10 Syntactic and Semantic Binding

In the sections to come, we will first look at syntactic co-indexing procedures and conditions on binding. This will be short, since the details belong in a syntax text. We will then distinguish syntactic and semantic notions of "binding" and state a principle connecting the two. The outcome will be essentially Reinhart's theory of pronoun interpretation,[1] and we will review its predictions about "sloppy identity" readings and the so-called Weak Crossover effect, as well as its implications for the syntax of co-reference.

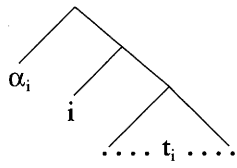
10.1 Indexing and Surface Structure binding

We have argued that the input for the semantic interpretation component should be LF representations. LF representations are transformationally derived from SS representations by Quantifier Raising (QR). We have adopted a very unconstrained view of QR: it is optional; it can apply to any kind of DP; and it can adjoin to any node. Its application is indirectly constrained by syntactic principles on the one hand and by interpretability on the other.

QR, like all movement, leaves a co-indexed trace. Where do the indices come from? One possibility is that they are added in the application of movement itself, so that even an initially index-less phrase would be co-indexed with its trace after movement. Another possibility is that the phrase to be moved had an index to begin with, which then gets duplicated in the movement. What we have done so far in this book was compatible with either option, but in this chapter, we take the second view: all indices are already present by SS.

Suppose that indices are optionally inserted with any DP at DS and may be chosen freely at this point. When a DP α_i moves in the course of the derivation, a trace t_i is left in its original site, and the index of the moved DP is also adjoined to its sister node at the landing site (to form a predicate abstract). So the configuration after movement looks like this:[2]

(1)



Though indices are assigned freely, certain choices will later be filtered out. One obvious constraint is that every *pronoun* must be generated with an index, or else it will not be interpretable.[3] For non-pronominal DPs, indices are in principle optional, but will, in effect, be required if the DP is going to move. Otherwise, there will be no index on its trace, and the trace will be uninterpretable. Another way in which the semantics indirectly constrains indexing possibilities has to do which features like gender, person, and number. Recall from chapters 5 and 9 that these induce certain presuppositions, which will systematically fail if we try to co-index DPs with conflicting features.

Among syntactic constraints on indexing possibilities, we have mentioned (in chapter 5) the Prohibition against Vacuous Binding and, briefly, the so-called Binding Theory. It is the latter's effects which we want to look at more closely now.

To formulate the Binding Theory, we need a definition of *syntactic binding*, which in turn presupposes a definition of *c-command*. Here are two more or less standard definitions.[4]

(2) *C-command*
A node α c-commands a node β iff
(i) neither node dominates the other, and
(ii) the first branching node dominating α dominates β.

(3) *Syntactic binding*
A node α syntactically binds a node β iff
(i) α and β are co-indexed,
(ii) α c-commands β,
(iii) α is in an A-position, and
(iv) α does not c-command any other node which also is co-indexed with β, c-commands β, and is in an A-position.

"A-positions" are the positions of subjects and objects: "non-A (A-bar) positions" are adjoined and complementizer positions. The Binding Theory only applies to binders in A-positions. The following version is from Chomsky.[5]

(4) *Binding Theory*
(A) Reflexive pronouns and reciprocals must be bound in their Minimal Governing Category.
(B) All other pronouns must be free in their Minimal Governing Category.
(C) All non-pronominal DPs must be free.

"Bound" here is to be understood as "syntactically bound" and "free" as "not syntactically bound". Clauses (A) and (B) give conditions for binding possibilities of different kinds of pronouns. The conditions crucially rely on the notion "Minimal Governing Category". There is much discussion of this in the syntactic literature. For our purposes, the exact definition of the local domain in which reciprocals and reflexives must be bound and other pronouns must be free is not essential. What is essential, however, is that reflexives *must be bound*, ordinary pronouns *can be bound or free*, and non-pronominal DPs *must be free*.

10.2 Syntactic binding, semantic binding, and the Binding Principle

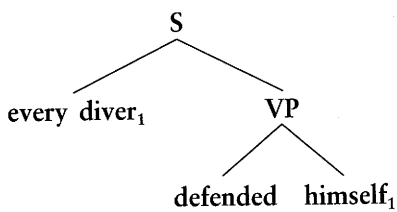
Syntactic binding is not the same as binding in the semantic sense. We discussed the semantic notion in section 5.4. Our discussion yielded the following definition.

