

Ellipsis Redundancy and Reduction

Redundancy

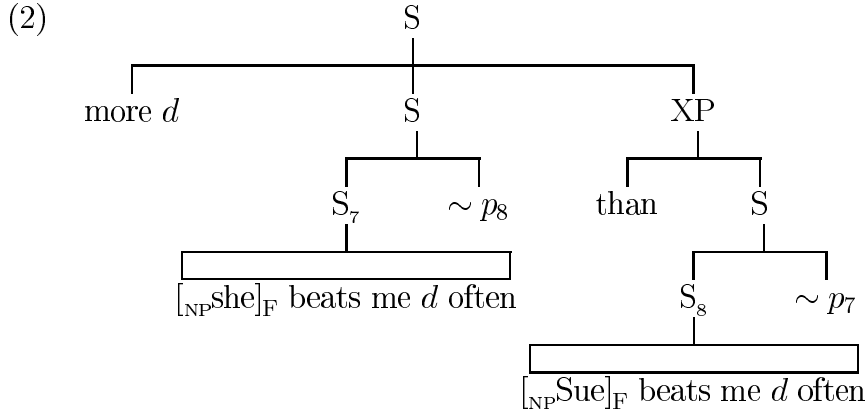
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1 Focus and anaphoric destressing

Consider a pronunciation of (1) with prominence on the capitalized noun phrases. In terms of a relational notion of prominence, the subject $[_{NP}she]$ is prominent within the clause $[_S she beats me]$, and $[_{NP}Sue]$ is prominent within the clause $[_S Sue beats me]$. This prosody seems to have the pragmatic function of putting the two clauses into opposition, with prominences indicating where they differ, and prosodic reduction of the remaining parts indicating where the clauses are invariant.

(1) SHE beats me more often than SUE beats me

[Car84], [Roc86] and [Roo92] propose theories of *focus interpretation* which formalize the idea just outlined. Under my assumptions, the prominences are the correlates of a syntactic focus features on the two prominent NPs, written as F subscripts. Further, the grammatical representation of (1) includes operators which interpret the focus features at the level of the minimal dominating S nodes. In the logical form below, each focus feature is interpreted by an operator written \sim .



In addition to its overt syntactic argument, \sim has a non-overt argument, in this case a proposition variable corresponding to another overt phrase, the correspondence being established by indexing. In (2), the indexing is symmetric, and can be thought of (in a loose way) as formalizing the notion that the two phrases $[_S [_{NP} she]_F \text{ beats me } d \text{ often}]$ and $[_S [_{NP} Sue]_F \text{ beats me } d \text{ often}]$ are being placed in opposition. The semantics of \sim is straightforward. The first operator $\sim p_8$ (where p_8 is a proposition variable) introduces a constraint that p_8 be a proposition of the form ‘ y beats me d often’, for some y . Furthermore, p_8 is required to be distinct from the proposition expressed by the overt argument $[_S [_{NP} she]_F \text{ beats me } d \text{ often}]$. The indexing indicates that p_8 is to be identified with the proposition which is the semantic value of the *than*-clause $[_S [_{NP} Sue]_F \text{ beats me } d \text{ often}]$. Since this is a proposition of the desired form, the constraint introduced by focus interpretation is satisfied.

Obviously, getting to this constraint requires access to focus-sensitive semantic material from the phrase where focus is interpreted. The semantics for \sim is stated in terms of the ‘alternative semantics’ for focus ([Roo85], [vS89], [Kra91]), which makes available, in addition to the usual proposition as the semantics for $[_S [_{NP} she]_F \text{ beats me } d \text{ often}]$, an additional focus semantic value. In this case, the focus semantic value is the set of propositions of the form ‘ y beats me d often’.

In [Roo92], I applied a more general version of this approach to focus interpretation to a variety of phenomena, including sentence-internal “association

with focus” effects. Here I will use this theory in a limited way: we will be concerned with examples such as those above, where patterns of relative prominence are used to express semantic redundancy of overt linguistic material relative to other overt linguistic material. In (2), each clause is partially redundant relative to the other, and this is the semantic import of the prosody. Given this concern, it is convenient to assume an extension of the theory where \sim can be used to express total redundancy, as well as partial redundancy. According to a view defended in [Lad80], there need not be a focus on *like* in a pronunciation of (3) where *like* has the final pitch prominence and the second occurrence of *semantics* is reduced. Rather, the prosody can be motivated simply by the redundancy of *semantics*. The second occurrence is “anaphorically” reduced, with the consequence that *like* bears a default prominence, a prominence which does not receive a direct semantic interpretation.

- (3) We are supposed to take statistics and semantics this term, but I don’t like semantics.

It is natural to represent such cases of anaphoric reduction with a \sim operator having scope just over the reduced material:

- (4) We are supposed to take statistics and [semantics]_s this term, but I don’t [like [[semantics] \sim 8]]

The idea is that the operator \sim expresses redundancy of its left (overt) argument with respect to its right argument, non-redundant material being marked by focus. If there is no focus in the overt argument, the entire argument must be redundant.¹

¹A problem arises in realizing this extension of the empirical phenomena analyzed in terms of the \sim operator. As we have seen, contrastive focus can be symmetric. A unified theory of prosodic redundancy marking must somehow avoid the conclusion that anaphoric destressing can be symmetric also. For there is no rendition of (3) where each occurrence of *semantics* is reduced, by virtue of the presence of the other. I will not try to resolve this problem here.

In summary, logical forms such as (2) and (4) characterize the licensing of contrastive focus and anaphoric deaccenting: via the semantics for \sim , they entail a certain kind of redundancy. It will be important below that the licensing is semantically mediated: in a representation such as $\sim p_8$, p_8 denotes a proposition, which is a semantic object.

