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Nuclear Accent, Focus, and Bidirectional OT

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Abstract

We propose an account within Bidirectional Optimality Theory (BiOT) of the relationship between sentence accent and focus. Three violable constraints ranked according to their relative strength explain the placement of accent within a focus: a syntactic constraint which gives the default case; and two stronger pragmatic constraints which get us to shift to alternatives. It is shown how the analysis captures the standard cases of accent placement, while also extending to interesting cases of stress shift.

11.1 Introduction

This paper gives an analysis in the framework of Bidirectional Optimality Theory (BiOT) of the relationship between nuclear accent and focus. Nuclear accent is a pitch accent that occurs near the end of an intonational phrase. Prosodically, it is the most prominent syllable in the phrase (for a more technical definition see e.g., Pierrehumbert 1980). In what follows, we indicate the nuclear accent with capitals. Intuitively it is the word or syllable that carries the most stress in an utterance. We will make the simplifying assumption that an utterance comes with a single nuclear stress. We follow the tradition of using the

notion of focus to explain the correlation that holds between nuclear accent and discourse context. Nuclear accent normally signals focus (Rochemont 1986; Lambrecht 1994; Rooth 1992), where the focus can basically be taken to correspond to the constituent that fills the location of a WH-phrase in a WH-question answer. In the following example and henceforth we indicate the focus with brackets $[.]_F$:

(1)   Q: Who's building a desk?
        A: [My NEIGHBOUR]$_F$ is building a desk.
        A':#My neighbour is building [a DESK]$_F$.

The response of A' in (1) is infelicitous because the placement of the nuclear accent indicates that the focus is not on the constituent corresponding to the WH-phrase of the question. The result is a mismatch between discourse structure and the phonological coding. In what follows we will simply assume a theory of focus (e.g., Aloni and van Rooij 2002 among others) and so bypass the problem of which focal structure is felicitous in which context.[1] Instead, we concentrate solely on the placement of nuclear accent within a focus.

The paper is structured as follows. The next section introduces and motivates three Optimality Theoretic (OT) constraints that form the basis of our analysis. Section 11.3 introduces Bidirectional Optimality Theory. Section 11.3.1 looks at a number of illustrations of bidirectional optimisation procedures involving the choice of nuclear accent/focus pairs for a given context. Section 11.4 looks at several examples that suggest future extensions of the theory. Section 11.5 is the conclusion.

11.2   Constraints

Optimality Theory (OT) makes use of a limited number of soft constraints (violable principles) ranked according to their relative strength (see Prince and Smolensky 1997). Ranked constraints are used to select a set of optimal candidates from a larger set of candidates. A given candidate can be optimal even if it violates a constraint provided all alternative candidates lead to more severe constraint violations. A single violation of a higher ranked constraint overrides in severity multiple violations of a lower ranked constraint. Bidirectional Optimality Theory (BiOT) evaluates sets of candidates that are potential form-meaning pairs (Blutner, 2000). In our analysis candidates will be ⟨(placement of) nuclear accent, (placement of) focus⟩ pairs. In this section, we (i)

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[1] We would eventually like to provide an account of this in terms of BiOT (cf., Schwarzschild 1999, Blutner 2000).

describe the three constraints that will generate the rankings of the ⟨nuclear accent, focus⟩ pairs, and (ii) provide motivation for their ordering with respect to one another.

11.2.1 A structural constraint

As a structural constraint on the placement of accent within focus we assume a version of the Nuclear Stress Rule (Chomsky and Halle 1968, Cinque 1993, Reinhart 1997, among others):

- **Nuclear Stress Rule (NSR):** Put accent on the most embedded constituent

For example, in a canonical [Subj V Obj] sentence, the Obj is the most embedded constituent, as (2) illustrates.

(2)   IP

    Subj   VP

    John   V   Obj

            loves   Mary

It follows from the NSR that the nuclear accent in an utterance of (2) should fall on the Obj *Mary*, as (3) demonstrates.

