

Accented Pronouns and Contrast*

Elise McClay & Michael Wagner
McGill University

ABSTRACT

Both the lack of accentuation on a referring expression and the choice of a pronoun over a full noun phrase have been tied to a higher accessibility of the referent. Why, then, would a pronoun ever be accented? We consider three perspectives: Kameyama's (1999) Complementary Preference Hypothesis, Smyth's (1994) Parallel Function view, and Rooth's (1992) Alternatives Theory of Focus, and present experimental evidence in favour of the focus view. We conclude by noting issues with respect to the definition of contrast that arise when considering cases of multiple foci as in the data of our experiments.

1 Accenting Pronouns

Speakers choose between different realizations of referring expressions depending on context. If the referent is already discourse-salient, a speaker prefers to leave the expression unaccented (cf. Nootboom & Terken 1982, Terken & Hirschberg 1994, i.a.), and is more likely to use a pronoun instead of a full noun phrase (Grosz 1977, Grosz *et al.* 1995). The conditions for accent omission and pronominalization are, then, very similar. But nevertheless, there are occasions where it is preferred for a pronoun to be accented. As already observed in Akmajian & Jackendoff (1970), accenting a pronoun can change its interpretation, and at least under certain circumstances a particular interpretation of a pronoun seems to require accenting:

- (1) a. John corrected Bill, then he corrected MARY.
→*likely interpretation: John corrected Mary*
- b. John corrected Bill, then HE corrected MARY.
→*likely interpretation: Bill corrected Mary*

This paper compares different theories aimed at explaining how this interaction between accent placement and pronominal reference resolution comes about. Two theories commonly assumed in the literature are the *Complementary Preference Account* and the *Parallel Function Account*. We argue that neither explanation is adequate, since they do not account for the contrastive nature of pronoun accentuation. The alternatives theory of focus Rooth (1992), on the other hand, can provide an explanation for the distribution of accents on pronouns.

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2 Accented Pronouns are Contrastive

Two frequently-assumed accounts of pronoun accentuation, the *Complementary Preference Account* and the *Parallel Function Account*, aim at explaining the accentuation of pronouns purely based on properties of the referring pronoun itself, and properties of the referring expression that first introduced it in prior discourse. We argue that neither approach is adequate, since both fail to explain that a contrast to the constituent containing the pronoun is necessary to license an accent.

2.1 Complementary Preference

The Complementary Preference Hypothesis (a term coined by Kameyama 1999) holds that a pronoun is (likely to be) accented if it refers to a less accessible referent among several potential candidates. Some version of this hypothesis is often assumed in the more computationally and experimentally oriented literature (Ariel 1990, Gundel *et al.* 1993, Cahn 1995, Nakatani 1997, Kameyama 1999). Beaver (2004) incorporates this idea into a more formal semantic approach.

In our example in (1), there are two potential referents for the subject pronoun *he*: the subject/agent and the object/patient of the prior sentence. There is independent evidence that subject/agent-referents are more accessible antecedents than object/patient referents (cf. Smyth 1994, Arnold 1998). The higher accessibility of subject/agent-referents could then be the reason for the accentuation pattern in the case where the pronoun refers to the referent of the object/patient antecedent:

- (2) a. John_{*i*} corrected Bill, then he_{*i*} corrected MARY.
Referent is the most accessible one → unaccented pronoun
b. John corrected Bill_{*i*}, then HE_{*i*} corrected MARY.
Referent is the less accessible one → accented pronoun

As noted in Kothari (2007), the empirical basis for the view that an accent on a pronoun reflects an ‘unusual’ antecedent is slim. While examples like (2) lend plausibility to the general idea, it is less clear that intuitions about variations of them conform to it, and Kothari did not find evidence supporting the hypothesis when looking at corpus data. A straightforward prediction of the Complementary Preference Hypothesis is that pronoun accentuation should be impossible or at least unlikely when the reference resolution of a pronoun is unambiguous. Consider the following unambiguous variation on (2):

- (3) Sally corrected Bill_{*i*}, then he_{*i*} corrected MARY.
Referent is the only accessible one → unaccented pronoun

It hardly takes an experiment to show that an accented pronoun in (3) is possible and even likely, contrary to this prediction. Our experiments below confirm just how likely an accent is in such cases. The Complementary Preference Hypothesis, at least as stated in Kameyama (1999), seems unsatisfactory, since its explanation relies on the presence of competing possible antecedents for the pronoun, but it’s not clear that such a competition is sufficient or even necessary.

Of course one could consider a weaker version of this hypothesis that allows for competition of referents even when their features (in this case gender features)

are not compatible with the features of the pronoun. But there is another reason that makes this account unsatisfactory, which is that it relies on pronoun-specific stipulations, instead of deriving the prosodic realization of pronouns from a more general theory of accent placement (cf. De Hoop 2004, German 2009, who also note this issue). An account capable of deriving pronoun accentuation from general principles of accent placement would clearly be superior.