2 Ellipsis redundancy

Essentially by definition, ellipsis is a device expressing redundancy, and in this respect it is similar to prosodic marking of redundancy. According to a folkloric slogan, ellipsis is just a very extreme form of phonetic reduction, where all phonetic content is totally reduced. Without taking a position as to whether it would be possible to take the slogan literally, I will be concerned with evaluating a consequence. If ellipsis and prosodic redundancy marking differ just in the degree of phonetic of reduction, the theories of the two phenomena must be identical in other respects. Specifically, the kind of redundancy which licenses ellipsis would be identical to the kind of redundancy which licenses contrastive focus and anaphoric reduction. I will first argue against this hypothesis, and then, using evidence from a certain class of marginal data, motivate a sophisticated version of it.

3 Sloppy non-pronominals

A reading of ellipsis where some given pair of corresponding elements (one within the elided material and one in the antecedent) have the same referent is said to be a strict interpretation of the ellipsis. In (5a) the strict interpretation is ‘... and 7 is less than or equal to 5’. A sloppy interpretation is one where reference varies: the sloppy interpretation of (5a) is ‘... and 7 is less than or equal to 7’, where the reference of *itself* is the number 5 in the antecedent,

while the corresponding reference in the ellipsis clause is the number 7.²

- (5) a. 5 is (obviously) less than or equal to itself, and (of course) 7 is too.
- b. 5 is (obviously) less than or equal to 5, and (of course) 7 is too.
- c. 5 is (obviously) less than or equal to 5, and (of course) the same is true of 7.

This characterization of the sloppy/strict distinction deliberately avoids the assumption that the corresponding element in the antecedent (i.e. *itself* in (5a)) is a pronoun or other anaphoric element. In fact, sloppy readings for ellipsis are impossible if a non-anaphoric element such as a proper name is substituted for the pronoun. (5b), where a coreferential numeral *5* is substituted for *itself*, has no sloppy reading.³ However, such non-ambiguity is not observed with all devices expressing redundant predication. In (5c), the phrase *the same is true of ...*, which at least in a broad sense expresses redundant predication, allows for both strict and sloppy readings.

As a guiding idea for this paper, I speculate that sloppy non-pronominals are impossible in ellipsis because ellipsis is at least partially sensitive to the representation of information, perhaps to syntax. The “the same is true of —” construction is semantically mediated, and so allows for sloppy non-pronominals.

Let us now look at an analogue of the representations above with prosodic redundancy marking, rather than ellipsis or the *same is true of* construction. Consider first an example with a pronominal in the potentially sloppy posi-

²If taken literally, this explanation would presuppose a number of assumptions of the theory of ellipsis; at this stage, it is intended simply an explanation of terminology. Below I will in fact argue in terms of one of these assumptions, namely that there is syntactic structure in the area of the ellipsis, at one syntactic level.

³Following the lead of Fiengo and May (to appear), I am here using mathematical language in order to suspend principle C of the binding theory: note that one occurrence of *5* in (5b,c) c-commands the other. The device of mathematical language is not strictly necessary. While examples such as *Bill likes Bill and John does too* are perceived as principle C violations, it is possible to evaluate their semantics. Only a strict interpretation is possible.

tion:

- (6) 5_5 is (obviously) less than or equal to itself₅, and (of course)
 $7_{2,F}$ *is less than or equal to itself*₂ as well.

The relevant example is one where the material *is less than or equal to itself*₂ is prosodically reduced. Such reduction will be indicated by italics in numbered examples. A pronunciation where *itself* is contrastively focused is possible as well, but this would not be parallel to the earlier ellipsis example, since we are considering ellipsis (and consequently, reduction) of an entire verb phrase. The approach to contrastive focus sketched above entails the following logical form for a sloppy reading:

- (7) $[_S [_S 5_5 \text{ is less than or equal to itself}_{5,1}]]$ and
 $[_S [_S 7_{2,F} [_S e_2 \text{ is less than or equal to itself}_2]] \sim 1]]$

There is a contrastive focus on the subject $[_{NP} 7]$, which is interpreted at the level of the right conjunct by the operator ~ 1 . It turns out that this representation entails that the contrasting proposition p_1 is one of the form ‘ x is less than or equal to x ’. Since the semantic value of the main clause (namely the proposition ‘5 is less than or equal to 5’) is of this form, the constraint introduced by focus interpretation is satisfied.

There is one subtlety about focus interpretation in the representation above. In order to obtain a focus-determined constraint dictating a contrasting proposition of the form ‘ x is less than or equal to x ’, rather than one of the form ‘ x is less than or equal to 7’, the first occurrence of $[_{NP} 7]$ must be scoped. This is a result of the recursive semantics for focus proposed in [Roo85].

Note that the reading just discussed is descriptively a sloppy interpretation of the prosodic reduction, since reference in the position of the object of *to* varies. So, prosodic reduction is subject to sloppy interpretations, just like ellipsis. A difference arises when we substitute a proper name in the antecedent:

- (8) $[_S [_S 5 \text{ is less than or equal to } 5]_1]$ and
 $[_S [_S 7_{2,F} [_S e_2 \text{ is less than or equal to itself}_2]] \sim 1]]$

In intuition, the modification does not affect the possibility for prosodic reduction, with a sloppy interpretation. This is in fact predicted by the theory: the semantics of ~ 1 refers just to the semantics of the antecedent sentence, not to anything about its syntax. Given that $[_s 5 \text{ is less than or equal to } 5]$ denotes the same proposition as $[_s 5 \text{ is less than or equal to itself}]$, if (7) is a possible grammatical representation, then (8) is a possible grammatical representation. As a consequence of the fact that focus interpretation is semantically mediated, the focus-determined constraint is satisfied in the same way in the two variants.