(1) Let α^m be a variable occurrence in a tree γ which is (semantically) bound in γ, and let β^n be a variable binder occurrence in γ.
Then β^n *(semantically) binds* α^m iff the sister of β^n is the largest subtree of γ in which α^m is (semantically) free.

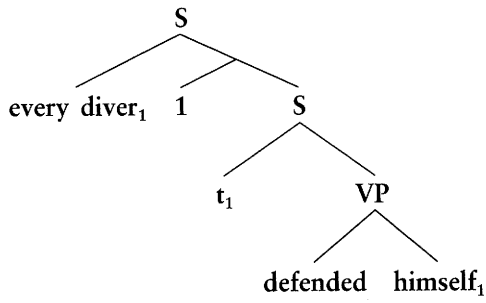
Recall also that the only variable binders in our system are the adjoined indices that trigger the Predicate Abstraction Rule.

Compare the following two structures:

(2)



(3)



The pronoun "himself$_1$" is syntactically bound in both (2) and (3), but semantically bound only in (3). Accordingly, our semantic rules give very different results when applied to these two structures. In (2), "himself$_1$" is interpreted like a free variable; it receives its value from the variable assignment supplied by the utterance context (if any). The index on "every diver" receives no interpretation at all. It is not seen by any of our semantic rules, and we assume it is just skipped over. (2) can only mean that every diver defended a certain contextually salient individual. In (3), on the other hand, the pronoun "himself$_1$" is interpreted like a bound variable. It is bound in the interpretation of the predicate abstract, and the predicted meaning for (3) is that every diver defended himself.

(3) correctly captures the truth-conditions of the English sentence "Every diver defended himself"; (2) does not. We have to find out, then, what excludes (2) as a possible LF for this sentence. In other words, we have to give an explanation for why QR is obligatory in structures like this, even though it is an optional rule and there is no type mismatch forcing us to move the quantifier phrase.

We propose that what is at play here is a principle which enforces a tight connection between syntactic binding at SS and semantic binding at LF. Roughly speaking, every syntactic binding relation must correspond to a semantic binding relation, and vice versa. To give a precise statement, we must first introduce a derivative notion of "semantic binding", which relates two DPs. (On the literal notion, only variable binders in the semantic sense can bind anything.)

(4) A DP α *semantically binds* a DP β (in the derivative sense) iff β and the trace of α are (semantically) bound by the same variable binder.

In this derivative sense, we can say that "every diver$_1$" in (3) "semantically binds" "himself$_1$", even though the real binder is the adjoined index right below it.

We can now state our principle.

(5) *Binding Principle*
Let α and β be DPs, where β is not phonetically empty. Then α binds β syntactically at SS iff α binds β semantically at LF.

(The qualification "not empty" serves to exempt traces.)

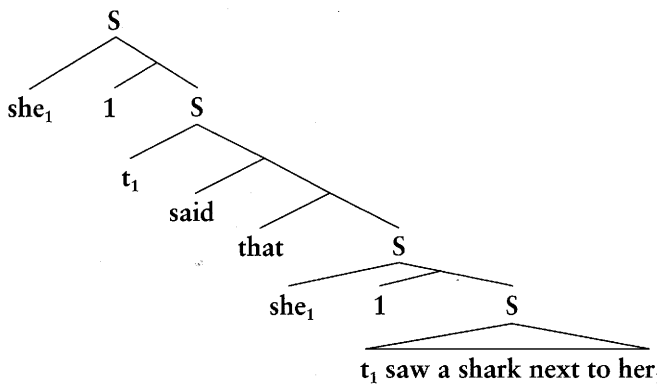
The Binding Principle in interaction with the Binding Theory excludes (2) as a possible LF, even though it is a possible SS, of course. The Binding Theory requires syntactic binding between quantifier phrase and reflexive at SS. Because of the Binding Principle, this must be matched by semantic binding at LF. This means that QR *must* apply in this case, hence the correct interpretation of the sentence "Every diver defended himself" is guaranteed.

Let us look at another example.

(6) She_1 said that she_1 saw a shark next to her_1.