2.2 Parallel Function

A second popular account relates pronoun accentuation to the degree of parallelism of the grammatical properties of the pronoun and the antecedent. The Parallel Function Hypothesis Smyth (1994) holds that the fewer features a pronoun shares with its antecedent, the more likely it is to be accented. Relevant features include *gender*, *thematic role*, and *grammatical role*. This approach could account for the accentuation pattern in our examples:

- (4) a. John_{*i,male,agent,subject*} corrected Bill, then he_{*i,male,agent,subject*} corrected MARY.
all features shared → *less likely to be accented*
- b. John corrected Bill_{*i,male,patient,object*}, then HE_{*i,male,agent,subject*} corrected MARY.
few features shared → *more likely to be accented*

Parallel Function makes very specific assumptions about the relevance of various dimensions of parallelism with the antecedent, but does not require there to be a competing referent for the pronoun. It thus differs from Complementary Preference in being able to account for accents on unambiguous pronouns such as the one in (3). Since features can also be shared between full noun phrases, it is also an account that potentially generalizes to the accentuation of non-pronouns such as proper names, whose reference is indexically fixed, and therefore Complementary Preference does not make any predictions.

There is a conceptual problem with the notion of featural similarity assumed in Parallel Function. Gender is a grammatical feature of a noun phrase, while grammatical role is a structural property of the configuration it occurs in, and thematic role depends on the relationship the argument has with the verb that licenses it. The idea that they would form a homogenous set of features over which grammar can quantify in assessing whether an accent should be placed seems odd. But setting this conceptual issue aside, there is a more fundamental shortcoming that this theory shares with Complementary Preference, to which we turn now.

2.3 Why Contrast is Crucial

Parallel Function shares with Complementary Preference the assumption that the pronoun is the only relevant linguistic material in the sentence for deciding its accentuation status; for instance, the choice of predicate and any other arguments should not directly affect accentuation.¹ This is arguably a crucial flaw of both theories, since it leaves unaccounted the generalization that an accent on a pronoun

¹The choice of predicate matters indirectly by affecting since it determines the thematic role, but choices between different predicates that assign the same role should not matter.

appears to require a contrast to constituent containing the pronoun. In the following example accenting the pronoun sounds odd:

(5) John corrected Bill_i. # Then HIS_i mother called.

The referent of the unaccented possessive pronoun might be preferentially taken to be *John* (expected under a accessibility-based account), but accenting is not a felicitous way to shift the bias toward *Bill*. This is true irrespective of whether *mother* carries an accent as well. The most natural way to assure the correct reference is to use the proper name. Accenting *his* in (5) requires a contextually motivated contrast of the form { *John's mother, Bill's mother, ...* } if *mother* remains unaccented; if *mother* is accented, then it seems that a contrast in both possessive and noun is required: { *John's father, Bill's brother, ...* }. This intuition is unexpected if an accent just conveys unusual or non-parallel reference, and provides evidence in favour of a the view that accented pronouns require broader contrasts.

According to Complementary Preference, an accent should be able to signal that the referent is *Bill* as the less accessible of two potential referents. Similarly, Parallel Function predict an accent—in fact, independent of whether the referent is *John* or *Bill*—since both are not parallel either in thematic or grammatical role. The source of the problem is arguably that both accounts were designed to account a narrow set of cases, which arguably fail to generalize to other types of examples.

In the following, we will pursue the idea that once we explicate the notion of contrast that is relevant, we no longer need a pronoun-specific explanation for the accents that pronouns might carry. In particular, we will argue that the alternatives theory of focus (Rooth 1985 et seq) provides a better account of accented pronouns than either Complementary Preference or Parallel Function. The idea that the notion of contrast might be crucial for understanding accentuation on pronouns is not new, and has also been advocated in De Hoop (2004), Kehler (2005), Kothari (2007), Büring (2008), and German (2009). We will not be able to discuss similarities and differences between all of these approaches in this paper in detail, but we will return to Büring's discussion in concluding.

3 The Alternatives Theory of Focus

The alternatives theory of focus postulates that every constituent comes with two semantic representations: its regular meaning, and a set of alternatives of the same type. These alternatives are derived by substituting Focus-marked (F-marked) material in the constituent with alternatives. When a focus operator \sim attaches to a constituent, it introduces an anaphoric relation to a contextual salient antecedent. We will assume that \sim presupposes that there is a salient antecedent that is a member of the alternative set of the complement of \sim . We will call the complement of \sim its scope. \sim exerts an influence on prominence because of a requirement that F-marked material in the scope of \sim must be more prominent than non-F-marked material (Rooth 1992, Truckenbrodt 1995).

3.1 Contrast and Givenness

Focus theory provides an explanation for why contrastive constituents are accented, but also for why given constituents often remain unaccented. Consider (note that we will place \sim to the right of its complement, following Rooth 1992):

- (6) Sally corrected Bill?
- a. No, [JOHN_F corrected Bill] \sim . \rightarrow presupposes: There is a salient antecedent of the form *x corrected Bill*.
 - b. No, # JOHN corrected BILL.

The response in (6a) asserts that *John corrected Bill*, and in addition introduces a focus presupposition which requires there to be a contrasting antecedent of the shape *x corrected Bill*. Although givenness plays no independent role in focus theory, we can reconstruct a notion of givenness marking by saying that non-F marked material in the scope of \sim is construed as given, since it is required to be part of the focus antecedent. The constituent *corrected Bill* is not F-marked, but in the scope of \sim , which results in prosodic reduction.