There is another configuration in which the same distinction between ellipsis and reduction can be demonstrated. At least for some speakers, a sloppy interpretation of a pronoun remains possible in cases where the antecedent for the pronoun is a proper part of the subject of the antecedent VP, rather than being the entire subject of the antecedent VP. For such speakers (9a) is ambiguous between a strict interpretation ‘Bill’s coach thinks John has a chance’ and a sloppy interpretation ‘Bill’s coach thinks Bill has a chance’.

- (9) a. John₁’s coach thinks he₁ has a chance, and Bill₂’s coach does too.
 b. John₁’s coach thinks John₁ has a chance, and Bill₂’s coach does too.
 c. John₁’s coach thinks John₁ has a chance, and
 Bill_{2,F}’s *coach thinks he₂ has a chance*, too.

As before, the sloppy interpretation drops out when a proper name is substituted for the pronominal correlate, as in (9b). However, a sloppy interpretation is possible in the corresponding prosodically reduced sentence (9c). Again, the relevant example is one where the embedded subject $[_{NP} \text{ he}]_2$ is included in the reduced material.

The logical form for (9c) is parallel to (8). In order to obtain a bound variable reading for the pronoun with a focused antecedent, the antecedent $[_{NP} \text{ Bill}]$ is scoped.⁴

⁴At this point, an objection can be raised to my assumption that this reading is generated by scoping the antecedent, since a theory of constraints on movement might exclude the

- (10) $[_S \text{ John}_1\text{'s coach thinks John}_1 \text{ has a chance}]_3$, and
 $[_S [_S \text{ Bill}_{2,F} [_S \text{ e}_2\text{'s coach thinks he}_2 \text{ has a chance}]] \sim 3]$

Focus is interpreted at the level of the second conjunct, resulting in a constraint that the proposition p_3 be one of the form ‘ x ’s coach thinks x has a chance’. Since the proposition contributed by the left conjunct is of this form, the constraint is satisfied. The logical form for the version with a sloppy proper name is isomorphic:

- (11) $[_S \text{ John}_1\text{'s coach thinks John}_1 \text{ has a chance}]_3$, and
 $[_S [_S \text{ Bill}_{2,F} [_S \text{ e}_2\text{'s coach thinks he}_2 \text{ has a chance}]] \sim 3]$

Summing up, prosodic reduction, but not ellipsis, allows sloppy proper names in the antecedent. The data for reduction are predicted by the semantically mediated theory of contrastive focus of [Roo92].

4 Implicational bridging in reduction

It is known that an entailment relation can be implicated in licensing prosodic redundancy marking:

- (12) $\text{she}_1 \text{ called him}_2 \text{ a Republican, and then } [_S \text{ he}_{2,F} \text{ insulted her}_{1,F}]$

In the example, there is no overt phrase contributing the proposition **insult**(x_1, x_2), and so a logical form of the kind employed above requires a modification in the theory. At an informal level, what is going on is (or seems) straightforward: a presupposed axiom ‘if x calls y a Republican, then x insults y ’ is used to derive **insult**(x_1, x_2) from the semantic representation of the first conjunct. This deduced information is the actual contrasting proposition employed in focus interpretation at the level of the second conjunct. Plainly, it makes sense to implement this idea at a level such as discourse representation, rather than at a syntactic level. However, as an expository device, we can employ the derivation of the representation (10). However, I will stick with the assumptions of [Roo85], in order to maintain a foundation for semantic interpretation.

representation (13a), which indicates the understood contrasting proposition by means of a formula serving as an argument of \sim .

- (13)a. $[_S \text{she}_1 \text{ called him}_2 \text{ a Republican}]_3$, and then
 $[_S [_S \text{he}_{2,F} \text{ insulted her}_{1,F}] \sim \mathbf{insult}(x_1, x_2)]$
 b. $[_S \text{she}_1 \text{ called him}_2 \text{ a Republican}]_3$, and then $[_S [_S \text{he}_{2,F} \text{ insulted her}_{1,F}] \sim 3]$

An alternative is to build an implicational relation into the semantics of \sim . This would allow us to continue to employ a notation in which the argument of \sim is co-indexed with a syntactic phrase, as in (13b). For the present, I will argue in terms of this second option, that is I will assume that the grammatical representation of (12) is (12b). Turning to another example, the grammatical representation of (14a) is (14b), which captures via focus interpretation and co-indexing the fact that contrastive focus in the second conjunct is licensed by an (implicationally bridged) relation to the first conjunct.

- (14)a. First John told Mary about the budget cuts, and then Sue_F *heard about them*.
 b. First $[_S \text{John told Mary about the budget cuts}]_1$, and then $[_S [_S \text{Sue}_F \text{ heard about them}] \sim 1]$
 c. Presupposed axiom: if a tells b about c, then b hears about c.

The implicational bridging is supported by the fact that if a tells b about c, then b hears about c. The point regarding ellipsis is now obvious: while the kind of redundancy present in (14) is sufficient to license contrastive focus, it is not sufficient to license ellipsis. That is, (15) does not have the reading ‘Sue heard about the budget cuts’.

- (15) First someone told Mary about the budget cuts, then Sue_F *did*.

This further distinction supports the notion that prosodic redundancy marking is semantically mediated, since implicational bridging clearly has something to do with semantics. Complementarily, it points in direction of a syntactic sensitivity of ellipsis.

5 Ellipsis in an expanded domain

We have seen two criteria distinguishing ellipsis from reduction. Both support a semantically mediated theory of reduction, and some degree of representational sensitivity for ellipsis. At this point, it might seem advisable to conclude that ellipsis and prosodic redundancy marking have nothing to do with each other: the phenomena are related only in that they are both expressions of redundancy, the theories of the two being simply distinct. This conclusion is stronger than what is warranted. All that has been shown is that the redundancy constraints on ellipsis are in some respect stronger than the redundancy constraint on contrastive focus. This leaves open the possibility of an overlap between the two theories: perhaps the semantic redundancy constraint expressed by \sim above is also operative in ellipsis, together with some constraint (perhaps of a syntactic nature) which is operative in ellipsis but not in contrastive focus.