In (6), we have two syntactic binding relations: the first pronoun binds the second, and the second binds the third. The Binding Principle requires that each of these syntactic binding relations corresponds to a semantic binding relation. This means that all but the lowest pronoun must QR, and the LF looks as follows:

(6′)



The Binding Principle imposes a direct correspondence between syntactic binding at Surface Structure and variable binding at Logical Form. Whenever you find syntactic binding of a pronoun at SS, you have a bound-variable interpretation at LF. And whenever you have a bound variable interpretation at LF, you have syntactic binding at SS. The second subclaim is a version of the so-called Weak Crossover condition. The first subclaim is surprising and controversial. Is the bound-variable interpretation really the only way to interpret syntactic binding of pronouns? We will see that there are reasons for a positive answer. They are laid out in detail in Reinhart's book, and we will review them below.

10.3 Weak Crossover

Here is an example of what is known as "Weak Crossover".

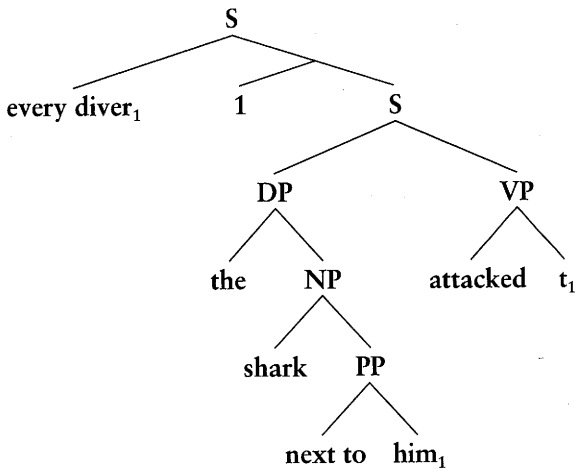
(1) The shark next to him attacked every diver.

In (1), the pronoun **him** cannot receive a bound-variable interpretation. But now consider the following indexing.

(2) The shark next to him_1 attacked [every diver]$_1$.

In (2), the pronoun $\textbf{him}_1$ and the quantifier phrase $\textbf{every diver}_1$ are co-indexed. Yet neither DP binds the other syntactically, since neither c-commands the other. According to the Binding Principle, this means that neither is allowed to bind the other semantically at LF; hence the following structure is not a possible LF for (2).

(3)

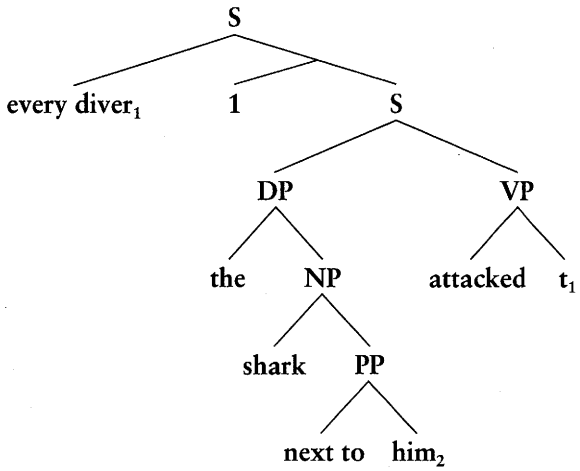


In (3), $\textbf{him}_1$ is semantically bound, but it was not syntactically bound at SS, in violation of the Binding Principle. We have no choice as far as QR goes, however. The object is of semantic type <<e,t>,t>, hence the type mismatch forces QR. The conclusion, then, is that the Binding Principle indirectly rules out the co-indexing between object and pronoun in (2).[6] A legitimate indexing for the same sentence is (4).

(4) The shark next to him_2 attacked [every diver]$_1$.

The LF representation derivable from (4) presents no problem for the Binding Principle.

(5)



In (5), the pronoun **him$_2$** is not semantically bound. If the utterance context doesn't specify a value for it, the sentence winds up without a truth-value, hence is inappropriate. The Binding Principle, then, correctly predicts that the pronoun in (1) must be referential, and cannot be understood as a bound variable.

The Weak Crossover facts confirm one part of the Binding Principle: namely, that bound-variable interpretations of pronouns at LF require syntactic binding at SS. The following section provides more evidence for the same claim as well as for the other part: namely, that syntactic binding forces a bound-variable interpretation.

10.4 The Binding Principle and strict and sloppy identity

Our discussion of ellipsis (section 9.3) gave us evidence that certain pronouns anaphorically related to proper names are truly ambiguous between a co-referential and a bound-variable interpretation. We saw this in examples like (1).

(1) First Philipp cleaned his room, and then Felix (did).