Focus theory can explain why a prominence shift is possible in (6): the presupposition introduced by (6a) is satisfied. And it can also explain why a prominence shift is in fact obligatory, as is illustrated with (6b), since the focus operator contributes a presupposition: A general principle such as *Maximize Presupposition* (see Heim 1991 for the initial idea and Sauerland 2005 and Wagner 2005 for its application to givenness marking) or *Don't overlook anaphoric possibilities* (Williams 1997) can be invoked as the driving force behind making focus marking obligatory. Schwarzschild (1999) proposes a constraint *Avoid-F*, which given the assumptions about F-marking made in the paper has similar consequences in many cases (but arguably not all, cf. Wagner 2006).

The operator \sim is used to account both cases like (6a), where intuitively a contrast is involved, and cases like (7), where a constituent is marked as given and remains unaccented, and no contrast is felt. The latter cases can be explained by positing that a property taking the given constituent as an argument is marked as focused, as illustrated with the F-marking in (7a) (cf. Wagner 2006). *Maximize Presupposition* again explains why (7b) is not an option.

- (7) Do you know Bill?
- a. [[I JUST MET]_F Bill] \sim \rightarrow presupposes:
There is a salient antecedent of the form [p(Bill)], where p is a property
 - b. # I just met BILL

Consider now what happens if in addition to making *Bill* given, the context also mentions a contrasting name, as in (8). A speaker then seems to have the choice between two possible renditions: *Bill* can remain unaccented, reflecting that the referent is given as in (8a), or *Bill* can be accented, reflecting a contrast as in (8b):

- (8) A: Do you know Bill and Sue?
- a. B: I just [met BILL_{F】 \sim .}
 - b. B: [[I just MET]_F Bill] \sim .

The two presuppositions do not stand in an entailment relation to each other, and Maximize Presupposition does not favour one over the other, and the renditions reflect different choices by the speaker which contrast to mark.

To summarize: given constituents remain unaccented, except if there are contrasting alternatives, in which case they can be focused and hence accented. Since pronouns refer to given information and require an antecedent, the reason they tend to be unaccented might simply be that the conditions on their use also usually suffice to satisfy the focus structure that leads to their deaccentuation (cf. Wagner 2006 for a discussion of this view). And just like other given constituents, pronouns can be accented if there is an appropriate contrast. Their behaviour is then similar to that of full noun phrases like the proper names in (8). This, in a nutshell, is the account of pronoun accentuation we argue for in this paper.

For the cases involving accented subject pronoun, which concern us most in this paper, there is an important issue that arises in properly characterizing what it means for such a pronoun to be contrastive. Consider the following example:

(9) # John_i corrected Bill, then [HE_i_F corrected MARY_F]~.

Accenting the pronoun is infelicitous. It seems that the alternative substituted for *he* in the antecedent cannot have the same referent as the pronoun. This makes sense intuitively, since such an antecedent would not be contrastive. One reason why the infelicity might arise is that a stronger presupposition could have been encoded by ~ if the pronoun had remained non-F-marked, and hence Maximize Presupposition might rule out (9). We will return to related issues in concluding.

4 Two Production Experiments

The three theories about how pronouns come to be accented make similar predictions in cases like (1), but diverge in their predictions for other cases. Our experiments stick to the case of accented subject pronouns, but will look at instances in which gender assures that the pronoun in question is unambiguous, and vary other factors in an attempt to distinguish between the different theories.

4.1 Experiment 1: Active Sentences

Two production studies were conducted in which the basic task was to read a pair of sentences silently, and then say them aloud as naturally as possible. The target sentences always involved subject pronouns, preceded by a sentence that introduced the relevant referents and provided potential antecedents for focus marking. Table 4.1 provides a sample item from Experiment 1.

Both experiments were run using Psychtoolbox for MatLab. Each experiment contained eight different sets of linguistic materials (items), with all target sentences identical within an item. Each participant saw all items in all four conditions in a pseudorandom order, but never more than two adjacent utterances from the same item or the same condition.. The recordings of participants were subsequently perceptually annotated by the first author for prominence on the pronoun, and forced-aligned using the Prosodylab Aligner (Gorman *et al.* 2011) to measure quantitative acoustic factors such as duration of the pronoun.

The simplest version of the Complementary Preference Hypothesis predicts no accented pronoun in any condition, since the pronoun is unambiguous. The Parallel Function Theory predicts accented pronouns in conditions where some more of the “features” of the pronoun do not match those of its antecedent—in our experiment, the pronoun differed in either grammatical role or thematic role in every condition except the first, so every condition except the first would be predicted to have an accent (or at least be likely to have one). Presumably, the likelihood of an accent should correlate with the number of differing features in this account. Focus Theory predicts accents where a double contrast can be encoded, which should be possible when the pronoun has the opposite thematic role compared to the antecedent, at least if we assume the following F-marking:

(10) Then [he_F corrected Jill $_F$] \sim .

The antecedent clause *Robert was corrected by Linda* entails that *Linda corrected Robert*, which can therefore serve as antecedent for the focus marking in (10), just as the explicit antecedent *Linda corrected Robert* in the second condition.

