP here is the binding domain – it contains the potential antecedent *Martha* (note, not the actual antecedent, just a potential[2] one). This means that the anaphor is not bound in its binding domain, and is a violation of principle A.

But now consider (9a) again. Here the anaphor can be bound by *Heidi*. The main difference between this sentence and (9b) is that the object DP contains no potential antecedent for the anaphor. The first potential antecedent is the actual antecedent. So the binding domain for this sentence is the whole clause.

9′) a) ([$_{CP}$ Heidi$_i$ believes [$_{DP}$ any description of herself$_i$].
potential antecedent

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[1] (17) of course has a PRO in it that does the binding, but it is worth noting the parallel in any case.

[2] The notion of "potential" antecedent is very loose. The potential antecedent need not agree with the anaphor, nor must it even be a semantically plausible antecedent.

a) *Heidi$_i$ believes Art's description of herself$_i$.

b) *Heidi$_i$ dislikes the TV's depiction of herself$_i$.

The only principle seems to be that it is in the specifier of the DP or TP.

The surprising result that binding domains for anaphors seem to be able to shift around depending upon whether there is an antecedent or not is captured in our revised principle A below:

18) ***Binding Principle A*** (final): One copy of an anaphor in a chain must be bound within the smallest CP or DP containing it and a potential antecedent.

This version of principle A makes an interesting prediction about the distribution of anaphors that appear in the subject position of an embedded clause. Let us make the reasonable assumption that an anaphor can't serve as its own antecedent, or that a DP dominating the anaphor can't serve as that anaphor's antecedent.[3] If we have an embedded clause where the anaphor is in the subject, the smallest CP containing a subject is the main clause. This means that a DP can bind an anaphor in an embedded clause if that anaphor is inside the subject position. Quite surprisingly, this is true: such sentences are grammatical (19 below and 14 above):

19) $[_{CP}$ Heidi$_i$ said $[_{CP}$ that $[_{DP}$ pictures of herself$_i$] were embarrassing]]

This DP does not count as a potential antecedent because it dominates the anaphors.

This CP does not count as the binding domain for the anaphor because it does not contain a potential antecedent.

This is the first potential antecedent for the anaphor (it is also the actual antecedent).

This is the binding domain for the anaphor as it is the smallest CP or DP containing a potential antecedent.

When we add a possessor within the embedded subject, the binding domain shifts:

20) *$[_{CP}$ Heidi$_i$ said $[_{CP}$ that $[_{DP}$ Martha$_k$'s pictures of herself$_i$] were embarrassing]].

potential antecedent

smallest DP or CP containing the anaphor and a potential antecedent.

This is a truly surprising result, but one that follows directly from the binding principle in (18).

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[3] This is known as the *i-within-i* condition, the details of which need not concern us here.

Before leaving this topic, it's worth noting that this binding principle does leave one sentence unexplained, and this is a fairly important sentence at that. The ungrammaticality of sentence (1) (repeated here as 21) is now a mystery:

21) *Chris$_i$ said [$_{CP}$ that himself$_i$ was appealing].

According to the principle in (18) this should be acceptable. If *himself* can't count as its own potential antecedent, then the smallest CP or DP containing a potential antecedent for the anaphor is the main clause (with the actual antecedent *Chris* serving as the potential antecedent). This means that *himself* would be bound within its binding domain so the sentence should be grammatical contrary to fact. In order to account for (21) we are going to have to appeal to something other than the binding principle in (18). Fortunately, there is a relatively simple solution to this problem. The anaphor in (21) is in the specifier of TP, this is the position where nominative case is assigned. Notice that English does not have any nominative anaphors (**heself*, **sheself*, **Iself* etc.) Perhaps the ungrammaticality of (21) is not due to any binding principle violations but is a simple case conflict instead. *Himself* is accusative in case, but it is in a position that is associated with nominative case.

You can now try General Problem Set 1 and Challenge Sets 2 & 3

2.3 Pronouns

Our definition of binding domain as the smallest CP or DP containing a potential antecedent seems to work well for anaphors, but unfortunately it doesn't fare so well for our examples with pronouns. Take the examples in (13) (repeated here as 22):

22) a) Heidi$_i$ likes her$_i$ violin.
b) Heidi$_i$ likes her$_k$ violin.