If the pronoun "his" is a free variable, (1) receives a "strict" reading; if it is a bound variable, we obtain the "sloppy" reading.

The Binding Principle which we have posited in this chapter now states that the bound-variable interpretation is grammatical in exactly those cases where we also have syntactic binding at Surface Structure. Given the connection between bound-variable interpretation and sloppy identity, this implies further predictions about the distribution of strict and sloppy readings. In the configuration of example (1), the syntactic Binding Theory permits, but does not force, co-indexing between "Philipp" and "his" at SS. The emergence of both sloppy and strict readings is thus precisely what we expect in this case. Let us look at the predictions for some other cases.[7]

Since syntactic binding always requires c-command, a pronoun which is anaphorically related to a *non-c-commanding* antecedent can only be an instance of co-reference anaphora, but never of bound-variable anaphora. We have already seen that therefore the antecedent can never be a quantifier (see section 10.3). It also follows that when the antecedent is a proper name and there is an elliptical continuation, a sloppy reading is systematically unavailable.

(2) His father spoils Roman, but not Felix.

(2) cannot mean that Roman's father spoils Roman, but Felix's father doesn't spoil Felix.

Further test cases for this prediction are the following examples:[8]

(3) (a) Zelda bought *Siegfried* a present on *his* birthday, and Felix too (that is, "... and she bought Felix ... too").
(b) Zelda thought about *Siegfried* on *his* birthday, and about Felix too.

(4) (a) You can keep *Rosa* in *her* room for the whole afternoon, but not Zelda.
(b) Felix is kissing *Rosa* in *her* favorite picture but not Zelda (that is, "he is not kissing Zelda").
(c) *Rosa* is wearing a pink dress in *her* favorite picture, but not Zelda.

Lack of c-command is one possible obstacle to syntactic binding, but not the only one. The Binding Theory (clause (B)) also implies that a non-reflexive pronoun may not be bound when it is "too close" to a potential antecedent, as in *"Bill_1 likes him_1". In this case, too, our theory predicts that only co-reference anaphora may obtain, never bound-variable anaphora. For reasons we will turn to in the last section, even co-reference at first seems impossible here. But there are special discourse conditions under which it is not entirely excluded, and these provide us with another kind of test case for the Binding Principle.[9] Consider (5).[10]

(5) I know what Bill and Mary have in common. Mary likes Bill and *Bill* likes *him* too.

(5) illustrates that there is a possible context in which "Bill likes him" has the truth-conditions of "Bill likes Bill". Assuming that the Binding Theory is correct, this configuration precludes co-indexing, and if the Binding Principle is right, the observed truth-conditions can therefore not be the result of construing "him" as a bound variable. This can only be a case of co-reference. It follows, then, that elliptical continuations will unambiguously have a strict reading. The prediction is borne out:

(6) Ann: "Nobody likes Bill."
Mary: "No, that's not quite right. Bill likes him, of course, just like you do."

Mary's utterance in (6) cannot have a sloppy reading. It can't mean that Bill likes Bill, just like you like you.

Thus far, we have looked at implications from one direction of the Binding Principle. If there is a bound-variable interpretation, there has to be syntactic binding at Surface Structure. The other part of the biconditional says that whenever there is syntactic binding at SS, there must be semantic binding at LF. This part, too, implies predictions about the distribution of strict and sloppy readings. Let's look at cases where the syntax doesn't just allow, but requires, binding. Reflexive pronouns must be syntactically bound according to clause (A) of the Binding Theory. The Binding Principle therefore predicts them to be bound variables in all cases. Co-reference is never an option, and we expect the absence of a "strict" reading in examples like (7).[11]

(7) Ann hurt herself, and Mary (did) too.

Let us finally note (again with Reinhart) that parallel examples with **only** can be constructed for all of the ellipsis examples in this section.[12] In these examples, capitalization represents focal stress.

(8) Only Philipp cleaned his room.

(9) I only claimed that his father spoils ROMAN.

(10) (a) Zelda only bought SIEGFRIED a present on his birthday.
(b) Zelda only though about SIEGFRIED on his birthday.

(11) (a) You can only keep ROSA in her room for the whole afternoon.
(b) Felix is only kissing ROSA in her favorite picture.
(c) Only Rosa is wearing a pink dress in her favorite picture.

(12) Despite the big fuss about Felix's candidacy, when we counted the votes, we found out that in fact only Felix himself voted for him.

