Ellipsis Licensing via Alternatives*

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Abstract

Binding and ellipsis are empirically and theoretically symbiotic: each helps reveal otherwise hidden facts about the other. Here I focus on a problematic feature of many approaches to binding and ellipsis, namely that they license strict identity in cases where the corresponding pronoun in the ellipsis antecedent is locally bound. Such a licensing regime overpredicts the distribution of strict readings. This is a particularly dire problem for theories of binding that involve what I call compulsory binding (Reinhart 1983, Grodzinsky & Reinhart 1993, Fox 2000, Büring 2005), but it also afflicts the widely adopted ellipsis licensing framework of Rooth (1992). I propose a new theory in which ellipsis is licensed via formal alternatives (Fox & Katzir 2011), pairing this with the approach to binding developed by Heim (1993), Reinhart (2006), and Roelofsen (2010). Beyond its success in taming the generation of strict readings, the approach developed here straightforwardly derives certain ellipsis phenomena that have elsewhere been attributed to Parallelism (Fox 2000). The present approach thus trades an exogenous constraint for a licensing mechanism whose basic operation yields the same results, while making use of a theoretical formative (formal alternatives) that has been argued to be of independent interest.

1 Introduction

Theories of ellipsis and binding are intimately bound up with one another, given the central role that diagnostics from each domain have played in providing evidence for the other. In particular, the following two questions often go hand in hand:

1. What licenses VP ellipsis?
2. How does the grammar regulate the ways in which pronouns find their antecedents when more than one logical form leads to the same semantic interpretation?

Here I propose a new theory of VP ellipsis licensing, one that pairs well with the approach to binding pursued by Heim (1993), Reinhart (2006), and Roelofsen (2010). One aim is to derive certain conditions on ellipsis licensing that have previously been attributed to Parallelism (Fox 2000). Parallelism has always been something of a mystery, both in form (it is an extra stipulation that rides atop the core identity condition on ellipsis) and in content (it is unclear why something like Parallelism should hold, given the nature of the core identity condition). On the theory proposed here, Parallelism's

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effects fall out as a consequence of the core ellipsis licensing mechanism. Moreover, I show that the general approach to binding upon which Parallelism rests—which I call the compulsory binding approach, taken to its logical extreme in the Have Local Binding! condition of Büring (2005)—makes certain erroneous predictions that the present proposal avoids.

The licensing condition I propose is based on the independently developed notion of formal alternatives (Fox & Katzir 2011). Specifically, I propose that VP ellipsis is licensed just in case there are LF constituents E and A containing the elided VP and its antecedent, respectively, such that A is a formal alternative of E. The proposal is inspired by the theory of ellipsis licensing of Rooth (1992). The principal innovation here is that Rooth's syntactic and semantic licensing conditions are rolled into one. With the Roothian contrast condition stated on logical forms rather than on truth conditions, we maintain certain binding distinctions that VP ellipsis appears to be sensitive to but that are neutralized in the mapping to the denotational semantics.

The major theoretical takeaways are twofold. First, the present proposal, if it is on the right track, points to the increasingly central role that formal alternatives play in the grammar. Alongside their role in scalar implicature and association with focus, alternatives appear to be implicated in ellipsis licensing. Second, the regulation of pronominal binding possibilities appears to be governed not by considerations of derivational or representational economy, as on the view of Fox (2000) and Büring (2005), but by the drive to minimize interpretive options, as argued by Reinhart (2006) and elaborated by Roelofsen (2010). The evidence from ellipsis points to the grammar's being able to generate each of two semantically indistinguishable LFs in cases where neither of those LFs violates an independent grammatical condition (such as Condition B); but if one of the LFs does violate such a condition, the interpretation in question cannot be "snuck in" by means of the other LF. Finally, the proposal advanced here allows us to maintain the view that Condition B regulates only semantic binding, a virtue of compulsory binding approaches (dating at least to Reinhart 1983) that our Heim (1993)- and Roelofsen (2010)-based theory shares.

2 Compulsory Binding and Its Discontents

2.1 Compulsory Binding Approaches

We begin with binding. Our point of departure is a family of proposals that constitute what I will call the COMPULSORY BINDING approach to pronominal interpretation. I note at the outset that these are not proposals about binding proper, but rather about transderivational constraints (often formulated as economy conditions) that sit atop an independent binding theory. The group includes Rule I of Grodzinsky & Reinhart (1993) (and its forebear, the Coreference Rule of Reinhart 1983), Rule H of Fox (2000), and Have Local Binding! (HLB) of Büring (2005). Their definitions are in (1).

(1) a. Rule I: NP A cannot corefer with NP B if replacing A with C, C a variable A-bound by B, yields an indistinguishable interpretation (Grodzinsky & Reinhart 1993: 79)

b. Rule H: A pronoun, α, can be bound by an antecedent, β, only if there is no closer antecedent, γ, such that it is possible to bind α by γ and *get the same semantic interpretation* (Fox 2000: 115; emphasis original)

c. HLB: For any two NPs α and β, if α could semantically bind β (i.e., if it c-commands β and β is not semantically bound in α's c-command domain already), α must semantically bind β, unless that changes the interpretation (Büring 2005: 270)

Rule I regulates the availability of pronominal coreference, barring it in favor of semantic binding when the two are semantically equivalent. Rule H regulates the availability of nonlocal binding, barring it in favor of local binding when the two are semantically equivalent. HLB combines Rule I and Rule H, enforcing maximally local binding on a given interpretation; in combining the restrictions on coreference with those on nonlocal binding in a single rule, Büring points to commonalities between the two domains first discussed by Heim (1993), though Heim's theory is not in the compulsory binding camp.