A crucial case is the one in which the grammatical roles are different, and the thematic roles the same: *Linda was corrected by Robert. Then he/HE corrected Jill*, since this condition differentiates between Parallel Function and Focus Theory. Table 4.1 summarizes the predictions of the three theories, and gives the actual observed proportions of accented pronouns.

Gram. Role	Them. Role	Utterance	Comp. Pref.	Par.Func.	Focus	Actual
Same	Same	Robert corrected Linda. Then he corrected Jill.	No Accent	No Accent	No Accent	17%
Different	Different	Linda corrected Robert . Then he corrected Jill.	No Accent	Accent	Accent	67%
Same	Different	Robert was corrected by Linda. Then he corrected Jill.	No Accent	Accent	Accent	51%
Different	Same	Linda was corrected by Robert . Then he corrected Jill.	No Accent	Accent	No Accent	55%

Table 1: Experiment 1, sample item and results in percentage of pronouns accented

The pattern observed based on the perceptual annotation is confirmed by a quantitative measure of the duration of the pronoun, as summarized in Figure 1. The generalization emerging from the results is that pronouns are more likely to be accented than not when they differ in thematic role or grammatical role from their antecedent. The most interesting result is that they tend to be accented when they have a different grammatical role *even if they share the same thematic role*.

A logistic mixed effects regression model was fit for pronoun accentuation. The model included grammatical role, thematic role and their interaction as predictors, and random effects for items and participants that included slopes for both predictors. There were main effects of both grammatical role and thematic role ($p < 0.001$ for each), and also a significant interaction ($p < 0.02$). A linear regression model with pronoun duration as a dependent variable again showed an effect of grammatical role ($t = 8.2$), thematic role ($t = 6.0$), and their interaction ($t = -2.2$).²

²The models used the lmer and glmer function of the R package lme4 Bates & Maechler 2010.

The results are as predicted by Parallel Function, and incompatible with Complementary Preference, which predicts that unambiguous pronouns should not be accented at all. A broader interpretation of Complementary Preference could maybe ignore gender marking on pronouns, and simply go by the accessibility of the antecedents. However, in this case it will simply become a version Parallel Function, since what has to be assumed to matter most in order to account for the data in this case is that accessibility of referent correlates with the degree of parallelism in features between antecedent and pronoun.

The results also seem incompatible with Focus Theory. In the final condition, where thematic role is held constant and grammatical role changes, focus should not license the focus marking of the subject in (10): *Linda was corrected by Robert. Then he corrected Jill.* The reason is that the antecedent would also license the stronger presupposition that ensues when only placing an accent on *Jill* (cf. the discussion of 9 above). Suppose, however, that we restrict the substitution of focus alternatives in precluding identical alternatives. Then the example in question would require an antecedent of the form *x (not Robert) corrected y (not Linda)*. This presupposition, is not satisfied in the given context, but presupposition of the following focus structure is:

However, let's consider a different F-marking:

(11) [he_F [corrected Jill]_F]_F~

The presupposition of ~ is now: There is a salient alternative of the form *x y-ed*, where *x* ≠ *Robert* and *y* ≠ *corrected Jill*. This can be fulfilled by: *x = Linda* and *y = was corrected by Robert*. So *he* can be accented if there is a salient alternative in which some other subject non-identical to the referent of *he* did something. This captures the intuition the accent on the pronoun in this case encodes a switch in the referent of the subject, but does not encode a contrast beyond that. Such accents are often attributed to a 'topic switch' (De Hoop 2004). The F-marking in (11) captures this intuition just using ~ without the need of an independent notion of topic.

To summarize, the results of Experiment 1 are as predicted by Parallel Function, and incompatible with Complementary Preference. They are compatible with Focus Theory once we take different focus markings into account and make additional assumptions about what counts as a contrast.

4.2 Experiment 2: Passive Sentences

Experiment 2 is identical to Experiment 1, except that the target sentences are all in passive voice. This changes the syntactic structure in ways that interact with the focus marking assumed in Focus Theory, but doesn't change the predictions of Parallel Function. Table 4.2 includes a sample item, a summary of the predictions, and the percentages of accentuation registered in the perceptual annotation.

A different pattern from Experiment 1 emerges in Experiment 2. The condition in which the antecedent co-referent expression matches the pronoun in thematic role, but differs in grammatical role results in a much lower rate of accentuation. The duration measures of both experiments are compared in Figure 1, along with

Including the interaction of the predictors in the random effects did not lead to a converging model.

Gram. Role	Them. Role	Utterance	Par.Func.	Focus	Actual
Same	Same	Robert was corrected by Linda. Then he was corrected by Jill.	No Accent	No Accent	16%
Different	Different	Linda was corrected by Robert . Then he was corrected by Jill.	Accent	Accent	57%
Same	Different	Robert corrected Linda. Then he was corrected by Jill.	Accent	Accent	54%
Different	Same	Linda corrected Robert . Then he was corrected by Jill.	Accent	No Accent	34%

Table 2: Sample Item and Results of Experiment 2

the proportions of the perceptual annotation. Quantitative measures confirm that the results are not due to annotator bias, and the linear regression models led to results that were qualitatively identical to the results of the logistic regression on the annotations. Again, logistic and linear regression models were fit for accentuation rate and pronoun duration respectively and again, there were significant main effects. The interaction between grammatical role and thematic role was significant in the logistic regression ($p < 0.01$), but not in the linear regression ($t = -1.1$).