(13) Only Ann hurt herself.[13]

We leave it to the reader to deduce (and examine) the relevant predictions about possible readings.

10.5 Syntactic constraints on co-reference?

The Binding Principle stipulates a tight correspondence between syntactic binding at SS and bound-variable interpretation at LF, and we have seen ample support for this. Our theory also implies that syntactic binding or the absence thereof has nothing to do with allowing or prohibiting co-reference. If a DP is not syntactically bound, it is not interpreted as a bound variable. But how else it is interpreted in that case depends solely on its lexical content (if it is a non-pronominal DP) or on the assignment contributed by the utterance situation (if it is a pronoun). There is nothing in the theory which predicts that any of the following examples should be ungrammatical or require disjoint reference between the italicized DPs.

(1) (a) *My father* voted for *my father*.
(b) *I* hurt *me*.
(c) *Bill Clinton* overestimates *him*.
(d) *She* sold *Ann*'s car.

Bound-variable interpretations are precluded, but co-reference is allowed by the theory (provided suitable utterance contexts), and in some cases even necessitated by the DPs' inherent meanings (including feature-related presuppositions).

For some examples (though admittedly not the ones that come to mind at first), this permissiveness is welcome. For instance, we don't have to worry about sentences like (2).

(2) She is the boss.

Presumably, clause (C) of the Binding Theory prohibits co-indexation of **she** and **the boss** in (2). But there is clearly no obstacle to co-reference between the two DPs. On our current approach, (2) receives a truth-value only in contexts that fix a reference for **she**. The referent of **she** must have been mentioned earlier, or else must be picked out with a gesture, or be salient otherwise. If the context does indeed specify a referent for **she** in (2), then (2) is true just in case this referent is the boss. And this account seems right.

The point is not limited to identity sentences like (2). For another classic example,[14] imagine yourself at a Halloween party, trying to guess which of your friends is hiding behind which costume. One of the guests just left the party, and somebody utters (3).

(3) He put on John's coat.

The pronoun "he" refers to the one who just left, and the utterance is just as grammatical and felicitous if this is John as it is if it's somebody else. Moreover, there is the type of example which we already saw in the section on sloppy identity:

(4) I know what Bill and Mary have in common. Mary likes Bill and Bill likes him too.

In sum, there is some evidence which indicates that it would actually be misguided to search for a theory on which Binding Theory directly constrains reference. Our present approach makes some good predictions.

Still, there are problems. Notwithstanding the existence of examples like (2), (3), and (4), most examples with c-commanded names and locally c-commanded pronouns are clearly judged to disallow co-reference. Except for the identity sentence in (2), we had to set up rather special discourse contexts to bring out the judgment that co-reference *was* possible. The problem is highlighted by pairs like (5) and (6).

(5) *She* liked the flowers that we bought for *Zelda*.

(6) The flowers that we bought for *her* pleased *Zelda*.

(6), in which the pronoun precedes but does not c-command the name, is readily accepted with a co-referential reading. (5) clearly has a different intuitive status. Once the pronoun c-commands the name, only a much narrower set of conceivable utterance contexts will make co-reference acceptable.

Reinhart offers an explanation for this difference. She proposes a further principle, which establishes a preference ranking between different LFs that

convey the same meaning. In a nutshell, Reinhart's principle says that if a given message can be conveyed by two minimally different LFs of which one involves variable binding where the other has co-reference, then the variable binding structure is always the preferred one.[15] A precise formulation of the principle is not trivial,[16] and we will content ourselves here with a few elementary and informal illustrations.

Suppose a speaker wants to convey the information that Felix voted for himself. That is, she wants to produce an utterance which is true if Felix voted for Felix and false if he didn't. There are various different possible utterances which have these truth-conditions. The following pairs of LFs and reference assignments (where needed) represent a few of these choices:

(7) Felix voted for Felix

(8) Felix voted for him_1 $\quad g_c = [1 \rightarrow \text{Felix}]$

(9) Felix 1 [t_1 voted for himself_1]

(10) He_1 voted for Felix $\quad g_c = [1 \rightarrow \text{Felix}]$

In (7), (8), and (10), the object co-refers with the subject, but in (9), it is a bound variable. Reinhart's principle thus dictates that the speaker choose (9) over (7), (8), or (10). It thus accounts for the fact that speakers will not use the surface sentences corresponding to (7), (8), or (10) if they mean to express these particular truth-conditions.