(3)   Hey, guess what?
        a.   John loves MARY.
        b. #JOHN loves Mary.
        c. #John LOVES Mary.

NSR Violations

A number of counter examples to Chomsky and Halle's (1968) formulation of the NSR were soon found, which lead some (e.g., Bolinger 1972) to reject the idea of a syntactic account of accent. In examples (4)–(6), the felicitous versions violate the NSR, with the nuclear accent falling on constituents that are not the most embedded.

(4)   a. #He was arrested because he killed a PERSON.
        b.   He was arrested because he KILLED a person.

(5)   a. #The telephone is RINGING.
        b.   The TELEPHONE is ringing.

(6)   a. #John$_i$'s cat licked HIM$_i$.
        b.   John$_i$'s cat LICKED him$_i$.

But unlike Bolinger, we do not have to abandon structural constraints like the NSR to account for examples like (4)–(6). We are using a default framework where contrasts between different constraints are resolved by ranking one constraint over another. To account for these violations of the NSR, rather than eliminate the constraint altogether, we need to provide motivation for higher ranked (semantic/pragmatic) constraints. To this effect, we turn next to the introduction of a Destress constraint.

11.2.2 Destress

The examples (4)–(6) have in common that the constituent that should receive the nuclear accent in accordance with the NSR is already implicitly or explicitly present in the context. In this section we introduce a constraint that prevents such "uninformative" constituents from receiving the nuclear accent.

In example (7), we see that the notion of "semantic weight" plays a role in accent placement (cf., Bolinger 1972, 1986). Certain content words such as *man, thing, person, place*, etc., are perceived of as being inherently empty or uninformative and therefore the accent moves to a more contentful word. The contrast between the "empty" *person* and the contentful *policeman* illustrates this.

(7) a. He was arrested because he KILLED a person.
     b. He was arrested because he killed a POLICEMAN.

In example (8), *ringing* is left unaccented, being predictable from the mention of *telephone*. In contrast, that a telephone should be green is not predictable.

(8) a. The TELEPHONE is ringing.
     b. The telephone is GREEN.

In example (9a) the pronoun is destressed since it is coreferential with *John*, an activated discourse entity. In contrast, the pronoun of (9b) can receive the nuclear accent as predicted by the NSR, picking up on a non-activated referent.

(9) a. John_i's cat LICKED him_i.
     b. John_i's cat licked HIM_j.

The above discussion motivates the following constraint:

• **Destress:** destress activated, predictable, semantically empty words, etc. (Bolinger, Ladd, Reinhart, among others).

A case can be made for replacing Destress with a family of con-

straints with an internal hierarchy which may vary cross-linguistically, but we will ignore this complication in what follows.

To sum up, by making Destress a stronger constraint than the NSR, the contrasts of (7)–(9) are explained.

11.2.3 Focus set rule

The final constraint that we will introduce is the Focus Set Rule (FSR). In Reinhart (1997), the notion of a focus set is introduced thus:

- **Focus set:** the focus set of a sentence S comprises all and only subtrees (constituents) which contain the nuclear accent of S

For example, the following (a) sentences have the focus sets of (b):

(10) a. [$_{IP}$ [$_{Subj}$ My neighbour] [$_{VP}$ is [$_V$ building] [$_{Obj}$ a DESK]]]
      b. *Focus set*: {IP, VP, Obj}

(11) a. [$_{IP}$ [$_{Subj}$ My neighbour] [$_{VP}$ is [$_V$ BUILDING] [$_{Obj}$ a desk]]]
      b. *Focus set*: {IP, VP, V}

(12) a. [$_{IP}$ [$_{Subj}$ My NEIGHBOUR] [$_{VP}$ is [$_V$ building] [$_{Obj}$ a desk]]]
      b. *Focus set*: {IP, Subj}

Having the notion of a focus set gives rise to the following constraint:

- **Focus set rule (FSR)**: the focus of a sentence must be in the focus set of the sentence.