A phenomenon which points in exactly this direction was touched on above. In non-standard instances of sloppy readings for verb phrase ellipsis, as in the example repeated below, there is a difficulty in stating all of the redundancy constraint on ellipsis at the level of the verb phrases, since the verb phrases do not contain the antecedent for the sloppy pronoun.

- (16)a. John₁'s coach thinks he₁ has a chance, and Bill₂'s coach does too.
b. [_S John₁'s coach thinks he₁ has a chance], and
[_S Bill₂'s coach does think he₂ has a chance], too

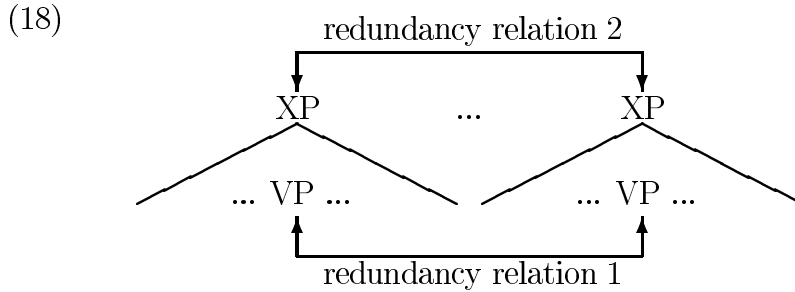
The specific problem is that the sloppy reading of (16a) (i.e. the reading indicated in (16b)) has to be licensed, without also licensing sloppy readings in similar examples such as the one below.

- (17)a. John₁'s coach thinks he₁ has a chance, and Bill₂ does too.
b. [_S John₁'s coach thinks he₁ has a chance], and
[_S Bill₂ does think he₂ has a a chance], too

Sentence (17a) has no sloppy reading 'Bill thinks he (Bill) has a chance'. Look-

ing just at information available at the VP level, it is hard to see how the distinction might be drawn: the shape of the VPs in (17) is exactly as in (16). This suggests that VP ellipsis is in some examples licensed at a higher level. In the present case, ellipsis should be at least partially licensed at the S level, a level at which differences between (16) and (17) are present.

Fiengo and May (to appear and this volume) propose a two-level architecture for VP ellipsis in which one redundancy relation is imposed at the VP level, and another at a containing level:



They propose that relation 1 is a syntactic reconstruction relation, which enforces identity of form of the verb phrases, with some allowance for variation. The allowed variation which is relevant here is that pronominal indices may vary: the VPs in (16) stand in the reconstruction relation, even though where the index 1 appears in the VP on the left, the index 2 appears in the VP on the right.⁵ It is the second redundancy relation which has the function of regulating indices. That is, it should be defined in such a way that the Ss in (16) stand in the redundancy relation, while those in (17) do not. Fiengo and May take advantage of the fact that the antecedents (*John* and *Bill*) are in syntactically isomorphic positions in the first example but not the second, and define redundancy relation 2 as a certain kind of syntactic isomorphy of patterns of indexes in a tree.

In earlier sections, I argued against identifying the redundancy constraint

⁵Here I am deliberately simplifying Fiengo and May's actual proposal regarding the reconstruction relation, in a way which (I believe) does not affect my conclusions. However, it will be necessary to verify this relative to the published version of Fiengo and May (to appear).

on ellipsis with the redundancy constraint on reduction. Assuming now that there are in fact two redundancy constraints on ellipsis, the arguments show only that the redundancy constraints on ellipsis can not *as a whole* be identified with the redundancy constraints on reduction: several more nuanced hypotheses remain open. Note that reconstruction would appear to be otiose in the case of reduction, since prosodically reduced material still has overt content. This suggests that what distinguishes ellipsis from reduction might simply be the requirement for reconstruction of syntactic and lexical material. A review of the arguments from the previous sections shows that this assumption is indeed sufficient to account for the identified differences between ellipsis and reduction. Consider the differential behavior vis-a-vis sloppy readings for proper names.

- (19)a. 5_1 is (obviously) less than or equal to 5_1 , and (of course) 7_2 is too
 b. 5_1 is (obviously) less than or equal to 5_1 , and (of course)
 $[_{NP} 7]_{2,F}$ *is less than or equal to itself* $_2$ too

There is a sloppy reading for reduction (example b) but not for ellipsis (example a). Assuming that reconstruction is required in ellipsis but not in reduction, this can be accounted for by the assumption that the phrases $[_{VP}$ is less than or equal to $5_1]$ and $[_{VP}$ is less than or equal to itself $_2]$ do not stand in the reconstruction relation. Because of the change from the proper name $[_{NP} 5]_1$ to a pronoun (which moreover has a different index), this is a plausible assumption easily encodable in a suitable definition of the reconstruction relation.⁶

Differential behavior vis-a-vis implicational bridging is illustrated by the example repeated below.

- (20)a. First John told Mary about the budget cuts, and then
 Sue_F *heard about them*.
 b. First someone told Mary about the budget cuts, then Sue_F *did*.

In the first variant, contrastive focus is licensed via implicational bridging.

⁶Specifically, it is a consequence of Fiengo and May's reconstruction relation.

The ellipsis variant does not have the relevant reading ‘Sue heard about the budget cuts’. Under present assumptions, the distinction receives an appropriately straightforward explanation: the relevant reading for the ellipsis variant is not generated because there is no antecedent for the reconstruction of $[_{VP} \textit{heard about them}]$.