By way of example, consider the sentences in (2) and (3). In (2), *John* and *his* are coconstrued; this reading could be generated either by the LF in (2a), where *his* is free and corefers with *John*, or by the LF in (2b), where *his* is interpreted as a variable bound by *John*. The effect of Rule I (and HLB) is to discard the coreference LF in favor of the binding LF. Likewise, in (3), the effect of Rule H (and HLB) is to discard the cobinding LF in (3a), where *every man* binds both pronouns, in favor of the transitive binding LF in (3b), where *every man* binds the intermediate pronoun and the intermediate pronoun binds the lower pronoun.[1]

(2) John_i loves his_i mother.

a. ~~John_1 λ2 t_2 loves his_1 mother.~~ ~~COREFERENCE~~

b. John_1 λ2 t_2 loves his_2 mother. BINDING

(3) Every man_i said that he_i loves his_i mother.

a. ~~Every man λ1 t_1 said he_1 λ2 t_2 loves his_1 mother.~~ ~~COBINDING~~

b. Every man λ1 t_1 said he_1 λ2 t_2 loves his_2 mother. TRANSITIVE BINDING

In cases where the presence of an operator like *only* yields a truth-conditional difference between coreference and binding, Rule I/HLB permits both LFs; and Rule H/HLB does the same for cobinding and transitive binding:

(4) Only John_i loves his_i mother.

a. Only John_1 λ2 t_2 loves his_1 mother. COREFERENCE
'John loves John's mother and no one else loves John's mother.'

b. Only John_1 λ2 t_2 loves his_2 mother. BINDING
'John loves John's mother and no one else loves their own mother.'

(5) Every man_i said that only he_i loves his_i mother.

a. Every man λ1 t_1 said that only he_1 λ2 t_2 loves his_1 mother. COBINDING
'Every man *x* said that *x* loves *x*'s mother and that no one else loves *x*'s mother.'

[1] The notation in these examples closely mirrors that of Büring (2005), which is in turn inspired by the double indexing convention of Heim (1993); cf. also Higginbotham (1983). An individual-denoting DP bears a subscript index that determines its semantic value via the operative assignment function. When a DP is c-commanded by a coindexed λ, it is interpreted as a variable abstracted over by that λ; it is bound by the sister of the λ-abstract ($John_1$, in (2)). The subscript index is thus a bindee index, corresponding to Heim's inner index. When a DP moves, it creates a predicate abstract and introduces a binder index (Heim's outer index) that binds its trace and any other bindee-coindexed elements in its c-command domain. The moved DP's binder index is distinct from its bindee index and is indicated on the adjacent λ (cf. Büring's β notation); for example, in (2) *John* has a subscript/bindee/inner index of 1 and a λ/binder/outer index of 2. A consequence of this system is that a moved DP bears a subscript/bindee/inner index distinct from that of its trace, whose subscript/bindee/inner index is identical to the moved DP's λ/binder/outer index. Quantificational DPs like *every man*, which are nonreferential, do not bear an inner index.

b. Every man λ1 t_1 said that only he_1 λ2 t_2 loves his_2 mother. TRANSITIVE BINDING
'Every man *x* said that *x* loves *x*'s mother and that no one else loves their own mother.'

On the compulsory binding approach, then, coreference and cobinding LFs are permissible just in case they yield truth conditions distinct from those of their binding and transitive binding counterparts, respectively.

2.2 Ellipsis: the Binding–Strict Problem

The compulsory binding approach entails a particular view of identity under ellipsis. Specifically, an ellipsis antecedent that contains binding must be able to license both strict and sloppy identity. In an example like (6), where the strict and sloppy readings are both available, Rule I/HLB rules out the coreference LF in (6a-i), leaving the binding LF in (6a-ii) as the only available ellipsis antecedent for both the strict and sloppy LFs in (6b).

(6) $John_i$ loves his_i mother and $Bill_j$ does too.
   a. Antecedent LF: binding only (per Rule I/HLB)
      (i) ~~$John_1$ λ2 t_2 loves his_1 mother~~ ~~COREFERENCE~~
      (ii) $John_1$ λ2 t_2 loves his_2 mother BINDING
   b. Ellipsis LF: binding…or not
      (i) $Bill_3$ λ4 t_4 does <love his_1 mother> too STRICT
      (ii) $Bill_3$ λ4 t_4 does <love his_4 mother> too SLOPPY

The licensing of the sloppy reading is unsurprising: a pronoun with a bound-variable interpretation in the elided VP corresponds to a pronoun with a bound-variable interpretation (bound from a parallel syntactic position) in the antecedent. All theories of ellipsis licensing are designed to generate this core result. The challenge for compulsory binding approaches comes from the strict reading, where the bound-variable pronoun in the antecedent corresponds to a free pronoun in the elided VP.

With this challenge in mind, Fox proposes the following condition on ellipsis licensing:

(7) NP Parallelism (Fox 2000: 117):
NPs in the antecedent and elided VPs must either
   a. have the same referential value (Referential Parallelism) or
   b. be linked by identical dependencies (Structural Parallelism)

On Fox's approach, the strict reading of (6) is licensed by Referential Parallelism: the referential value of the bound-variable *his* in the ellipsis antecedent is identical to the referential value of its binder, *John*, which in turn permits ellipsis of a VP in which *his* has that same value. The sloppy reading is licensed by Structural Parallelism: the bound-variable pronouns in the antecedent and elided VPs are bound by the subject in each clause, and the pronouns themselves occupy parallel positions vis-à-vis the subjects.

NP Parallelism (or a functional equivalent) is necessary in order to reconcile the compulsory binding approach to pronominal interpretation with the existence of strict readings under ellipsis. Fox and Büring, who also adopts NP Parallelism, suggest further that NP Parallelism enjoys the independent advantage of providing a natural explanation for the restricted pattern of readings known as Dahl's Puzzle; I defer discussion of this issue to section 6.2. Here I wish to focus on a more immediate

empirical consequence of adopting NP Parallelism: its (largely overlooked) overgeneration of strict readings. Given the compulsory binding approach's strong reliance on NP Parallelism to derive core ellipsis facts, a convincing demonstration of NP Parallelism's failings will spell trouble for compulsory binding more broadly.