An application of the FSR

As an application of the FSR, consider the following example from Lambrecht and Michaelis (1998):

(13) Q: Why do you rob BANKS?
      A: Because that's where the money is.
      B: Because I didn't want to work in McRonald's.
      C: #Because John couldn't be bothered.

Here are two focus possibilities generated by the focus set of (13)'s question:

(14) a. Why do you rob [BANKS]$_F$?
      b. Why do you [rob BANKS]$_F$?

With the focus as in (14a), the question (13) asks might be elaborated thus: "Why does the suspect rob banks ... as opposed to say libraries or churches?", with a felicitous answer being something like (13A). With the focus as in (14b), the more pragmatically likely question asked is:

"What makes you do this criminal activity?", with a felicitous answer being something like (13B). Consider the possibility of having the focus on the Subject. Under such a reading the question would have to mean "Why do you rather than somebody else rob banks?" This focal structure is however unavailable for (13Q), since this would require the nuclear accent to fall on *you*. This provides an account for why (13C) is infelicitous.

11.2.4   The ranking

We have already provided motivation for having the NSR as the weakest constraint. Examples (15) and (16) provide motivation for the FSR being the strongest constraint.

(15)   Q: Did Mary feed John$_i$'s cat yesterday?
        A: No, [HE$_i$]$_F$ fed Snuggles.
        A′: #No, [he$_i$]$_F$ fed SNUGGLES.

(16)   Q: Did John kill Mary?
        A: No, but [SOMEONE]$_F$ certainly killed her.
        A′: #No, but [someone]$_F$ certainly killed HER.

In (15), every word is a potential candidate for destress (assuming the hearer knows the name of the cat). The felicitous answer also violates the NSR, but obeys the focus set rule, while in the latter, infelicitous answer, the opposite is the case. The felicity of the answer to (16) follows in a similar manner. In both cases, violations of the NSR and Destress are trumped by obedience to the FSR. We will therefore assume the ranking of (17):

(17)   FSR > Destress > NSR

From the relative ranking of the FSR, the assumption that there is only one nuclear accent in an utterance, and the assumption that each utterance comes with a focus, we predict the following generalisation: every nuclear accent occurs within a focus and every focus contains one nuclear accent (cf., Selkirk 1984). According to Ballantyne (2002) in an analysis of natural speech, this generalisation held for roughly 85 percent of cases. This strong correlation between focus and nuclear accent is reflected in our high ranking of the FSR. Violations of this generalisation can be accounted for by assuming additional overriding factors.

11.2.5 Some OT examples

We now illustrate the workings of the constraints on a number of examples.

A tie-breaker

We first discuss an example where a violation of a lower ranked constraint becomes a tie-breaker in a case where several candidates violate the same highly ranked constraint. In (18), an example from Cruttenden and Faber (1991), accenting either *people* or *there* violates Destress. As a consequence, the optimal pair is determined by the lower ranked NSR, as Table 1 illustrates.[2]

(18)   I love both London and the people THERE.

Table 1:

		FSR	Destress	NSR
☞	[the people THERE]$_F$		*	
	[the PEOPLE there]$_F$		*	!*

In contrast, the use of a "heavy" noun, such as *penguins* in (19) (also from Cruttenden and Faber 1991) makes Destress the deciding constraint, as Table 2 illustrates.

(19)   I love both Antarctica and the PENGUINS there.

Table 2:

		FSR	Destress	NSR
	[the penguins THERE]$_F$		!*	
☞	[the PENGUINS there]$_F$			*

Multiple violations

Assuming that in the coordinate structure *John and Mary*, *Mary* is the most embedded constituent, (20) gives an example in which a constraint (the NSR) being violated more than once is crucial in ruling out a candidate, as illustrated in Table 3.

(20)   Q: Who called?
        A: John and MARY called.

Table 3:

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[2] "☞" indicates an optimal candidate, (*) indicates a constraint violation, and (!) indicates a deciding violation.