Here again we have a case where a DP is acting like a binding domain. Recall that pronouns must be free within their binding domain. In order to explain the grammaticality of (22a), the pronoun must be in a different binding domain than its antecedent. The obvious candidate for this is the DP [*her violin*]. But in the previous section we argued the binding domain was the smallest DP or CP containing a potential antecedent. Assuming that pronouns can't be their own antecedents, the DP [*her violin*] contains no such potential antecedent, so it can't be a binding domain. By the potential antecedent definition the binding domain is the whole CP, which would mean that in (22a) the pronoun would be bound by *Heidi* within its domain in violation of

principle B. Yet the sentence is grammatical. Chomsky (1986b) came up with an ingenious solution to this problem. He suggested that that binding domains for pronouns and anaphors are defined differently. The difference lies in the inherent nature of the DP types. Anaphors are DPs that want to bound so they are going to look for the closest potential antecedent. Pronouns by contrast want to be free! So they are going to look for structures ***without*** an antecedent if they can find them. So the DP [*her violin*] is the smallest DP or CP that does not contain a potential antecedent:[4]

23) $[_{CP}$ Heidi$_i$ likes $[_{DP}$ her$_i$ violin]].
smallest DP or CP <u>not</u> containing a potential antecedent

This constraint is encoded in (24):

24) ***Binding Principle B*** (nearly final): A pronoun must be free within the smallest CP or DP containing it but <u>not</u> containing a potential antecedent.

The fact that binding domain is defined differently for pronouns and anaphors not only reflects that they are different animals with different requirements, but more importantly explains the contrasts outlined in section 2.1.

But the definition in (24) still has a problem. Under this definition there is no way to explain the ungrammaticality of (25):

25) *Heidi$_i$ likes her$_i$.

This is because under (24) there is no way to define a binding domain for *her*. In (25) there is no DP or CP that contains *her*, is not *her* itself, and does not contain a potential antecedent. The binding domain for (25) is undefined under (24). In order to correct for this we need to add a rider clause to (24), such that if no CP or DP without a potential antecedent can be found, then the root (main clause) CP counts:

26) ***Binding Principle B*** (final). A pronoun must be free within the smallest CP or DP containing it but <u>not</u> containing a potential antecedent. If no such category is found, the pronoun must be free within the root CP.

With this definition, the ungrammaticality of (25) is explained. The main clause CP acts as the binding domain, and the pronoun is bound within this domain in violation of principle B.

This approach makes a very interesting prediction. Recall sentence (19)

[4] Violin isn't a potential antecedent as it doesn't asymmetrically c-command *her*, and neither *her* nor the DP containing *her* can be the potential antecedent.

from above, repeated here as (27):

27) [$_{CP}$ Heidi$_i$ said [$_{CP}$ that [$_{DP}$ pictures of herself$_i$] were embarrassing]].

One surprising fact is that for most speakers, anaphors like those in (27) can freely alternate with pronouns:

28) [$_{CP}$ Heidi$_i$ said [$_{CP}$ that [$_{DP}$ pictures of her$_i$] were embarrassing]].

Under our old theory – where the binding domains for pronouns and anaphors were identical – the fact that both (27) and (28) are grammatical would be a real puzzle. Under the older approach, pronouns and anaphors were by definition in complementary distribution (pronouns had to be free in their clause, anaphors had to be bound in their clause). The fact that (27) and (28) can both exist shows that the domains for the binding principles are more nuanced. The definitions have to allow for a situation, where the anaphor in (27) is bound by *Heidi* in its binding domain, but where the pronoun is free in its binding domain in the structurally identical (28). But if binding domains are defined relativistically (relative to the type of the DP involved), then (27) and (28) do not form a contradiction. In (27) the smallest DP or CP containing a potential antecedent is the main clause CP. In (28) the smallest DP or CP not containing an antecedent is the DP [*pictures of her*]. So the anaphor in (27) can be bound in its domain, while pronoun in the exact same position in (28) can be free in its domain.