In summary, the assumption that reconstruction is operative in ellipsis but not prosodic reduction is sufficient to explain the differences identified in the earlier sections of this paper. As a consequence, the possibility is open that redundancy relation 2 is identical to the semantic redundancy relation which licenses prosodic reduction. The next section presents evidence for this.

6 Evidence for semantic redundancy

Above, we saw a logical form for a variant of the coach example with prosodic redundancy marking. The simplest assumption is that the logical form for an ellipsis variant is the same:

- (21)a. John’s coach thinks he has a chance, and Bill’s coach does too.
 b. $[_S \text{John}_1 \text{'s coach thinks he}_1 \text{ has a chance}]_3$, and
 $[_S [_S \text{Bill}_{2,F} [_S \text{e}_2 \text{'s coach thinks he}_2 \text{ has a chance}]] \sim 3]$

That is, we assume that the logical form for ellipsis involves an operator expressing relation 2, namely the focus interpretation operator \sim . This way of proceeding has the consequence that ellipsis is always accompanied by prosodic reduction, and/or contrastive focus. The empirical consequences of this assumption are weaker than one might think, since in the simplest examples, we can postulate an LF where \sim operates on just the elided phrase:

- (22)a. John left, and Bill did, too.
 b. John $[_{VP} \text{left}]_4$, and Bill did $[_{VP} [_{VP} \text{leave}] \sim 4]$, too

Certainly, the consequence that a deleted phrase is prosodically reduced is unobjectionable. However, given that *Bill* is prominent, we can also conjecture

a contrastive focus:

$$(23) \quad [_S \text{ John } [_{VP} \text{left}]]_5, \text{ and } [_S [_S \text{ Bill}_F \text{ did } [_{VP} \text{leave}]] \sim 5]$$

In this representation, the \sim operator has the dual role of licensing ellipsis and contrastive focus. Without some modification, the theory would allow for either logical form.

In the examples such as (21), the assumption that a \sim operator must be present in order to license ellipsis entails the presence of a contrastive focus. Given the indexing dictated by the sloppy reading, semantic redundancy is present only at the S and not the VP level, and thus this must be the level where \sim is adjoined. This in turn has the effect of dictating contrastive focus: the focus on $[_{NP} \text{ Bill}]_{2,F}$ is required if the semantics associated with \sim is to be satisfied.

It would be possible to avoid the consequence that ellipsis entails contrastive focus in such examples by postulating a semantic mechanism licensing ellipsis which did not refer to information contributed by focus features, but which had the same semantics as \sim . However, in the relevant examples it strikes me that quite prominent foci, in the required locations, are indeed present. Consequently, I will tentatively assume that a link between ellipsis and contrastive focus is tenable, keeping in reserve the possibility of retreating to the weaker position. It is relevant to note that caveats about the difficulty of diagnosing the presence of focus cut both ways: they have the effect of reducing the force of counterexamples as well as confirming ones.

In earlier sections, two diagnostics for semantically mediated redundancy, and in particular for the \sim relation, were identified. The project is now to see whether the diagnostics can be used to support or refute the hypothesis that redundancy relation 2 is expressed by the \sim operator.⁷ Although the assumption that a distinct redundancy relation (i.e. the reconstruction relation) is operative in ellipsis limits possibilities, a difference in the domains of the

⁷Or, assuming the weaker hypothesis, that redundancy relation 2 and \sim are semantically the same relation.

redundancy relations makes it possible to apply these diagnostics. In logical forms for VP ellipsis, relation 1 applies at the VP level, while as we have seen relation 2 may apply at a properly containing level, in the examples above the S level. In such configurations, we predict that material in the S antecedent but outside the VP antecedent will satisfy the diagnostics for semantic redundancy. We begin with the criterion of sloppy non-pronominals. (24) differs from the earlier examples in that two NP conjuncts *and his coach* have been added.

(24) Bill₁ and his₁ coach think he₁ has a chance, and

Tom_{2,F} *and his₂ coach do too.*

The change does not affect the possibility for a sloppy reading for ellipsis (or, in a parallel example, for prosodic reduction). This is predicted by the theory laid out above. In the LF below, the second underlined VP counts as a reconstruction of the first, because it differs only in the choice of pronominal indices. The constraint imposed by \sim is satisfied because the first conjunct expresses a proposition of the form ‘ x and x ’s coach think x has a chance’.

(25) [_S John₁ and his₁ coach thinks he₁ has a chance]₃, and

[_S [_S Bill_{2,F} [_S e₂ and his₂ coach thinks he₂ has a chance]]] \sim 3

The point of adding the material *and his coach* is that it gives an additional pronoun position outside the reconstruction antecedent but inside the semantic antecedent. We apply the diagnostic by substituting a proper name for this pronoun:

(26) Bill₁ and Bill₁’s coach think he₁ has a chance, and

Tom₂ *and his₂ coach do too*

While repeating the proper name is unmotivated and thus produces an awkward result, the possibility for a sloppy reading is unaffected. Here is an analogous mathematical example (constructed by Steve Berman):

(27)a. 7₁ divided by 7₁ is its₁ smallest divisor,

and $8_{2,F}$ *divided by itself*₂ *is too*.

- b. 7_1 divided by 7_1 is its₁ smallest divisor,
since any number_{2,F} *divided by itself*₂ *is*.

Again, a sloppy reading remains possible. Recall that in examples where the proper name is within the reconstruction antecedent a sloppy reading is excluded. The difference is accounted for by the assumption, reviewed above, that reconstruction is sensitive to the distinction between proper names and pronouns, while the semantic redundancy relation \sim is not. Since the position of the second occurrences of *Bill* and *7* above are outside the reconstruction antecedent, the presence of a proper name in this position does not affect the possibility for ellipsis.