		FSR	Destress	NSR
☞	[John and MARY]$_F$ called			*
	[JOHN and Mary]$_F$ called			!**
	[John and Mary]$_F$ CALLED	!*		

Interpretational interference

With the above examples, placement of nuclear accent is evaluated with respect to candidates with the same focus. Essentially, this is a production oriented point of view, where a speaker must decide a suitable prosodic form for a given focus structure.

But there is also an interpretational perspective, where a hearer must, once given the prosodic form by the speaker, figure out the intended focus in a given context. As seen with (14) and Table 4 below, different placements of focus can have a drastic effect on the meaning of an utterance. With the nuclear accent on BANKS, our constraints predict that focus on *you* is impossible, but still leaves the ambiguity of focus that gives rise to the joke.

Table 4:

		FSR	Destress	NSR
☞	Why do you rob [BANKS]$_F$			
☞	Why do you [rob BANKS]$_F$			
	Why do [you]$_F$ rob BANKS	!*		

However, the constraints alone are not enough to always allow the hearer to interpret the focus assignment correctly. Consider (21).

(21)   Bill only PUFFED a joint (he didn't inhale).

For (21), there is an unambiguous narrow focus on the V. However, the constraints alone predict an ambiguity between V and VP focus, as Table 5 shows.

Table 5:

		FSR	Destress	NSR
☞	Bill only [PUFFED]$_F$ a joint			*
☞	Bill only [PUFFED a joint]$_F$			*

Intuitively, broad focus for (21) is ruled out by the existence of a better prosodic form to express that particular focus interpretation, namely (22).

(22)   Bill only puffed a JOINT.

From Table 6, it can be seen that the form of (22) expresses the VP focus interpretation with less severe constraint violations.

Table 6:

		FSR	Destress	NSR
☞	Bill only [puffed a JOINT]$_F$			
	Bill only [PUFFED a joint]$_F$			*!

Imagine the hearer's perspective. If she hears nuclear accent on PUFFED, the constraints give her two possible focus interpretations, as Table 5 shows. But she also must take into account that the speaker could have utilised an alternative form to express the broader focus that would have incurred less severe constraint violations (i.e. JOINT). That the speaker *chose* not to, provides a cue for the interpreter to seek her focus elsewhere.

In the next section we introduce the notion of BiOT, which is a formal way of evaluating the above optimisation procedures at once. Essentially, what this does is incorporate both the speaker and hearer perspectives in tandem.

11.3 Bi-directional optimality

In this section we analyse the relationship between accent and focus in the framework of Bi-directional Optimality Theory (Blutner, 2000).

Optimal solutions are searched along two dimensions: (i) the dimension of the speaker who compares different prosodic forms for one and the same focal structure to be communicated; and (ii) the dimension of the hearer who compares different focus interpretations for a given prosodic form. Different form-meaning pairs are ordered with respect to the ranked constraints introduced in the previous section. Candidate C_1 is at least as good as C_2, ($C_1 \leq C_2$) iff C_1's constraint violations are no more severe than C_2's. A candidate (accent, focus) is *optimal* iff there are no other better pairs (accent1, focus) or (accent, focus1), i.e.,

(i) For all (accent1, focus): (accent, focus) $\leq$ (accent1, focus)

(ii) For all (accent, focus1): (accent, focus) $\leq$ (accent, focus1)

See the notion of *strong optimality* in Blutner (2000) and Jäger (2002).

11.3.1 Illustrations

In this section we look at a number of illustrations of optimisation procedures involving the choice of nuclear accent/focus pairs for a given context. We begin with a basic example to illustrate how the NSR and

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FSR constraints interact, and then we consider a more complex example where Destress plays a decisive role.

The basic case

In the example of this section, we will consider the problem of the possible placement of nuclear accent/focus on a family of sentences resembling (23).

(23)   My neighbour is building a desk.