The fact that NP Parallelism overgenerates strict readings was noticed by Roelofsen (2010), who gives the example in (8) (his (28)). As Roelofsen notes, the prediction of NP Parallelism is that this example should have an available reading on which Bob was the only person who called their own mother yesterday, and Max is the only person who called Bob's mother today; this is the reading generated when *his* is bound in the antecedent VP and free in the elided VP, licensed via Referential Parallelism. No such reading is available.

(8) Yesterday, only Bob_i called his_i mother. Today, only Max_j did.

Roelofsen (2010: 126) concedes the possibility that "there may be constraints on VP ellipsis *besides* [NP] Parallelism that rule out the relevant readings"; Roelofsen does not pursue the matter further, and as far as I am aware it has not been taken up elsewhere in the literature. Here I show that the overgeneration of strict readings is systematic, and I suggest that there is nothing that would lead us to expect Referential Parallelism to be suspended in the relevant cases. On the contrary, we will find good reason to reject Referential Parallelism altogether.

The crucial characteristic of Roelofsen's example is that coreference and binding in the ellipsis antecedent are truth-conditionally distinct (in this case, due to the presence of *only*). Unlike examples like (6), where the semantic neutralization of coreference and binding makes it impossible to directly assess correlations between the LF structure of the antecedent and the range of available readings under ellipsis, cases like (8) make the structure of the antecedent transparent, which in turn opens up the ellipsis correlations to investigation.

What we find in such cases is a systematic correlation between the LF structure of the antecedent and the range of available readings under ellipsis: coreference in the antecedent is associated only with a strict reading, and binding in the antecedent only with a sloppy reading. This runs counter to the prediction of compulsory binding and NP Parallelism, which license thoroughgoing strict/sloppy ambiguity when there is binding in the antecedent.[2] Examples are shown in (9) and (10).

(9) Only John_i called his_i mother. Bill_j didn't.

- a. Coreference–strict: 'John called John's mother and no one else called John's mother. Bill didn't call John's mother.'
- b. *Coreference–sloppy: 'John called John's mother and no one else called John's mother. Bill didn't call Bill's mother.'
- c. *Binding–strict: 'John called John's mother and no one else called their own mother. Bill didn't call John's mother.'
- d. Binding–sloppy: 'John called John's mother and no one else called their own mother. Bill didn't call Bill's mother.'

(10) Mary only said that JOHN_i called his_i mother. Alice added that Bill_j did too.

- a. Coreference–strict: 'Mary said that John called John's mother and Mary didn't say that

[2] Of course, the availability of a strict reading ultimately depends on the presence of a referential binder for the elided pronoun's bound correspondent in the ellipsis antecedent. NP Parallelism does not predict a strict reading for an example like *Every boy$_i$ called his$_i$ mother, and John$_j$ did too*.

anyone else called John's mother. Alice added that Bill called John's mother.'

b. *Coreference–sloppy: 'Mary said that John called John's mother and Mary didn't say that anyone else called John's mother. Alice added that Bill called Bill's mother.'

c. *Binding–strict: 'Mary said that John called John's mother and Mary didn't say that anyone else called their own mother. Alice added that Bill called John's mother.'

d. Binding–sloppy: 'Mary said that John called John's mother and Mary didn't say that anyone else called their own mother. Alice added that Bill called Bill's mother.'

Of particular interest here is the unavailability of the binding–strict configuration in (9c) and (10c), where the bound reading of the pronoun in the ellipsis antecedent (now distinguishable from its coreferential counterpart) is paired with strict identity under ellipsis. This is precisely the configuration that NP Parallelism is devised to permit, in order to license strict readings for cases where coreference and binding are indistinguishable in the antecedent (and thus where, per compulsory binding approaches, only binding is permitted). Once we make it possible to detect correlations between the LF structure of the antecedent and the available readings under ellipsis, we find correlations that are systematic and that cast serious doubt on NP Parallelism (in particular, on its Referential Parallelism clause). This, in turn, dims the prospect of pairing compulsory binding with a satisfactory theory of ellipsis licensing. For (9c), one might object that since a binding LF in the antecedent entails the sloppy reading—if no one other than John called their own mother, then it follows that Bob didn't call his own mother—the strict reading is independently disfavored.[3] No such entailment, however, is found in (10), where the focused embedded subject *John* associates with *only* in the matrix clause and the binding–strict configuration remains unavailable.

Turning to transitive binding and cobinding, we find an analogous state of affairs. In cases where transitive binding and cobinding are semantically equivalent (and where compulsory binding thus mandates transitive binding), an ambiguity is available under ellipsis, as in (11). But when an operator like *only* allows us to distinguish transitive binding from cobinding in the antecedent, we observe strict correlations between cobinding and strict identity on the one hand, and between transitive binding and sloppy identity on the other, as shown in (12).

(11) Every boy_i claims that he_i loves his_i mother and knows that John_j does too.

a. Strict: 'Every boy *b* claims that *b* loves *b*'s mother and knows that John loves *b*'s mother.'

b. Sloppy: 'Every boy *b* claims that *b* loves *b*'s mother and knows that John loves John's mother.'

(12) Every boy_i claims that only he_i loves his_i mother but secretly knows that John_j does too.

a. Cobinding–strict: 'Every boy *b*:
   (i) claims that *b* loves *b*'s mother and no one else loves *b*'s mother but
   (ii) secretly knows that John loves *b*'s mother'

b. *Cobinding–sloppy: 'Every boy *b*:
   (i) claims that *b* loves *b*'s mother and no one else loves *b*'s mother but
   (ii) secretly knows that John loves John's mother'

c. *Transitive binding–strict: 'Every boy *b*:
   (i) claims that *b* loves *b*'s mother and no one else loves their own mother but

[3] One could just as easily imagine that this setup might favor the strict reading, since the strict reading conveys new information rather than affirming an entailment of what has already been said.