We have presented the example from the speaker's perspective, but we can equally well look at it from the hearer's. Whereas the speaker needed to make a choice between different ways of encoding a given truth-condition, the hearer's task is to disambiguate a given surface string. Suppose the hearer hears "Felix voted for him" and needs to guess the LF structure and reference assignment that the speaker intends him to recover. Among the candidates might be the following pairs.

(8) Felix voted for him_1 $\quad g_c = [1 \rightarrow \text{Felix}]$

(11) Felix voted for him_1 $\quad g_c = [1 \rightarrow \text{Max}]$

(12) Felix voted for him_1 $\quad g_c = [1 \rightarrow \text{Oscar}]$

Now the hearer is taking into account that the speaker is guided by Reinhart's principle, and thus he must reason as follows: "If she intended (8), she would

be expressing the information that Felix voted for Felix. But in order to convey *this* message, she could also have chosen a different utterance, the one in (9). And by Reinhart's principle, she would have preferred that choice. I therefore conclude that she must not have intended (8), but perhaps (11) or (12)." So Reinhart's principle also explains why a *hearer* will not assign a co-referential reading to the surface form "Felix voted for him".

Similar reasoning applies to other examples. For instance, (5) (repeated from above) must not be used with "she" referring to Zelda,

(5) *She* liked the flowers that we bought for *Zelda*

because the meaning thereby expressed would be the same as that of a competing LF which involves variable binding: namely, (13).

(13) Zelda 1[t_1 liked the flowers that we bought for her_1]

Reinhart's principle therefore predicts that the binding structure in (13) must be chosen over a co-reference use of (5). It also correctly predicts that (6) is different.

(6) The flowers that we bought for *her* pleased *Zelda.*

(6) on the reading where "she" refers to Zelda does not have any "competitor" that expresses the same meaning through variable binding.[17] If (14) or (15) were grammatical, they would qualify, but these LFs cannot be generated without violating the Binding Principle. (See section 10.3.)

(14) Zelda 1[the flowers that we bought for t_1 pleased her_1]

(15) Zelda 1[the flowers that we bought for her_1 pleased t_1]

Reinhart's approach to the connection between syntactic Binding Theory and the interpretation of referential DPs seems roundabout and complicated at first, and it uses concepts and procedures that need to be made precise for it to yield correct predictions. As it has turned out, however, this is not a weakness, but relates directly to its greatest strengths. In particular, the approach leads naturally to an interesting and plausible hypothesis about the so-called "exceptional" cases like (2), (3), and (4) above, in which co-reference *is* allowed.[18] Let us illustrate with example (2).

What we want to explain is why co-reference is okay in (2); that is, why the speaker is permitted to choose the following LF plus reference assignment.

(16) She_1 is the boss $g_c := [1 \rightarrow$ the boss$]$

Why isn't she required to forgo this choice in favor of the following alternative, which involves variable binding instead of co-reference?

(17) The boss $1[t_1$ is herself$_1]$

Reinhart's answer is that (17) *would not convey the same information* as (16). This is what distinguishes example (2) from the ones above (for example, "Felix voted for him"). The information that the speaker intended to convey in our story about "Felix voted for him" was adequately expressed by the bound-variable structure "Felix$_1$ voted for himself$_1$". But the information that the speaker wants to convey when she says "She is the boss" is *not* preserved in the reformulation "The boss is herself". The latter is completely trivial, and only attributes to the boss the necessary property of self-identity. The original utterance, by contrast, can clearly serve to tell the hearer something new (and possibly false). Reinhart's principle regulates only choices between possible utterances which convey a given intended message. It thus implies that (17) is not in competition with (16), and therefore leads to the correct prediction that the co-reference in (16) is acceptable.

Incidentally, the account just sketched raises an interesting question about the relevant concept of "same information" or "intended message". The difference between "She is the boss" (with co-reference) and "the boss is (identical to) herself" is intuitively real enough, but it turns out that it cannot be pinned down as a difference between the truth-conditions of utterances in the technical sense of our theory.[19] As a simple calculation reveals, if the LF **she$_1$ is the boss** is uttered in a context c such that $g_c(1)$ = the boss, then this utterance has precisely the same truth-conditions as an utterance of the LF **the boss $1[t_1$ is herself$_1]$** (uttered in any context). Both utterances are true non-contingently, since the boss = the boss, of course. It appears that there is something wrong here with our conception of "truth-condition of an utterance," or at least that this is not the appropriate theoretical construct to explicate the semantic (or pragmatic) notions that are relevant to the operation of Reinhart's principle. Unfortunately, we cannot offer a better explication here, since it would require a serious theory of context dependency.[20]