You now have enough information to try General Problem Set 2

IDEAS, RULES, AND CONSTRAINTS INTRODUCED IN THIS CHAPTER

i) ***The Copy Theory of Movement***: Movement is a two-part operation. First the moved element is copied and put into the surface position; second the original is made silent (but is still structurally present).

ii) ***Chain***: The moved copy and all its traces.

iii) ***Potential Antecedent***: A DP in the specifier of TP or another DP. The potential antecedent cannot be the anaphor or pronoun itself, nor can it be a DP that contains the anaphor or pronoun.

iv) ***Binding Principle A*** (final): One copy of an anaphor in a chain must be bound within the smallest CP or DP containing it and a potential antecedent

v) ***Binding Principle B*** (final): A pronoun must be free within the

smallest CP or DP containing it but not containing a potential antecedent. If no such CP or DP can be found, the pronoun must be free within the root CP.

FURTHER READING

Büring, Daniel (2005) *Binding Theory*. Cambridge: Cambridge University Press.

Chomsky, Noam (1986b) *Knowledge of Language: Its Nature, Origins and Use*. New York: Praeger.

GENERAL PROBLEM SETS

1. BINDING DOMAIN FOR ANAPHORS

[Application of Skills; Intermediate]

Draw the trees for each of the following sentences, then identify the binding domain of the anaphors. For the ungrammatical forms, explain why the sentence is ungrammatical. In all cases assume that *John* and *himself* are coindexed. Assume the judgments given:

a) John loves himself.
b) John loves pictures of himself.
c) *John loves Mary's pictures of himself.
d) *John thinks that Mary loves himself.
e) *John thinks that Mary's depiction of himself is wrong.
f) John thinks that most depictions of himself are wrong.
g) Which pictures of himself does John like?
h) John seems to like pictures of himself.
i) John believes himself to be the best at baseball.
j) John wants to congratulate himself.

2. BINDING DOMAIN FOR PRONOUNS

[Application of Skills; Intermediate]

Draw the trees for each of the following sentences, then identify the binding domain of the pronouns. For the ungrammatical forms, explain why the sentence is ungrammatical. In all cases assume that John and the pronoun are coindexed. Assume the judgments given:

a) *John loves him
b) John loves his puppy.
c) John asked if the unflattering description of his work would be published in the paper.

d) John asked if his essay would be published in the paper.
e) *John wants to kiss him.
f) *John believes him to be fantastic.

CHALLENGE PROBLEM SETS

CHALLENGE PROBLEM SET 1: PRONOUNS

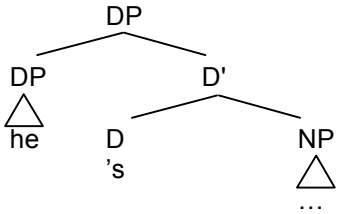
[Critical Thinking; Challenge]

We argued above that at least one link of a movement chain containing an anaphor must meet principle A of the binding theory and be bound within its binding domain. Is this true for pronouns as well? Provide examples to support your answer.

CHALLENGE PROBLEM SET 2: POSSESSIVE PRONOUNS

[Critical Thinking; Challenge]

Up to now we've treated possessive pronouns as being of category D. One alternative is that pronouns like *his* are really bimorphemic and take the form below:



And then there are morphological rules that turn *he's* into *his* (and *she's* into *her*, etc.). Using our definition of "potential antecedent." how does the following sentence argue for the tree above instead of treating *his* as a D? Assume the judgment given.

*Mary doesn't like his pictures of himself.

CHALLENGE PROBLEM SET 3: WESTERN AMERICAN DIALECTS OF ENGLISH

[Critical Thinking; Challenge]

For most speakers of English the sentence below is ungrammatical with the indexation given. However, there is a significant dialect area in the western United States (Andy Barss has found speakers from Arizona, California and New Mexico that all have this judgment, although it may extend to other areas as well) where this sentence is typically judged as fully acceptable.

Heidi$_i$ doesn't like Nate's pictures of herself$_i$.

What minor adjustment must we make to principle A to explain the grammaticality of this sentence in this dialect?