(ii) secretly knows that John loves *b*'s mother'

d. Transitive binding–sloppy: 'Every boy *b*:
   (i) claims that *b* loves *b*'s mother and no one else loves their own mother but
   (ii) secretly knows that John loves John's mother'

It should come as no surprise that transitive binding and cobinding obey a set of restrictions analogous to what we observe for binding and coreference. The parallels between these two sets of phenomena—and the notion that they point to a common grammatical basis—are the subject of Heim's (1993) groundbreaking work. But they spell further trouble for compulsory binding approaches, making plain the generality of the ellipsis licensing problem they encounter.

The facts here are rather damaging for NP Parallelism and compulsory binding. Heeding Roelofsen's advice, we cannot exclude the possibility that some unknown condition on VP ellipsis rules out the binding–strict configuration on independent grounds.[4] But it is remarkable, to say the least, that the binding–strict configuration should vanish just as soon as we have identified a reliable means of detecting it. Certainly nothing in NP Parallelism leads us to expect that an ellipsis antecedent with a locally bound pronoun should cease to license a strict reading just in case it has a truth-conditionally distinct counterpart LF with a free (or nonlocally bound) pronoun. I suggest instead that, to craft a successful account of ellipsis licensing, we must abandon Referential Parallelism. This, in turn, will require us to jettison compulsory binding.

3 Binding–Strict Configurations in the System of Rooth (1992)

The binding–strict problem is instructive not just for our understanding of transderivational economy constraints on binding and the theories of ellipsis they rely on. It also serves as a useful probe for investigating theories of ellipsis licensing more generally. NP Parallelism is a departure from the ellipsis licensing theory explored by Rooth (1992), which has been widely adopted, with various additions and variations across the literature. In this section I show that Rooth's theory, despite not contemplating something like Referential Parallelism, is nonetheless susceptible to the binding–strict problem. In the following section, I propose a modification of Rooth's theory that solves the problem.

In Rooth's system and its descendants, VP ellipsis is licensed if the following two conditions are met:

(13) a. Syntactic condition: the elided VP and its antecedent VP are syntactically identical (modulo indices)

b. Semantic condition: there is a constituent E dominating the elided VP and a nonoverlapping constituent A dominating the antecedent VP such that the ordinary semantic value of A is an element of the focus semantic value of E (under all assignments)
   $\Rightarrow$ Schematically: $[\![\mathrm{A}]\!]^g_{\mathrm{o}} \in [\![\mathrm{E}]\!]^g_{\mathrm{f}}$, for all g

To take a concrete example, consider the sentence *John loves his mother, and Bill does too*. In a binding–strict configuration, A and E will have the LFs and semantic values shown below in (14).[5]

[4] Henceforth, I will use the term "binding–strict configuration" to refer to both kinds of cases: those where the elided pronoun corefers with the binder of a bound correspondent in the antecedent, and those where the elided pronoun is cobound with the binder of a bound correspondent in the antecedent.

[5] If one finds it objectionable to interpret a proper name like *John* via an index and an assignment, then simply swap it

Since the ordinary semantic value of A is an element of the focus semantic value of E and the two VPs differ syntactically only in the index on *his*, ellipsis is licensed.

(14) John_i loves his_i mother, and Bill_j does too. (binding–strict)

a. LF for A: John_1 $\lambda 2$ t_2 loves his_2 mother

b. LF for E: $[\text{Bill}_3]_F$ $\lambda 4$ t_4 loves his_1 mother

c. $[\![\text{A}]\!]^g_o = g(1)$ loves $g(1)$'s mother

d. $[\![\text{E}]\!]^g_f = \{x \text{ loves } g(1)\text{'s mother} : x \in D\}$ $[\![\text{A}]\!]^g_o \in [\![\text{E}]\!]^g_f$, for arbitrary g

The root of the problem is that Rooth's licensing condition is stated on semantic values rather than syntactic logical forms. The mapping from logical forms to semantic values can neutralize the distinction between coreference and binding; this neutralization is a central preoccupation of the compulsory binding literature. Since ellipsis appears to be sensitive to precisely this distinction—as the binding–strict problem reveals—we should prefer an ellipsis licensing condition stated on representations that maintain it. In the next section, I propose just such a condition.

4 An Alternatives-Based Licensing Condition

In this section I propose a new theory of ellipsis licensing, one that avoids the binding–strict problem. The theory proposed here owes much to Rooth (1992), preserving Rooth's core insight that VP ellipsis depends on the satisfaction of a semantic contrast condition alongside syntactic identity between the elided VP and its antecedent. What is novel in the present proposal is its reimplementation of Rooth's system in terms of formal alternatives (Fox & Katzir 2011). The conceptual advantage of this proposal is that it allows us to combine Rooth's syntactic and semantic licensing conditions into a single condition, one stated in terms of a theoretical formative—formal alternatives—whose grammatical relevance has been independently argued for elsewhere. The empirical advantage is that it allows us to formulate a contrast condition that recognizes certain LF distinctions that VP ellipsis appears to be sensitive to despite their being neutralized in the mapping to truth conditions. The theory of ellipsis proposed here presupposes a theory of binding different from the compulsory binding approaches discussed above. I turn to the consequences for binding in section 6.

The licensing condition for VP ellipsis I propose, abbreviated $\text{A} \in F(\text{E})$, is shown in (15).