Reinhart's account of examples (1) and (3) follows the same general strategy. In each of these cases, there is a clear intuition that the speaker would not be conveying exactly her intended message if she replaced the utterance involving co-reference by one involving variable binding. This being so, the preference principle licenses the structure with co-reference. As in the case of (2), it is beyond our current means to analyze precisely what it is that would get lost in the replacement. But for the purposes of the present argument (and Reinhart's), this doesn't matter. We have shown that Reinhart's theory explains not only why Binding Theory appears to constrain co-reference is most cases, but also why it

sometimes doesn't. This vindicates the view that co-reference, as opposed to variable binding, is not directly represented in linguistic representations, and thus cannot be directly affected by syntactic rules.

10.6 Summary

We started out with a problem and ended up with Reinhart's theory of anaphora. The problem arose when we wondered what it is that forces anaphoric interpretation in cases like (1).

(1) Ann_1 defended herself_1

Our semantic rules for proper names and pronouns just don't allow us to establish a connection between the two noun phrases in (1). The interpretation of nouns doesn't depend on the index on the noun at all. And the interpretation of pronouns is strictly local. It depends on the index of the pronoun, but it can't see whether this pronoun is co-indexed with another node or not. We saw that we could guarantee an anaphoric interpretation for (1) only if we had reasons to require that the noun phrase $\textbf{Ann}_1$ must undergo QR. This led to one half of the Binding Principle: namely, that whenever there is syntactic binding, there must be semantic binding. The preceding sections gave support for this generalization, as well as for the other half of the Binding Principle: namely, that whenever there is semantic binding, there must be syntactic binding (a version of the "Weak Crossover Condition"). We also defended the view that neither the Binding Theory nor the Binding Principle make any mention of co-reference.

Notes

1 T. Reinhart, *Anaphora and Semantic Interpretation* (London, Croom Helm, 1983), and *idem*, "Coreference and Bound Anaphora," *Linguistics and Philosophy*, 6 (1983), pp. 47–88.

2 This looks a little different from the structures we have been drawing so far (see section 7.3). We previously did not include an index in the moved phrase itself. Most of the time, the index in α_i will in fact be semantically vacuous, and thus we might as well leave it out. The exceptions are cases in which the moved phrase is itself a variable (e.g., a pronoun).

3 We are not assuming here that the index is part of the pronoun as a lexical item. If pronouns are listed in the lexicon at all, they are listed there without an index and as semantically vacuous items. No semantic rule sees the pronoun itself, and the

lowest node that is interpreted is the indexed DP dominating it. This implies that our definition of "variable" in section 5.4 needs a small correction. As it is written, only *terminal* nodes can be variables. Instead of "terminal node", we should have said "node that dominates at most one non-vacuous item". This allows the indexed DP dominating a pronoun to count as a variable, but still excludes truly complex constituents containing meaningful material in addition to a (single) variable.

4 See N. Chomsky, *Lectures on Government and Binding* (Dordrecht, Foris, 1981). What we are defining under (3) is actually called "local A-binding" there. But since this is the only syntactic notion of binding we will be talking about, we can afford to omit "local" and "A" from its name.

5 Ibid.

6 This is not quite correct if there are nodes of type t below the subject, which can serve as alternative landing sites for QR (see ch. 8). On that assumption, the SS in (2) will not be ruled out. But note that QR'ing the object to a site below the subject would not result in binding the pronoun **him**$_1$. It would remain a free variable, whose interpretation is unrelated to that of the object's trace (despite co-indexing), and which can only get a referent from the context. So the empirical prediction remains the same: (1) cannot mean that every diver x was attacked by the shark next to x.

7 This will be a superficial and incomplete survey. See Reinhart's work for a detailed defense of the predicted generalizations, and much recent work for critical discussion.

8 Taken more or less from Reinhart, *Anaphora*, p. 153.

9 See ibid., p. 169 for the argument to follow.

10 See G. Evans, "Pronouns," *Linguistic Inquiry*, 11/2 (1980), pp. 337–62, at p. 349. Evans's paper contains several other classic examples illustrating the same phenomenon.