The implicational bridging diagnostic is applied in a similar way, by constructing an example where the difference of form resulting from bridging falls within the semantic antecedent, but outside the reconstruction antecedent. For purposes of orientation, we first consider an example without implicational bridging:

- (28) First John told Mary I was bad-mouthing her, and then he told Sue I was.

The sloppy reading ‘he told Sue I was bad-mouthing Sue’ is an instance of ellipsis in an expanded domain of redundancy. In the LF below, reconstruction of the ellipsis would operate at the VP level (reconstructing $[_{VP}\text{bad-mouthing her}_2]$ as $[_{VP}\text{bad-mouthing her}_3]$), while semantic licensing operates at the higher S level.

- (29) First $[_S \text{ John told Mary}_2 \text{ I was bad-mouthing her}_2]_8$
and then $[_S [_S \text{ he told Sue}_3 \text{ I was bad-mouthing her}_3] \sim 8]$

Implicational bridging is introduced in the following way:

- (30) First John told Mary I was bad-mouthing her, and then Sue heard I was.

The entailment relation exploited is, again, that if a tells b about c, then b hears about c. The modification seems not to affect the possibility for a sloppy reading.⁸ Recall that in examples where implicational bridging affected the form of the antecedent VP, ellipsis (in contradistinction to prosodic reduction) was impossible. This difference can be reduced to the assumption that redundancy relation 1 (i.e syntactic reconstruction) is sensitive to syntactic form. In the logical form for (30), because the VPs differ only in pronominal indices, they are sufficiently similar in shape to stand in the reconstruction relation. The S conjuncts are related by redundancy relation 2, as expressed by a version of \sim which builds in implicational bridging:

- (31) First [_S John told Mary I was bad-mouthing her]₁, and then
 [_S [_S Sue₄ [_S e₄ heard I was]] \sim 1]

While there is a gross difference in syntactic form at the S level, this does not matter, since redundancy relation 2 is a semantic relation.

Note the role of the sloppy/strict distinction in these arguments: in a strict reading, or examples not involving anaphora, there is nothing which forces redundancy relations 1 and 2 to operate at different levels. For instance, in a non-anaphoric version of (31), redundancy relation 2 could operate at the VP level:

- (32) First John told Mary I [_{VP} was cheating]₂, and then
 Sue heard I was [_{VP}[_{VP} *cheating*] \sim 2]

In this representation, \sim is satisfied by virtue of identity of predicates, and there is thus no implicational bridging. A similar representation for (30) is impossible, because the most embedded VPs do not express identical or implicationally related predicates.

Examples supporting a semantic redundancy relation 2 can be multiplied at will:

⁸For me, this means that a sloppy reading has an intermediate status.

- (33)a. Yesterday John₂'s boss told him₂ to shape up, and today Bill₃'s boss did.
- b. Yesterday the guy John₂ works for told him₂ to shape up, and today Bill₃'s boss did.

If ‘*x*'s boss’ is simply synonymous with ‘the guy *x* works for’, the semantic relation at the S level in (33b) is as in standard cases of contrastive focus; there is no implicational bridging involved. The example supports a semantic approach because the antecedents *John* and *Bill* are in syntactically non-isomorphic positions. A syntactic formulation of redundancy relation 2 would have to involve a very permissive notion of syntactic isomorphy if the anaphoric dependencies in (33b) are to satisfy the relation.

7 Counterevidence

The bottom line import of a theory which identifies redundancy relation 2 as the semantic relation which also licenses prosodic reduction is simply that ellipsis should be possible exactly in configurations where

1. a verb phrase can be syntactically reconstructed, and
2. some phrase identical with or dominating the reconstructed phrase can be related by the \sim relation to some phrase identical with or dominating the reconstruction antecedent, as indicated by the possibility for prosodic reduction in a non-ellipsis variant.⁹

The condition is not strictly concerned with surface sentences, because it requires us to theorize about appropriate logical forms. However, we obtain at least a rough prediction that in cases where prosodic reduction is possible and a verb phrase can be reconstructed, ellipsis should be possible.

⁹Here I am conjecturing that the reconstruction antecedent must be contained in the semantic antecedent, as suggested by the configuration (18). A weaker condition would require simply the presence of a focus interpretation operator with scope over the ellipsis.

I know of one class of counterexamples to this generalization. Above, I said that a theory of ellipsis has to explain the (marginal) acceptability of a sloppy reading in the first example repeated below, and the absence of sloppy reading ‘... and Bill thinks Bill has a chance’ in the second one.

- (34)a. John₁’s coach thinks he₁ has a chance, and Bill₂’s coach does too.
- b. John₁’s coach thinks he₁ has a chance, and Bill₂ does too.

I feel the contrast is fairly clear. We saw that the semantic redundancy relation \sim applying at the S level could distinguish the examples: in the logical form for (34a), the semantic redundancy constraint is satisfied, while in the logical form for (34b), it is not. According to the sophisticated ellipsis = reduction thesis, the possibilities should be the exactly parallel in a pair where the verb phrases are overt and prosodically reduced:

- (35)a. John₁’s coach thinks he₁ has a chance, and
Bill_{2,F}’s *coach thinks he₂ has a chance*, too.
- b. John₁’s coach thinks he₁ has a chance, and
Bill_{2,F} *thinks he has a chance*, too.

A sloppy reading for the first example is possible, as predicted. However, I feel a sloppy reading for the second sentence is also possible, contrary to what is required by the sophisticated thesis. Consider another minimal pair:

- (36)a. Yesterday, John’s friends paid off his debts, and
today Bill’s friends did.
- b. Yesterday, John’s friends paid off his debts, and
today Bill_F *did*.
- (37)a. Yesterday, John’s friends paid off his debts, and
today Bill_F’s *friends paid off his debts*.
- b. Yesterday, John’s friends paid off his debts, and
today Bill_F *paid off his debts*.