(15) $\text{A} \in F(\text{E})$: VP ellipsis is licensed just in case there is a constituent E dominating the elided VP and a nonoverlapping constituent A dominating the antecedent VP such that A is a formal alternative of E

I follow Fox & Katzir (2011) in assuming that alternatives are structurally defined—i.e., that they are syntactic logical forms rather than model-theoretic objects—and adopt their definition of the set of formal alternatives. Simplifying somewhat, the formal alternatives of a structure S are the set of structures $F(\text{S})$ such that $\text{S}' \in F(\text{S})$ just in case S' is formed by replacing focused elements of S with elements drawn from the lexicon, the subconstituents of S, or the set of contextually salient constituents (Fox & Katzir 2011: 97–98; for some amendments that do not directly concern us here, see Trinh & Haida 2015, Breheny et al. 2018, and Trinh 2018). Suitable replacements for focused

out for the deictic pronoun *he* with the same index; the binding–strict reading remains unavailable.

elements bear the 'at-most-as-structurally-complex-as' relation $\lesssim_C$, in a context C, to the elements they replace.

With this definition in place, the VP ellipsis licensing condition $\text{A} \in F(\text{E})$ will be satisfied just in case there is a constituent A dominating the ellipsis antecedent that can be formed by finding permissible replacements for focused elements of a constituent E dominating the elided VP. Only in that case will A be an element of $F(\text{E})$.

To begin, I illustrate the operation of the licensing condition $\text{A} \in F(\text{E})$ with the example in (16).[6]

(16) John sneezed, and $[\text{Mary}]_\text{F}$ did too.

a. A = John sneezed
b. E = $[\text{Mary}]_\text{F}$ sneezed
c. $F(\text{E}) = \{x \text{ sneezed} : x \lesssim_C \text{Mary}\}$ $\quad \text{A} \in F(\text{E})$

In this example, the constituent *John* bears the $\lesssim_C$ relation to the focused constituent *Mary*. In general, the subject of the clause containing the ellipsis antecedent will bear this relation to the focused subject of the elided VP, since it has just been mentioned and is thus contextually salient. The constituent *John sneezed* is thus an element of $F(\text{E})$, making it a suitable candidate for A, and this in turn licenses VP ellipsis.

In order to account for strict–sloppy ambiguity, we must assume the availability of distinct antecedent LFs: a coreference LF and a binding LF. This is because our ellipsis licensing condition, $\text{A} \in F(\text{E})$, derives a systematic correlation between coreference and strict readings on the one hand, and between binding and sloppy readings on the other hand. Let us examine each case in turn, beginning with coreference–strict.

(17) John loves his mother, and $[\text{Bill}]_\text{F}$ does too. (coreference–strict)

a. A = $\text{John}_1\ \lambda 2\ \text{t}_2$ loves his_1 mother
b. E = $[\text{Bill}_3]_\text{F}\ \lambda 4\ \text{t}_4$ loves his_1 mother
c. $F(\text{E}) = \{x_a\ \lambda b\ \text{t}_b \text{ loves his}_1 \text{ mother} : x \lesssim_C \text{Bill}\}$ $\quad \text{A} \in F(\text{E})$

The LF of the clause containing the elided VP is shown in (17b). In this LF, the elided pronoun, his_1, bears a free inner index. It is not bound by the clause's subject, *Bill*, whose outer index, 4, is marked on the adjacent λ. Moreover, there is no admissible alternative to this LF in which *his* is bound: no matter what replacement we might choose for focused $Bill_3$, the binding relations within the clause will remain unchanged, as shown in (17c). It follows that VP ellipsis will be licensed only if the corresponding pronoun in the ellipsis antecedent is free (and bears the index 1). This is precisely the situation that obtains in the antecedent LF in (17a), where his_1 is free but coreferential with the subject, $John_1$.

The binding–sloppy correlation is shown in (18). Sloppy identity requires binding in the elided clause E. Per $\text{A} \in F(\text{E})$, ellipsis will only be licensed if there is an antecedent A where a parallel binding relationship obtains.

(18) John loves his mother, and $[\text{Bill}]_\text{F}$ does too. (binding–sloppy)

a. A = $\text{John}_1\ \lambda 2\ \text{t}_2$ loves his_2 mother

[6]For present purposes, I assume that *do*-support occurs on the PF branch of the derivation, and thus that the presence of auxiliary *did* in (16) and similar examples does not affect the calculation of alternatives, which occurs on the LF branch.

b. E = $[\text{Bill}_3]_F$ $\lambda 4$ t_4 loves his_4 mother

c. $F(\text{E}) = \{x_a\ \lambda b\ t_b \text{ loves his}_b \text{ mother} : x \lesssim_C \text{Bill}\}$ $\quad \text{A} \in F(\text{E})$

As shown in (17c) and (18c), I assume that a set of formal alternatives $F(\text{S})$ must preserve the binding relationships present in S. I assume that $F(\text{S})$ is closed under alphabetic variation; in other words, the binder index on a λ and the matching bindee index on any traces or pronouns it binds may vary among S and the elements of $F(\text{S})$, but in no element of $F(\text{S})$ may such an index match a bindee index that is free in S. So, for example, an LF in which the λ and trace bore the index 1 would not be an admissible alternative to E in (17c). This, in the present system, is what prevents an elided clause with a free pronoun from being licensed by an antecedent clause where the corresponding pronoun is bound.[7]

On the present approach, a strict reading can be derived only if there is coreference in the antecedent, and a sloppy reading can be derived only if there is binding in the antecedent. The coreference A in (17a) is not a formal alternative of the sloppy E in (18b), and the binding A in (18a) is not a formal alternative of the strict E in (17b). The same holds for examples with transitive binding and cobinding; there, a strict reading is one where the elided pronoun in E and its correspondent in A share an inner index with a pronominal subject in A, with all three items ultimately bound by the same higher binder. The present approach thus avoids the binding–strict problem that bedevils compulsory binding approaches. This result depends on our rejecting the core move of compulsory binding approaches: we must assume that both the coreference LF in (17a) and the binding LF in (18a) are available representations for the sentence *John$_i$ loves his$_i$ mother*, following Heim (1993), Reinhart (2006), and Roelofsen (2010). I discuss the consequences of this for binding theory in section 6.