We formalise this as a competition between speaker and hearer, in which the speaker chooses a nuclear accent (given a focus) and the hearer chooses a focus given the nuclear accent she hears. This gives rise to an optimisation procedure between a number of accent/focus pairs. In Table 7 we illustrate the interesting competing candidates, together with their specific constraint violations (for a full table see the appendix).

Table 7: (condensed version)

		FSR	Destress	NSR
☞	My neighbour is building [a DESK]$_F$			
	My neighbour is [building]$_F$ a DESK	!*		
☞	My neighbour [is building a DESK]$_F$			
☞	[My neighbour is building a DESK]$_F$			
	[My neighbour]$_F$ is building a DESK	!*		
☞	My neighbour is [BUILDING]$_F$ a desk			*
	My neighbour [is BUILDING a desk]$_F$			!*
	[My neighbour is BUILDING a desk]$_F$			!*
	[My NEIGHBOUR is building a desk]$_F$			!**
☞	[My NEIGHBOUR]$_F$ is building a desk			**

This optimisation has five optimal solutions, which are illustrated in (24)–(28), respectively. These are the default accent, focus pairs.

(24)   Q: Is your neighbour buying a desk? $\langle$VERB, [V]$_F\rangle$
        A: No. He is [BUILDING]$_F$ a desk.

(25)   Q: What's your neighbour doing? $\langle$OBJ, [VP]$_F\rangle$
        A: He [is building a DESK]$_F$.

(26)   Q: What's happening? $\langle$OBJ, [IP]$_F\rangle$
        A: [My neighbour is building a DESK]$_F$.

(27)   Q: What's your neighbour building? $\langle$OBJ, [Obj]$_F\rangle$
        A: He is building [a DESK]$_F$.

(28)   Q: Who's building a desk?   ⟨SUBJ, [Subj]$_F$⟩
       A: [My NEIGHBOUR]$_F$ is building a desk.

Candidate ⟨VERB, [V]$_F$⟩ in (24) is optimal. The alternative focus interpretations for stress on the verb, namely ⟨VERB, [VP]$_F$⟩ and ⟨VERB, [IP]$_F$⟩, although equally ranked by our constraints, are blocked by the more preferred form OBJ for the respective meanings. Stress on the object in these cases does not lead to any constraint violations. VERB and SUBJ involve one and two violations of the NSR, respectively. This explains why OBJ is selected to express a VP or IP focus (examples (25) and (26)). In the other cases of narrow focus ([Obj]$_F$, and [Subj]$_F$), stressing the focused constituent is trivially optimal since the alternative candidates violate the FSR (examples (27) and (28)).

A Destress case

In the previous example Destress played no role since nothing was activated, predictable, etc., to trigger the Destress constraint. In this section we consider a family of examples like (29) that involve an activated pronoun that as a consequence counts as a candidate for destressing.

(29)   John$_i$'s cat ate him$_i$.

The problem of the possible placement of accent and focus for this type of sentence can be formalised again as a competition between different accent-focus pairs. Table 8 represents the interesting candidates (for the full table, see the appendix):

Table 8: (condensed version)

		FSR	Destress	NSR
☞	John$_i$'s cat ate [HIM$_i$]$_F$		*	
	John$_i$'s cat [ate HIM$_i$]$_F$		!*	
	[John$_i$'s cat ate HIM$_i$]$_F$		!*	
☞	John$_i$'s cat [ATE]$_F$ him$_i$			*
☞	John$_i$'s cat [ATE him$_i$]$_F$			*
☞	[John$_i$'s cat ATE him$_i$]$_F$			*
	[John$_i$'s CAT ate him$_i$]$_F$			!**
☞	[John$_i$'s CAT]$_F$ ate him$_i$			**

This table has five optimal solutions, illustrated in (30)–(34), respectively:

(30)   Q: Did John$_i$'s cat$_j$ lick him$_i$?   ⟨VERB,[V]$_F$⟩
       A: No, it$_j$ [ATE]$_F$ him$_i$.

(31) Q: What did John$_i$'s cat$_j$ do next? $\langle$VERB,[VP]$_F\rangle$
   A: It$_j$ [ATE him$_i$]$_F$.