Again, I feel a sloppy reading ‘... paid of Bill’s debts’ is possible in both variants of (37), but impossible in (36b). A justification for the contrastive focus in (37b) is perhaps accessible to intuition: the described events are parallel in that yesterday John was freed of his debts, while today Bill was. However, this intuition does not find an expression in the theory discussed above. In the logical form below the required semantic relation is not satisfied, since the first conjunct does not entail a proposition of the form ‘On d , x paid of x ’s debts’.¹⁰

- (38) [Yesterday_F, John₁’s friends paid off his₁ debts]_s, and
[[today_F Bill_{2,F} paid off his debts]~ 8]

To sum up, (35b) and (37b) are counterexamples to the bottom-line prediction of the sophisticated ellipsis = reduction thesis. Second, we do not have a theoretical account of how contrastive focus is licensed in this example.

Bierwisch (p.c.) has pointed out a strengthened form of the implicational bridging problem, which may be related to the problem just discussed. In examples such as the one below, contrastive focus is licensed, although no implicational relation obtains between either conjunct and a substitution instance of the other.

- (39) He_{1,F} bit her_{2,F}, and then she_{2,F} punched him_{1,F}.

The implicational bridging pattern reviewed above would require, in order to license focus in the right conjunct, that ‘ x bit y ’ entail ‘ x punched y ’. This is certainly not the case. Moreover, in order to license focus in the left conjunct, the converse relation would have to hold. Superficially, an extension of the theory of contrastive focus is required which allows entailment to run the other way: focus in this case seems to be licensed by the fact that the two conjuncts entail propositions of a more general form ‘ x *Red* y ’, where *R*

¹⁰I have included the temporal adverb in the scope of the \sim operator, since the time parameter varies across the conjuncts. The adverb is in fact contrastively topicalized; how contrastive topicalization interacts with focus interpretation my sense has yet to be investigated.

is a disjunction of hit, scratch, bite, and so forth. Similar examples can found in question-answer pairs:

(40) Policeman: Tell me who assaulted whom.

Witness: He_{1,F} bit her_{2,F}.

According to the simplist theories of the relation between wh-questions and focus (e.g. the one sketched in [Roo92]), the focus marking in the answer would dictate a question ‘who bit whom’. However, as long as the witness is presupposing that a bite constitutes an assault, the indicated focus, accompanied by reduction of *bit*, is quite possible.¹¹

The problem that these data pose for a theory of contrastive focus and anaphoric reduction is that although one ‘component’ of meaning present in *bit* is not redundant (i.e the one not present in *punched*), *bit* is reduced. Since the examples involve variation in the parts of the contrasting propositions corresponding to non-focused material, a purely semantic solution runs the risk of being reducing the \sim relation to vacuity: if substitutions are allowed in the positions of both focused phrases and reduced material, any two phrases of the same semantic type could be linked by the \sim operator. There is also an intuition that these uses of contrastive focus are quite indirect, in the sense that it takes a while to figure out the contrast that is intended. Both of these observations point in the direction of a pragmatic approach. However, I will not propose any solution here.

Can the sophisticated ellipsis = reduction thesis be saved? This depends on what the logical form for example (37b) is. If the logical form is (38), the thesis is false, since then ellipsis in (36b) would be licensed.

(41) Yesterday, [_S John₆’s friends paid off his₆ debts]₁, and
today [_S [Bill_{F,7} paid off his₇ debts] \sim 1]

But a pragmatic solution to Bierwisch’s problem might contemplate a different LF, where the right-hand argument of the \sim relation is some pragmatically

¹¹A rising accent on *bit* would question whether biting counts as assault.

constructed object. If the theory of ellipsis requires the configuration (18), such a logical form would not license ellipsis.

This is a good place to examine a possible objection to the logical forms I have been employing for ordinary examples of implicational bridging. After introducing this phenomenon, I mentioned two ways of dealing with it. One built entailment into the \sim relation, and this is the version I worked with. The other version left the semantics of \sim unaffected, maintaining that implicational bridging was a pragmatic phenomenon. Superficially, there is reason to prefer the second option. It is clear that elements which justify contrastive focus need not be present as the semantic values of phrases: they can be pragmatically constructed. Consider for instance uses of focus to trigger conversational quantity implicatures (cf. [Roo92, section 2.4]):

(42)a. Well, I_F think he is qualified.

b. Well, I think_F he is qualified.

Here the understood contrasting propositions (in the second example, ‘I know he is qualified’) are not explicit; they must be considered pragmatically constructed entities. In grammatical representations for (42), the second argument of the focus interpretation operator is a pragmatically constructed entity rather than the index of a syntactic phrase.

So, co-indexing between the second argument of \sim and a syntactic phrase is not always involved in focus interpretation. Suppose that a proposition p is present in a discourse ‘common ground’, and that p (possibly in combination with certain postulates) entails q . Then it is quite plausible that a pragmatic process — pragmatic in the sense that it is not driven by semantic interpretation rules — can introduce q into the common ground. This is simply the ‘pragmatic’ process involved in deductive reasoning. Judging by the phenomenon just discussed, the proposition q should be available as a possible contrasting proposition. Thus in the Republican example (repeated below), there is no reason to assume a revision in the semantics of *sim*. We can simply say that focus expresses a contrast between **insult**(x_2, x_1), and **insult**(x_1, x_2),

relying on a process which is not part of compositional semantics to make the latter proposition available.

- (43) she₁ called him₂ a Republican, and then [_S he_{2,F} insulted her_{1,F}]

This account does not cover all examples, though. In order to justify q as a contrasting proposition, p need not be asserted. The following example works nearly as well.

- (44) Although it is doubtful that she called him a Republican, he_F insulted her_F.