5 Parallelism via Alternatives

An advantage of the approach to ellipsis licensing advocated here is that it offers a natural explanation for constraints on ellipsis attributed to Parallelism. There is a large literature documenting the ways in which clauses containing ellipsis must be syntactically or semantically parallel to their antecedent clauses, but this requirement is typically stated in the form of an exogenous, freestanding constraint, not part of the core licensing mechanism. If ellipsis is licensed via condition like $\text{A} \in F(\text{E})$, then Parallelism falls out as a theorem.

For reasons of space, I focus here on a Parallelism-related phenomenon discussed by Fox (2000): the Ellipsis Scope Generalization.[8] For a recent discussion of how ellipsis sites containing movement traces require parallel extraction in the ellipsis antecedent—a state of affairs that will necessarily obtain if A must be a formal alternative of E—see Messick & Thoms (2016).

Sentences that support quantifier scope ambiguities are sometimes disambiguated in the presence of VP ellipsis (Sag 1976, Williams 1977, Hirschbühler 1982, Fiengo & May 1994). As Fox (2000) shows, the pattern of disambiguation is tied to a constraint he dubs Scope Economy, which prevents

[7] This condition may find a more natural expression in a binding system that eschews the use of indices in favor of a more direct structural representation of binding, such as that of Higginbotham (1983). There may likewise be good reasons to abandon the use of indices on proper names and free pronouns, as advocated by Reinhart (1983) and many others. For expository purposes, I will persist in using an indexing system here, but nothing in the proposal hinges crucially on this choice.

[8] Fox's related Ellipsis Binding Generalization is developed in the service of explaining the Dahl puzzle, which I discuss in section 6.2.

scope inversion in cases where it is semantically uninformative (i.e. where the inverse scope reading is semantically indistinguishable from the corresponding surface scope reading). The basic pattern is shown in (19).

(19) a. A student read every book. ($\exists > \forall, \forall > \exists$)
b. A student read every book. Mary did too. ($\exists > \forall$, *$\forall > \exists$)
c. Mary read every book. A student did too. ($\exists > \forall$, *$\forall > \exists$)
d. A student read every book. A teacher did too. ($\exists > \forall, \forall > \exists$)

While the sentence in (19a) supports both surface and inverse scope readings, the inverse scope reading becomes unavailable in the presence of ellipsis in (19b) and (19c). In (19d), the inverse scope reading is once again available, but the two clauses must bear the same scope relation: there is no available reading of (19d) with surface scope in the first clause and inverse scope in the second clause, or vice versa. This is Fox's Ellipsis Scope Generalization.

Fox accounts for the Ellipsis Scope Generalization by appealing to Scope Economy in concert with Parallelism. Scope Economy prevents scope inversion in the elided clause in (19b) and the antecedent clause in (19c): the interaction between the proper name *Mary* and the universal quantifier *every book* is scopally uninformative and thus blocked. The only available LF for those clauses is the surface scope LF. Parallelism requires a parallel scope relation to hold in the other clause in order for ellipsis to be licensed, whence the scopal disambiguation that we see. In (19d), Scope Economy does not prevent scope inversion in either clause; the only requirement is imposed by Parallelism.

The $A \in F(E)$ condition proposed here derives exactly the same effect as Parallelism for the examples in (19). If ellipsis is licensed just in case A is a formal alternative of E, then A and E must have parallel scope relations: A is an LF that may differ from E only in the replacement of focused elements by items that bear the $\lesssim_C$ relation to them. *Mary* is the relevant focused item in (19b). Whatever replaces it in A will necessarily occupy the same structural position, and thus bear the same scope relation to *every book*. If Scope Economy independently regulates the set of available LFs for E, then $A \in F(E)$ successfully derives the observed scopal disambiguation under ellipsis. The same holds, *mutatis mutandis*, for (19c) and (19d). We thus derive the Ellipsis Scope Generalization via the core ellipsis licensing mechanism, without recourse to an additional requirement like Parallelism.

An alternatives-based licensing mechanism like $A \in F(E)$ may also have advantages in accounting for certain permissible structural mismatches under ellipsis.[9] Rooth (1992) discusses cases like (20), where a sloppy reading is available despite the fact that *John* and *Bill* occupy structurally nonidentical positions in their respective clauses (and despite the fact that neither *John* nor *Bill* c-commands the relevant pronoun).[10]

(20) The guy who John_i works for likes him_i, and Bill_j's boss does too.

In order for ellipsis to be licensed under present assumptions, the DP *the guy who John works for* must bear the $\lesssim_C$ relation to *Bill's boss*. This is unproblematic, since this DP has just been mentioned and is therefore salient. (This in turn depends on the possibly more tendentious assumption that the

[9] Thoms (2015) develops an alternatives-based mechanism for licensing mismatches via accommodation. Focusing on auxiliary verb mismatches and polarity mismatches, he develops an account where ellipsis may be satisfied not via identity with the antecedent clause A itself but via identity with a semantically identical structural alternative to A: in present terms, an element of $F(A)$.

[10] For an E-type approach to such sloppy readings, see Tomioka (1999).

entire DP *Bill's boss* is in focus, rather than just the possessor *Bill*.) Sloppy identity depends on binding, as discussed above. Suppose that this binding is effected by a silent sentence-level focus operator that binds both *Bill* and (elided) *him*. The first clause will then be a satisfactory candidate for A just in case it contains a structurally parallel silent focus operator that binds *John* and *him*. The fact that *John* is structurally nonparallel to *Bill* is irrelevant, since *the guy who John works for* $\lesssim_C$ *Bill's boss*; we would run afoul of A $\in F$(E) only if A lacked the structurally parallel binder or bound pronoun. This is sketched in (21).