(32) Q: What happened next? $\langle$VERB,[IP]$_F\rangle$
   A: [John$_i$'s cat ATE him$_i$]$_F$.

(33) Q: What did John$_i$'s cat eat next? $\langle$OBJ,[Obj]$_F\rangle$
   A: It ate [HIM$_i$]$_F$.

(34) Q: Who ate John$_i$? $\langle$SUBJ,[Subj]$_F\rangle$
   A: [John$_i$'s CAT]$_F$ ate him$_i$.

VERB is optimal for [V]$_F$, but also for [VP]$_F$ and [IP]$_F$ despite violating the NSR, since the alternative candidates involve more severe constraint violations: OBJ violates the higher ranked Destress, and SUBJ involves two violations of the NSR, and for [VP]$_F$ the FSR as well. Interestingly, the pair $\langle$OBJ,[Obj]$_F\rangle$ is optimal despite violating Destress, because any alternative accenting option for [Obj]$_F$ involves a violation of the higher ranked FSR. The pair $\langle$SUBJ,[Subj]$_F\rangle$ is also trivially optimal for the same reason.

  Note that in Table 7, OBJ led to three possible focus interpretations ([Obj]$_F$, [VP]$_F$ and [IP]$_F$). In Table 8, OBJ allows only a narrow focus interpretation, namely [Obj]$_F$. On the other hand, VERB, which in Table 7 unambiguously expressed the narrow focus [V]$_F$, in Table 8 allows in addition the broad focus interpretations [VP]$_F$ and [IP]$_F$.

  As we noted earlier, and as is clear from the two examples of this section, our OT analysis predicts an interesting difference in complexity between production and interpretation tasks. The production of focal stress can be obtained by optimising unidirectionally from meaning to form, whereas bidirectional optimisation is crucial for correctly interpreting focal stress (see the interpretation for VERB in Table 7 and OBJ in Table 8). Recent experimental findings in language acquisition seem to confirm this mismatch (see Szendröi (2003)). Children seem to produce focal stress correctly from the two-word stage. At the same time, their comprehension abilities lag behind until they are 6 years old. Hendriks and Spenader (2004), de Hoop and Krämer (2004) and Hendriks (2005) have proposed that children acquire bidirectional optimisation strategies only later (around 6;6). Initially their interpretations seem best described by uni-directional OT. In this light, these findings cease to be paradoxical and find a natural explanation with our analysis.

11.4 Accent beyond focus

So far we have concentrated on building a theory for predicting (placement of nuclear accent, placement of focus) pairings in neutral contexts. In this section we discuss three types of cases where our BiOT analysis ostensibly fails. The first case is easily dealt with by examining the pragmatic nature of the Destress constraint. The latter two cases cannot be explained so easily: what they share in common is that they arise in situations where speakers are using nuclear accent for more than just picking out the focal structure.

Example (33) illustrated how placing the nuclear accent on a candidate for destress gives rise to a narrow focus interpretation. But, the same intonation can also let the hearer know that she is in an abnormal context. As a concrete example, consider (35).

(35)   [The telephone is RINGING]$_F$.

This is an example where Destress is violated, with the nuclear stress falling on the predictable word *ringing*. Recall that (35) was considered infelicitous when presented as (5a). But, suppose this was uttered by a speaker who has had his telephone cut off for a number of weeks. That (35) is an appropriate utterance for such a speaker may appear to be a counterexample to our constraints—stress on the V retains the IP focus, even though Destress is violated. Actually, the pragmatic nature of Destress comes to the rescue. In this context Destress is no longer violated from the speaker's point of view. For him, a ringing telephone is no more predictable than a telephone on fire. A hearer, even if she is unaware of the context, would infer that something odd is going on, as the predictability of "ringing" with "telephone" normally demands that "ringing" is destressed. If she assumes that the speaker is following the constraints, her only option is to change to a context where Destress no longer applies, that is, to a context where the telephone ringing is unexpected.