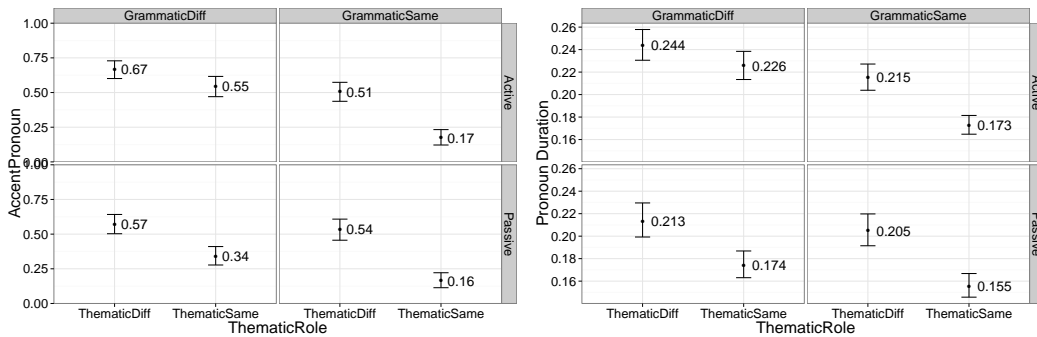


Figure 1: Accentuation rate and duration of pronoun of both experiments.

Crucially, there was a significant interaction such that the effect of grammatical role differed between the two experiments, both in the logistic ($p < 0.03$) and the linear regression model ($t = 2.9$).³ This difference between the experiments is unexpected for Parallel Function. Why would they differ in this way?

4.3 An Account in Terms of the Information Structure of the Context

One possible source of a difference between the two experiments is that the subject of a passive sentence is arguably necessarily understood as a topic, while the subject of an active sentence is not. Evidence for this comes from the fact that passive voice is dispreferred when the agent is topical in the context:

³The three-way interaction between thematic role, grammatical role, and target sentence syntax did not become significant, however.

- (12) What about John?
- a. He corrected Sue.
 - b. Sue corrected him.
 - c. He was corrected by Sue.
 - d. ?# Sue was corrected by him.

If the subject of a passive is obligatorily topical, then in the critical condition in experiment 1, the very constituent that in the context is marked as being topical is no longer present in the response that follows. So the response necessarily requires a change in topic, and maybe the subject of the response sentence tends to be accented to mark this topic switch. That a topic switch might play a role in pronoun accentuation is also assumed in De Hoop (2004) and Beaver & Clark (2002). Such an account in terms of topicality was in fact the hypothesis we put forward in our original abstract to CLS. However, there is a second possibility how to account for the difference between the two experiments.

4.4 An Account in Terms of the Syntax of the Response

An alternative explanation for the differences between the experiments could be in the syntax of the response, rather than the information structure of the context. Let's assume the following syntactic bracketing for passive sentences:

- (13) [[He was corrected] by Jill]

F-marking the subject and the complement of the by-phrase leads to a focus presupposition that is not fulfilled, and hence accenting the pronoun is not expected:

- (14) Linda corrected Robert.
 [[he_F was corrected] by Jill<sub>F}]~
 Presupposition of ~:</sub>

There is an antecedent of the form [x was corrected by y], $x \neq \text{Robert}$, $y \neq \text{Jill}$

F-marking the VP does not help in this case, since the alternative F-markings leave the subject pronoun non-F-marked, and hence unaccented (irrespective whether a VP node including or excluding the pronoun is F-marked):

- (15) [[he was corrected]_F by Jill_{F}]~}

Only after re-bracketing (via movement of the subject) can a structure be derived where a double contrast is marked that licenses an accent on the pronoun:

- (16) [he_F [was corrected by Jill]_{F}]~}

This structural difference between actives and passive, and the necessity of an extra movement step in the latter case, could then be the reason for the lower accentuation rate. Of course, the obvious question is whether (13) is a plausible analysis of the syntactic structure of passives. For space reasons, we cannot explore this question in detail, but we think that it is not implausible. Collins (2005), e.g. argued that the by-phrase in passive sentences actually originates in a high position, and then the other material is moved around; this bracketing is also not unexpected under the syntactic assumptions in Pesetsky (1995) and Phillips (1996), where there is at least some level of representation at which this bracketing should be available.

4.5 Discussion

The results of our experiment are inconsistent with Complementary Preference and Parallel Function since these accounts do not predict the difference in pattern between Experiment 1 and Experiment 2, and more generally no interaction between syntax and accentuation when featural differences are held constant. The results can be accounted for by Focus Theory once we place additional restrictions on what counts as a proper alternative, but requires certain assumptions about the syntax of passives, or additional assumptions about topicality in passives.⁴ Experimental evidence against accessibility-based accounts and in favour of explaining pronoun accents with a more general theory of accent placement was already presented in German (2009), but space limits us from discussing similarities and differences of our argument to this work. We now turn to issues in the interpretation of focus and the nature of contrast that shed some light on the restriction against identical substitutions in focus alternatives that we observed above.