11 A wider range of examples with reflexives reveals that the data are more complex. For recent discussion and controversy, see A. Hestvik, "Reflexives and Ellipsis," *Natural Language Semantics*, 3/2 (1995), pp. 211–37, and Fiengo and May, *Indices and Identity*, among others.

12 In many of these examples, **only** is a VP operator that associates with a focused element in the VP. See M. Rooth, "Association with Focus" (Ph.D. dissertation, University of Massachusetts, Amherst, 1985, distributed by GLSA) for ways of interpreting such constructions.

13 See Geach's discussion of the example "Only Satan pities himself" (P. Geach, *Reference and Generality* (Ithaca, NY, Cornell University Press, 1962).

14 This one is due to Higginbotham (J. Higginbotham, "Anaphora and GB: Some Preliminary Remarks," *Cahiers Linguistiques d'Ottawa*, 9 (1980), pp. 223–36). See also Evans, "Pronouns."

15 Reinhart's principle is sometimes called a "pragmatic" principle and has been related to general maxims of conversation like "Avoid ambiguity". (See S. Levinson, *Pragmatics* (Cambridge, Cambridge University Press, 1983).) It is tempting, indeed, to speculate that the preference for bound-variable anaphora ("Felix voted for himself") over co-reference ("Felix voted for him") is due simply to the fact that the reflexive disambiguates the utterance, whereas a plain pronoun creates referential ambiguity. We do not want to endorse a reduction to pragmatics of this simple-minded sort. For one thing, many applications of the principle as stated by Reinhart involve rankings among structures which all contain plain non-reflexive pronouns and thus have equally ambiguous surface forms. Also, the appeal to a general strategy of ambiguity avoidance opens the door to many objections. For example,

why do we allow co-reference in the coordinate sentence "Felix is smart and he is nice" when there is the less ambiguous alternative "Felix is smart and nice"? (Keenan, personal communication). Given that referential ambiguity is easily tolerated in this case, doesn't this undermine the whole idea behind Reinhart's proposal?

We do not mean to discourage attempts to reduce Reinhart's principle to something more general. Clearly, it should not simply be accepted as an isolated stipulation, and perhaps it really does turn out to follow from "pragmatics" in some sense of the word. But in our experience, billing the principle as a "pragmatic" one sometimes misleads people about what it actually says, and leads them to dismiss it without appreciating the considerable empirical support for it.

16 See Reinhart, *Anaphora*; Y. Grodzinsky and T. Reinhart, "The Innateness of Binding and Coreference," *Linguistic Inquiry*, 24 (1993), pp. 69–102; and I. Heim, "Anaphora and Semantic Interpretation: A Reinterpretation of Reinhart's Approach," SfS-Report-07-93 (University of Tübingen, 1993), for discussion and concrete proposals.

17 This example shows that the set of potential "competitors" must be limited to LFs with essentially the same overall structure, in a sense to be made precise. We do not want (6) to have to compete with (i), for example:

(i) Zelda $1[t_1$ was pleased by the flowers that we bought for $her_1]$

(i) is truth-conditionally equivalent with the co-referential reading of (6), and it is a grammatical structure involving variable binding. Nevertheless, its existence does not preempt the co-referential use of (6). The success of Reinhart's principle thus depends on an appropriate characterization of the set of structures that are being compared in its application. (See references in n. 16.)

18 Another strong argument for the approach has emerged from the study of language acquisition. Young children typically go through a stage in which they allow co-reference in linguistic structures in which adults do not. An insightful explanation of the children's performance has been based on the hypothesis that they have adult-like competence in the Binding Theory but an immature ability to apply Reinhart's preference principle. See Y.-C. Chien and K. Wexler, "Children's Knowledge of Locality Conditions in Binding as Evidence for the Modularity of Syntax and Pragmatics," *Language Acquisition*, 1 (1991), pp. 225–95; J. Grimshaw and S. T. Rosen, "Knowledge and Obedience: The Developmental Status of the Binding Theory," *Linguistic Inquiry*, 21 (1990), pp. 187–222; and Grodzinsky and Reinhart, "Innateness," for details and discussion.

19 Refer to the definition in section 9.1.2.

20 The problem here is actually a version of what is widely known as "Frege's problem" in the philosophical literature. See R. Stalnaker, "Assertion," in P. Cole (ed.), *Syntax and Semantics*, vol. 9: *Pragmatics* (New York, Academic Press, 1979), pp. 315–32, and the references on context dependency in chapter 4 above.