Since ‘she called him a Republican’ is not asserted, ‘she insulted him’ can not be deduced. At this point, one is tempted to say that the contrast is licensed by the derivation of a formula which embeds ‘she insulted him’. For instance, if the axiom ‘to call someone a Republican is to insult them’ is common knowledge, (44) might be equivalent to:

- (45) Although it is doubtful that she called him a Republican and (thus) insulted him, he insulted her.

By carrying through the corresponding substitution at a level of discourse semantics, a representation where contrastive focus is licensed could be obtained. At this point, though, we should start to worry about the limits to deductive licensing of contrastive focus. For instance, ‘Either 2 is 2, or she called him a Republican’ is logically true, so it can be deduced under any circumstances.

These problems are not necessarily insurmountable; they do show that a ‘pragmatic’ approach to implicational bridging is not likely to be as straightforward as my initial remarks about (43) suggested. This means that the representational approach assumed in this paper is not obviously at a disadvantage, at the present level of understanding.

To sum up this rather inconclusive section, we have seen that there are *prima facie* counterexamples to the sophisticated ellipsis = reduction hypothesis. Depending on the resolution of an open problem in the semantic and/or

pragmatic theory of focus, they may or may not be actual counterexamples.

8 Intermediate status

The motivation for two-level licensing of ellipsis is found in examples with sloppy readings for a pronoun the antecedent of which is not the argument of the antecedent predicate. Such readings – for instance the sloppy reading of the coach example – appear to have a marginal status. The examples can be improved by context which favors the sloppy reading, and eliminates certain competing readings, as in the example below, but I feel they remain less than perfect.

- (46) Tom and Dick each hired two trainers to coach them for the match. Tom's trainers are helping him a lot, but unfortunately Dick's trainers aren't.

What are we to make of this intuition? Within the theory of the previous section, we might say that scoping the genitive NP to a position where it can bind a reconstructed pronoun in an LF such as (21b) is difficult. That is, because of the structural position of the antecedent for the reconstructed pronoun, a bound variable reading for that pronoun is marginal. This is a fairly plausible story, and it is perhaps true that a bound variable reading for a pronoun bound by a quantifier in a parallel position, as in (47a) is perhaps slightly less favored than in configurations where the pronoun is c-commanded by its quantificational antecedent.

- (47)a. No boy's mother really loves him.
b. No boy really loves his mother.

Whatever we make of this suggestion, it remains true that under the sophisticated theory, (46) should have the same status as a variant with prosodic reduction and contrastive focus:

- (48) Tom and Dick each hired two trainers to coach them for the match.
Tom₆'s trainers are helping him₆ a lot, but

Dick_{7,F}'s *trainers* aren't_F *helping him*₇

Here I find a sloppy reading completely unexceptionable. If (46) and (48) have the same logical form, we can not try to attribute the intermediate status of (46) to a difficulty in scoping the antecedent for the sloppy pronoun to the required level.

I tentatively conclude that the sophisticated ellipsis = reduction thesis has a problem with explaining the degraded status of the sloppy reading of (46).

9 Conclusion

The first part of this paper identified two diagnostics which distinguish ellipsis from prosodic redundancy marking. I suggested accounting for the distinctions by means of a semantically mediated theory of the latter, combined with a theory of ellipsis which is to some degree representationally sensitive.

The second part considered marginal data involving an expanded range of redundancy licensing sloppy readings. I reviewed a two-level approach to licensing ellipsis in such examples, which postulates two independent redundancy relations. We saw that within such an architecture, it can be shown that redundancy relation 2 has certain properties of the redundancy relation which licenses contrastive focus and prosodic reduction. This suggested a sophisticated version of the ellipsis = redundancy thesis, which maintains that a semantic redundancy requirement is operative in both ellipsis and prosodic reduction, ellipsis being distinguished by the presence of a second, representationally sensitive redundancy requirement.

The final sections pointed out two problems for the sophisticated thesis. There are counterexamples to the bottom line prediction of the thesis, in that intuitions distinguish ellipsis from reduction in examples where a verb phrase can be reconstructed.

So, is ellipsis merely an extreme form of prosodic reduction? Definitely not 'merely', but the hypothesis that the phenomena have something to do

with each other at a theoretical level is not ready for the scrapheap. The resolution of certain crucial cases requires a sharpening of our understanding of the semantics and pragmatics of prosodic reduction.

References

- [Car84] Lauri Carlson. Focus and dialogue games: A game-theoretical approach to the interpretation of intonational focusing. In L. Vaina and J. Hintikka, editors, *Cognitive Constraints on Communication*, pages 295–333. D. Reidel, Dordrecht, 1984.
- [FM00] Robert Fiengo and Robert May. *Indices and Identity*. MIT Press, Cambridge, MA, 0000. To appear.
- [Kra91] Angelika Kratzer. The representation of focus. In Arnim von Stechow and Dieter Wunderlich, editors, *Semantik/Semantics: An International Handbook of Contemporary Research*, pages 804–825. de Gruyter, Berlin, 1991.
- [Lad80] Robert Ladd. *The Structure of Intonational Meaning*. Indiana University Press, Bloomington, 1980.
- [Roc86] Michael Rochemont. *Focus in Generative Grammar*. Benjamins, Amsterdam, 1986.
- [Roo85] Mats Rooth. *Association with Focus*. PhD thesis, University of Massachusetts, Amherst, GLSA, Dept. of Linguistics, South College, UMASS, Amherst MA 01003, 1985.
- [Roo92] Mats Rooth. A theory of focus interpretation. *Natural Language Semantics*, pages 75–116, 1992.
- [vS89] Arnim von Stechow. Focusing and backgrounding operators. Technical Report 6, Fachgruppe Sprachwissenschaft, Universität Konstanz, 1989.