5 Focus Antecedents and Entailment

Consider again the following two examples:

- (17) a. # John_i corrected Bill, then [HE_{iF} corrected MARY_F]~.
b. John_i corrected Bill, then [he corrected MARY_F]~.

As already discussed, the infelicity of (17a) might be due to the felicity of (17b): the focus presupposition in (17b) asymmetrically entails the one in (17a), and Maximize Presupposition can account for the latter's infelicity. However, other cases show that additional restrictions on alternatives are needed (cf. Wagner 2006; Wagner 2012b):

- (18) Last time, John won a prize. Guess what happened this time:
a. # [JOHN_F won a prize]~.
b. JOHN won a PRIZE.

In this context, no constituent can be marked as focused, and instead the default accentuation pattern emerges (cf. Schwarzschild 1999). This is surprising under the assumptions made here, since Maximize Presupposition should favor (18a), over no focus marking with default prominence as in (18b). It seems that identical substitutions do not lead to valid alternatives. The problem is in fact more general:⁵

- (19) They say the class is a guaranteed A. But last time, a physics student actually failed it.
a. # I wasn't surprised that this time again, [A STUDENT_F failed it]~.
b. I wasn't surprised that this time again, [a student FAILED it].

⁴At this point, we lean toward the account in terms of the syntax of the response based on results of follow-up experiments directly manipulating topicality. We do not report on the results for reasons of space, so the issue remains an open question.

⁵The felicitous example might either involve a focus on the VP, or maybe no focus operator at all, but crucially marking focus not on the subject is infelicitous.

We could try to impose a constraint on the substitutions of F-marked constituents, namely that they can neither be identical nor entail the constituent (see Schwarzschild 1999 for a cross-categorical notion of entailment). But restricting the set of possible substitutions locally is not the right solution. Consider:

- (20) a. Yesterday, A PHYSICS STUDENT failed the FINAL EXAM.
 a. ?# This time again, [A STUDENT failed it]~.
 b. This time again, a student FAILED it.
 b. Bill first denied that a A PHYSICS STUDENT failed the EXAM. Today he denied that [A STUDENT failed it]~.

Marking subject focus in (20a) seems odd, since the subject *a student* doesn't contrast with *a physics student*—after all, a physics student is also a student. This oddness is not felt in (20b). The contrast is arguably due to a difference in the entailment relations: A physics student failing the exam entails that a student failed it. But Bill denying that a physics student failed the exam doesn't entail denying that a student failed it. The embedding environment removes the entailment from the antecedent to the present proposition, and consequently the prosodic contrast becomes felicitous. An effect of the embedding environment is expected if the entailment condition is stated as a condition that ~ introduces, rather than formulating an anti-entailment condition on the substitutions of F-marked constituents. ~ would then prohibit the focus antecedent to entail the constituent ~ takes as its complement.

Wagner (2005) already argued that what counts as an alternative cannot be decided based on the F-marked constituent alone, but minimally the sister has to be considered. When focusing an adjective like *new*, the head noun matters whether *used* counts as an alternative: It would if it is *bicycle*, it would not if it is *boyfriend* (which incidentally suggests that non-entailment is actually not yet a sufficient restriction on alternatives). Katzir (2013) shows evidence that even more remote material matters for deciding what counts as a valid alternative. These observations suggest that the condition must be stated at the level of ~, or whichever operator is responsible for the focus presupposition rather than on the constituent that is being substituted. While in this condition ~ is successful in explaining some restrictions on focus substitutions in cases involving a single focus, cases of multiple focus (like the ones we are mostly concerned here) pose additional problems.

6 One or Two Operators?

Büring (2008) discusses cases of multiple foci related to our examples, based on data originally observed in Kehler (2005):

- (21) John cited Mary...
 a. ? ... but he *dissed* SUE.
 b. ... but he *DISSED* SUE.

It seems that a double contrast with a strong accent on both *dissed* and *Sue* is obligatory. Büring (2008) proposes that such examples involve two separate ~ operators, one of which operates over alternatives of the form *he x-ed Sue*, and the

other over alternatives of the form *he dissed x*. In order to have access to two separate alternative sets, foci in this account are indexed, and \sim can pick out particular foci to associate with. However, since neither an antecedent of the form *John x-ed Sue* nor one of the form *John dissed x* are salient in the discourse (as would be required based on our assumptions about the semantics of \sim), the precise presupposition of \sim has to be different. and Büring proposes that its presupposition can be paraphrased as follows:

- (22) a. Presupposition of \sim_1 : Whether he dissed Sue or Mary is an issue.
 b. Presupposition of \sim_2 : Whether he cited Sue or dissed Sue is an issue.

We could consider a similar analysis for our example in (17a):

- (23) John corrected Bill_i. Then [HE_{F1,i} corrected MARY_{F2}] $\sim_2 \sim_1$
 a. $\sim_1 \rightarrow$ Whether someone corrected Mary is an issue.
 b. $\sim_2 \rightarrow$ Whether Bill corrected someone is an issue.
 [arguably not fulfilled in (17a)]

This account faces a problem: The analysis presupposes the context *John corrected Bill* must be sufficient to license the presupposition of \sim_1 in (23), despite the fact that there is no antecedent that actually contains *Mary*. But if this is so, then a prominence shift to *Bill* exclusively is wrongly predicted to be felicitous in the following dialogues:

- (24) a. John corrected Bill. # Then [BILL_F corrected Mary] \sim
 b. John corrected someone. # Then [BILL_F corrected Mary] \sim
 Presupposition: $\sim \rightarrow$ whether someone corrected Mary is an issue.