(21) a. A = Op λ1 [the guy who John_1 works for] likes him_1
b. E = Op λ2 $[\text{Bill}_2\text{'s boss}]_F$ likes him_2
c. $F(\text{E}) = \{\text{Op } \lambda a\ x_b \text{ likes him}_a : x \lesssim_C \text{Bill's boss}\}$ $\quad \text{A} \in F(\text{E})$

Independent evidence that the sloppy reading of (20) may depend on association with a higher operator that also binds the pronoun comes from examples like (22), where association of *John* with the closer *only* eliminates the sloppy reading.

(22) The guy who only JOHN_i works for likes him_i, and Bill_j's boss does too. (*sloppy)

A fuller investigation of this issue must await future research. For now, I hope to have shown that an alternatives-based licensing mechanism may be a promising avenue for explaining structural mismatches under ellipsis, as the core mechanism for generating formal alternatives already contemplates the inclusion of discursively salient items that may differ in principled ways from the focused items they replace (for further discussion, see Fox & Katzir 2011 and Trinh & Haida 2015). By appealing to formal alternatives, we may achieve a limited flexibility in ellipsis licensing that matches up well with the accommodation facts, a result that requires additional stipulations in a Parallelism-based system.

6 Implications for Binding Theory

6.1 A Different Transderivational Constraint

The theory of ellipsis licensing proposed above requires an approach to binding that parts ways with compulsory binding. As discussed in section 4, accounting for strict–sloppy ambiguity within the present system requires us to have both coreference and binding LFs available for the ellipsis antecedent, even when they are truth-conditionally indistinguishable. This means that we must abandon the core tenet of compulsory binding approaches, namely that there is a grammatical preference for maximally local binding. In its place, I adopt a different approach, variously implemented by Heim (1993), Reinhart (2006), and Roelofsen (2010), according to which what is impermissible is any LF whose interpretation is indistinguishable from a competitor that violates a binding condition.

Here it will be useful to step back and be a bit more precise about the various factors affecting binding. The interpretation of pronominals is governed by two distinct sets of conditions: the binding conditions themselves (Condition B being of primary interest here), and the transderivational economy constraints that restrict LFs containing pronominals. Rule I, Rule H, and HLB all belong to the latter category. They presuppose some formulation of the binding conditions or other, and then specify transderivational constraints on the LFs that conform to those binding conditions. In jettisoning compulsory binding for the Heim/Reinhart/Roelofsen approach, we are trading one set of

transderivational constraints for another; the underlying assumptions about Condition B need not change substantially (or at all).

Compulsory binding is represented here by HLB, whose definition is repeated in (23). For the Heim/Reinhart/Roelofsen approach, I will follow the implementation of Roelofsen (2010), who formulates a condition he dubs Rule S, defined in (24).

(23) HLB: For any two NPs α and β, if α could semantically bind β (i.e., if it c-commands β and β is not semantically bound in α's c-command domain already), α must semantically bind β, unless that changes the interpretation (Büring 2005: 270)

(24) Rule S: Any interpretation of a given clause X that could be obtained via a logical form of X that violates Condition B (or other syntactic constraints on binding) is illicit (Roelofsen 2010: 134)

A virtue of both approaches is that they fit well with a very simple formulation of Condition B, a point emphasized by both Büring and Roelofsen. In particular, they permit the formulation of a Condition B that regulates only semantic binding (in present terms, binding by the sister of a c-commanding coindexed λ), imposing no restrictions on syntactic binding (coindexation with a c-commanding DP). Consider the sentence *John$_i$ loves him$_i$*, for which semantic binding is shown in (25a) and syntactic binding is shown in (25b).

(25) a. John$_1$ λ2 t$_2$ loves him$_2$ (semantic binding)
b. John$_1$ λ2 t$_2$ loves him$_1$ (syntactic binding)

The sentence is ungrammatical on this indexing/construal. If Condition B regulates only semantic binding, then Condition B cannot tell the whole story of its ungrammaticality: it rules out the LF in (25a), but not the one in (25b). In compulsory binding approaches, the latter LF is ruled out by the transderivational constraint (Rule I or HLB) barring coreference where it is semantically indistinguishable from binding. The pronoun in (25b), despite being syntactically bound, is semantically free and is thus assigned a reference, one that coincides with that of the coindexed c-commanding proper name.

In the alternative approach pursued here, (25b) is instead ruled out because it is semantically indistinguishable from an LF that violates Condition B, namely (25a). What is crucial is the fact that (25a) violates the binding conditions; the fact that it involves local semantic binding is purely incidental to Rule S's enforcement mechanism.

The empirical predictions of the present approach diverge from those of compulsory binding approaches in cases where local binding does not violate Condition B, a point emphasized by Büring (2005) in his comparison of Heim (1993) and Fox (2000). In (26), where the local domain for possessive *his* is the possessive DP rather than the whole clause, compulsory binding will rule out the syntactic binding LF in (26b) (via Rule I or HLB) due to its semantic indistinguishability from the semantic binding LF in (26a). Rule S, by contrast, will permit (26b), since the semantically indistinguishable (26a) does not violate Condition B.

(26) a. John$_1$ λ2 t$_2$ loves his$_2$ mother (semantic binding)
b. John$_1$ λ2 t$_2$ loves his$_1$ mother (syntactic binding)

Rule S thus permits both the (semantic) binding LF in (26a) and the coreference/syntactic binding LF in (26b), exactly as we need it to in order to account for strict–sloppy ambiguity under our

assumptions about ellipsis.