The presupposition of \sim should be satisfied here if it is satisfied in (23). In the case of (24a), one could argue that marking the additional contrast with \sim_2 as in (23) is obligatory since it adds an additional presupposition. But when the antecedent involves *someone* as in (24b), this explanation will not work, since the contrast should be licensed. The prominence shift should then be felicitous. The intuition is that (24) is infelicitous because there is no antecedent of the shape *x corrected Mary*—but then the same should be true in (23), and, by the same reasoning, in (21). So there is evidently a problem, and yet Büring’s account has the attractive feature that positing two operators would enable us to state conditions on the valid alternatives for each individual focus—which seems necessary to explain why the example in (21) contrasts with the following one, another example discussed in Büring (2008) and Kehler (2005):

- (25) Fred read the menu...
 a. ... and then he ordered a HAMBURGER.
 b. # ... and then he ORDERED A HAMBURGER.

Suppose only a single focus operator is involved in binding both the focus on *ordered* and *hamburger*. In that case, based on our analysis the double contrast should be fine: After all, *Fred read the menu* doesn’t entail *he ordered a hamburger*.

The intuition we need to capture is that *read* is not an alternative to *ordered*, and *menu* isn't really an alternative to *hamburger*. It seems that what double focus adds to (25) and (21) can be made explicit as follows:

- (26) a. ... and then he dissed (rather than cited) Sue (rather than Mary).
 b. # ... and then he ordered (rather than read) a hamburger (rather than a menu).

To capture the intuition that there are two separate contrasts, we need to have access to the individual foci. Büring's idea that two operators are involved, each binding one of the foci, seems like the right idea. Suppose then that there are indeed two operators but that *Sue* moves rightward, yielding the following structure (we have to assume with Schwarzschild (1999) that unbound variables and open arguments in the scope of \sim are existentially closed):

- (27) He cited Anna. And then [[[he dissed_{F1} x] \sim ₁ . λx] Sue_{F2}] \sim ₂
 a. \sim ₁: There is a salient alternative of the form *He x-ed someone*.
 b. \sim ₂: There is a salient alternative of the form *He dissed x*.

The first alternative is satisfied, since *he cited Anna* entails that *he cited someone*, which is a contextually appropriate alternative to *he dissed someone*. The second presupposition, on the other hand, does not seem satisfied, since there is no antecedent of the form *he dissed x*. Maybe we have to permit that the ordinary value of the complement of the first focus can serve as the antecedent of the focus semantic value of the second. The overall meaning would then be similar to the following paraphrase. It also involves two focus operators, but on separate clauses, and the first licences the focus marking not the second:

- (28) He cited Anna. And then [he dissed_{F1} someone] \sim ₁, namely [he dissed Sue_{F2}] \sim ₂.

While this analysis raises various questions that we cannot address here in detail, it offers an intuitive account of what's going on in examples involving double focus. A nice feature of this analysis is that it can capture the intuition noted in Büring (2008) that the accent after *dissed* is stronger than the optional accent that can be placed on *ordered* in (25). If (21) actually involves rightward movement, then the additional prominence might have its source in prosodic phrasing: In a sequence of three accented constituents, when we change the bracketing from right-branching to left-branching, the middle constituent appears to be much more prominent. Compare the level of prominence on *Sue* in: *John or (Sue and Jane)* with its prominence in *(John or Sue) and Jane*. When followed by a stronger boundary, an accented constituent sounds more prominent. In other words, this analysis can capture intuitions about different prominence levels between accented constituents without having to postulate different accent types.

The analysis also offers a new perspective on what are usually called topic accents. Suppose that a sentence with a contrastive topic actually involves two nested focus operators, and furthermore, rightward movement of the VP (leading once again to a strong boundary preceding the rightward moved constituent, i.e., following the 'contrastive topic'):

- (29) John ate the spinach. What about Fred?
 [[[Fred_{F1} x] ~ ₁] λx] [ate the beans_{F2}.] ~ ₂]
- a. Presupposition of ~ ₁: There is salient alternative of the form *x (rather than Fred) did something*
 - b. Presupposition of ~ ₂: There is a salient alternative of the form *Someone ate the x (rather than the beans)*

This type of analysis would have the desirable consequence that focus and topic accents could be analyzed as associates two nested instances of the same operator.⁶

References

- Akmajian, Adrian, & Ray Jackendoff. 1970. Coreferentiality and stress. *Linguistic inquiry* 1.124–126.
- Ariel, Mira. 1990. *Accessing noun-phrase antecedents*. London: Routledge.
- Arnold, Jennifer E. *Reference form and discourse patterns*. Stanford University dissertation.
- Bates, Douglas M., & Martin Maechler, 2010. lme4: Linear mixed-effects models using S4 classes. R package version 0.999375-33.
- Beaver, David I. 2004. The optimization of discourse anaphora. *Linguistics and Philosophy* 27.3–56.
- Beaver, David I., & Brady Z. Clark. 2002. Monotonicity and focus sensitivity. In *Proceedings of SALT XII*, ed. by Brendan Jackson, 40–58. Ithaca: CLC Publications.
- Büring, Daniel. 2008. What’s new (and what’s given) in the theory of focus? In *Proceedings of BLS 34*, 403–424.
- Cahn, Janet. 1995. The effect of pitch accenting on pronoun referent resolution. In *Proceedings of the 33rd annual meeting on Association for Computational Linguistics*, 290–292. Association for Computational Linguistics.
- Collins, Chris. 2005. A smuggling approach to the passive in English. *Syntax* 8.81–120.
- De Hoop, Helen. 2004. On the interpretation of stressed pronouns. In *Optimality theory and pragmatics*, ed. by Rainer Blutner & Henk Zeevat, volume 25–41. New York: Palgrave Macmillan.
- German, James Sneed. *Prosodic Strategies for Negotiating Reference in Discourse*. Northwestern University dissertation.
- Gorman, Kyle, Jonathan Howell, & Michael Wagner. 2011. Prosodylab-aligner: A tool for forced alignment of laboratory speech. *Proceedings of Acoustics Week in Canada. Canadian Acoustics* 39.192–193.
- Grosz, Barbara Jean. 1977. The representation and use of focus in dialogue understanding. In *IJCAI*, volume 67.
- Grosz, B.J., S. Weinstein, & A.K. Joshi. 1995. Centering: A framework for modeling the local coherence of discourse. *Computational linguistics* 21.203–225.
- Gundel, J.K., N. Hedberg, & R. Zacharski. 1993. Cognitive status and the form of referring expressions in discourse. *Language* 274–307.

⁶See Wagner (2012a) for a related recursive analysis of contrastive topics.

- Heim, Irene. 1991. Artikel und Definitheit. In *Semantics: An International Handbook of Contemporary Research*, ed. by Arnim von Stechow & Dieter Wunderlich, 487–535. Berlin: de Gruyter.
- Kameyama, Megumi. 1999. Stressed and unstressed pronouns: Complementary preferences. In *Focus: Linguistic, cognitive, and computational perspectives*, ed. by Peter Bosch & Rob van der Sandt, 206–321. Cambridge University Press.
- Katzir, Roni. 2013. A note on contrast. *Natural Language Semantics* .
- Kehler, A. 2005. Coherence-driven constraints on the placement of accent. In *Proceedings of the 15th Conference on Semantics and Linguistic Theory*, 98–115, Ithaca, NY. CLC Publications.
- Kothari, Anubha. 2007. Accented pronouns and unusual antecedents: A corpus study. In *Proceedings of the 8th SIGdial Workshop on Discourse and Dialogue*, 150–157.
- Nakatani, Christine Hisayo. *The computational processing of intonational prominence: A functional prosody perspective*. Harvard University dissertation.
- Nooteboom, Sieb. G. & Jacques M.B. Terken. 1982. What makes speakers omit pitch accents? An experiment. *Phonetica* 39.317–336.
- Pesetsky, David. 1995. *Zero Syntax. Experiencers and Cascades*, chapter 2: Linking Problems with Experiencer Predicates and 3: U(T)AH and the Zero Morpheme CAUS, 11–63. Cambridge, Ma: MIT Press.
- Phillips, Colin. *Order and Structure*. MIT dissertation.
- Rooth, Mats. *Association with Focus*. University of Massachusetts, Amherst dissertation.
- . 1992. A theory of focus interpretation. *Natural Language Semantics* 1.75–116.
- Sauerland, Uli, 2005. Recursion in semantics? the case of binding. Lecture Notes, Interfaces + Recursion = Language. The view from Syntax and Semantics. Symposium at ZAS, Berlin.
- Schwarzschild, Roger. 1999. Givenness, AVOIDF and other constraints on the placement of accent. *Natural Language Semantics* 7.141–177.
- Smyth, Ron. 1994. Grammatical determinants of ambiguous pronoun resolution. *Journal of Psycholinguistic Research* 23.197–229.
- Terken, J., & J. Hirschberg. 1994. Deaccentuation of words representing 'given' information: Effects of persistence of grammatical function and surface position. *Language and Speech* 37.125.
- Truckenbrodt, Hubert. *Phonological phrases: Their relation to syntax, focus, and prominence*. Cambridge, Mass.: MIT dissertation.
- Wagner, Michael. *Prosody and Recursion*. MIT dissertation.
- . 2006. Givenness and locality. In *Proceedings of SALT XVI*, ed. by Masayuki Gibson & Jonathan Howell, 295–312, Ithaca, NY. CLC Publications.
- . 2012a. Contrastive topics decomposed. *Semantics & Pragmatics* 5.1–54.
- . 2012b. Focus and givenness: A unified approach. In *Contrasts and Positions in Information Structure*, ed. by Ad Neeleman & Ivona Kučerová, 102–147. Cambridge University Press.
- Williams, Edwin. 1997. Blocking and anaphora. *Linguistic Inquiry* 28.577–628.