6.2 Other Binding Cases

Beyond its avoidance of the binding–strict problem, the present approach to ellipsis and binding also successfully accounts for several other cases that are problematic for compulsory binding approaches. Roelofsen (2011) discusses several variants of the Dahl puzzle (more on which directly below) that compulsory binding fails to account for. Two examples are shown in (27).

(27) a. Every student$_i$ said that she$_i$ loved her$_i$ paper and added that the professor$_j$ did too.
b. Every student$_i$ said that the professor$_j$ loved her$_i$ paper and added that she$_i$ did too.

In (27a), there is an available reading on which every student *s* says that the professor loved *s*'s paper. This requires the elided *her* to be bound by the matrix subject *every student*; the pronoun will perforce be free in E (since neither E nor A may be so large as to include the matrix subject, on pain of overlapping). In order to satisfy A $\in F$(E), the corresponding *her* in A must bear the same index as the elided *her* but must not be bound by the coindexed local subject, *she*. This is problematic for compulsory binding approaches, since cobinding is semantically equivalent to transitive binding here. Rule S, by contrast, permits cobinding here, since the semantically equivalent transitive binding LF (a variant of (28) in which the first-clause *her* bears the index 2 instead of 1) does not violate Condition B. This is sketched in (28). (Rule S succeeds and compulsory binding fails in exactly the same way for (27b), with A and E swapping places.)

(28) Every student $\lambda 1$ t_1 said that she$_1$ $\lambda 2$ t_2 loved her$_1$ paper and added that [the prof$_3$]$_F$ $\lambda 4$ did <t_4 love her$_1$ paper> too.
a. A = she$_1$ $\lambda 2$ t_2 loved her$_1$ paper
b. E = [the prof$_3$]$_F$ $\lambda 4$ t_4 loved her$_1$ paper
c. F(E) = $\{x_a$ λb t_b loved her$_1$ paper : $x \lesssim_C$ the prof$\}$ A $\in F$(E)

Despite these successes, the present approach fails to account for the well-known Dahl puzzle (Dahl 1973). The puzzle consists of the fact that in an example like (29), the elided clause cannot be understood to mean that Bill said that John loves Bill's mother.

(29) John$_i$ said that he$_i$ loves his$_i$ mother, and Bill$_j$ did too.

The problem for the current approach is that nothing in it prevents an LF for (29) in which *he* corefers with *John* while the lower *his* is (semantically) bound by *John*. I must leave this problem unresolved here.[11] While compulsory binding approaches succeed in accounting for the Dahl puzzle, it is hardly clear that this success outweighs the many problems such approaches encounter elsewhere.

[11] We might win an account of the Dahl puzzle by adopting the framework of Roelofsen (2011), who proposes a different transderivational constraint called Free Variable Economy (FVE). FVE handles the examples in (27) as well as the classic Dahl cases. FVE differs from Rule S significantly both in implementation and in the conceptual approach to economy that underpins it; Rule S is far more consonant with the proposals of Heim (1993) and Reinhart (2006). I will not undertake a thorough comparison of Rule S and FVE here, since the primary focus of the present paper is ellipsis licensing. On that score, Roelofsen (2011) adopts a version of Rooth's ellipsis licensing condition, and thus inherits its problematic licensing of binding–strict configurations. We thus might improve upon the framework of Roelofsen (2011) by pairing FVE with A $\in F$(E) as the ellipsis licensing condition.

As Heim (2009: 11) puts it in assessing the compulsory binding proposals of Fox (2000) and Büring (2005), "It is worth…pointing out how much rides on the Dahl puzzle….The discussion in Fox and Büring did not convey this impression. It rather suggested that the solution to this puzzle came as an added benefit to an independently motivated solution to the problems of native B[inding]T[heory]."

7 Summary

Our point of departure was the fruitful intertwinedness of binding and ellipsis, the ways in which each phenomenon reveals otherwise hidden facts about the other. Their empirical and theoretical symbiosis, I argue, has been seriously misapprehended in parts of the literature in at least one important respect; this is what the binding–strict problem reveals. While I am not the first to notice the binding–strict problem—Roelofsen (2010) briefly mentions it, and there may be other antecedents—its importance does not appear to have been widely appreciated in the literature.

The binding–strict problem presents an existential challenge for compulsory binding approaches, which depend on binding–strict configurations in order to explain ordinary strict–sloppy ambiguity under ellipsis. But compulsory binding approaches are not the only family of theories in the binding and ellipsis world to suffer from the binding–strict problem. The ellipsis licensing framework of Rooth (1992), which has been enormously influential and productive, also licenses ellipsis in binding–strict configurations.

My contribution here should be seen as a friendly amendment to Rooth's framework, one that avoids the binding–strict problem in a theoretically auspicious way. By stating the ellipsis licensing condition on syntactic logical forms rather than semantic interpretations, we avoid neutralizing distinctions that ellipsis appears to be sensitive to. Just as importantly, we gain a principled account of Parallelism, whose effects now fall out from the core licensing mechanism. Moreover, the condition is stated in terms of a theoretical formative—formal alternatives—whose theoretical interest has been demonstrated independently elsewhere (Fox & Katzir 2011). I have made no novel proposals in the area of binding, aiming instead to show that my proposed ellipsis licensing condition is compatible with an established family of theories outside of the compulsory binding camp (Heim 1993, Reinhart 2006, Roelofsen 2010).

The empirical landscape of ellipsis phenomena—even restricting our attention to VP ellipsis in English—is vast, and I make no pretense of having assessed the present proposal against all of it (for a recent survey, see Lipták 2015). I hope to have shown that an alternatives-based approach provides a natural way of addressing some well-known problems for syntactic identity in ellipsis licensing. I think there is sufficient promise in the present approach to warrant further investigation. And I believe that the binding–strict problem presents an important challenge for semantic identity in ellipsis licensing, one that stands independent of the particular licensing condition proposed here.

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