We now turn to examples where a speaker uses accent to express more than focal structure. Consider (36) in the following context: (36) is a comment made while watching a movie; the scene is of a hotel room with an open bedside cabinet drawer containing a gun and a bible.

(36)   You can tell it's an American hotel room. It has a bible AND a gun.

Our constraints predict that the nuclear stress will be on *gun*, unless there is narrow focus on *and*. However, this example really seems to be a case of broad focus, leading us to conclude (unsurprisingly) that there

are additional factors involved in nuclear accent placement. In general,
'x AND y' can be paraphrased as "not only x, but also y', where 'x' is
either given, typical or expected, while 'y' is less expected, or at least
low on a scale of expectations. The givenness or expectedness of the
first conjunct can easily be seen in (36), where switching the conjuncts
makes little sense.

A Bush speech (heard on BBC Radio 4, 08 March, 2005) concerns
the removal of troops from Syria, and uses the same rhetorical device,
but to slightly different purposes.

(37)   All Syrian military forces AND intelligence personnel must with-
         draw before the Lebanese elections for those elections to be free
         and fair.

A final example comes from a detective novel, "Strange Affair" by Pe-
ter Robinson. The detective, Alan Banks, is examining the flat of his
missing brother, who was always very security conscious.

(38)   Banks examined the lock and saw that it was the deadbolt
         kind, which you had to use a key both to open AND to close.

Here, the scale refers to locks in general—most locks need a key to open
them, but a more paranoid soul wants a lock that also needs a key to
close.

All of these stressed *and* examples seem to allow the paraphrase
of 'not only x, but also y'. Rhetorically, however, the effects run from
socio-political irony to a picture of someone's security consciousness.
Most likely, the different rhetorical effects arise from the combination
of the paraphrase along with the contrast between the informational
content of the conjuncts. Exactly what the nature of the contrast is
depends on a variety of contextual factors. Interestingly, if one were to
use the paraphrase rather than stressed *and*, the additive particle *also*
would carry the stress. Krifka (1999) proposes that stressed additive
particles associate with a contrastive topic. Something similar may be
occurring here.

To end this section, we have an example where shift of stress
onto a pronoun does not affect interpretation of the focus, but instead
gives rise to a threatening implicature. This example comes from the
1974 Francis Ford Coppola film "The Conversation". A surveillance
expert is spying on a young couple for a powerful business executive.
The executive happens to be married to the unfaithful woman. While
listening to the recordings, the surveillance expert hears the man utter
(39), where the 'he' refers to the executive and 'us' refers to the couple.

(39)   He'd KILL us if he had the chance.

Initially, the spy fears for the couple's lives and attempts to stop their murder at the hands of the executive. But it turns out that it is the executive who dies and not the couple. His actual death is a car accident and apparently unsuspicious.[3] But, the spy becomes increasingly paranoid and imagines other circumstances for the death. His paranoia leads the spy to think he has been set up in a sense and that the couple murdered the woman's husband. His memory of the intonation also changes, and by the end of the movie he hears instead

(40)   He'd kill US if he had the chance.

The referents of the pronouns are unchanged, which is unusual in the sense that a stressed pronoun can often lead to a change of reference.[4] But it is unclear as to whether there is any focus change from (39) to (40). Our theory predicts that (40) has a narrow focus interpretation. However, it seems that the stress on the pronoun indicates a contrast between 'us' and 'him'—one of this pair is going to be killed. This contrast gives an implicature that basically says: "We had better kill him before he kills us." It is possible that there is a close relation between this notion of contrastive accent and narrow focus as it is used in this paper. Again, this must be left for future research.

11.5   Conclusion

In this paper we have given an account within Bidirectional Optimality Theory (BiOT) of the relationship between pitch accent and meanings within focus constructions. The three constraints illustrate the interaction between syntax, semantics and pragmatics in determining the placement of accent within focus. We have seen that syntax gives the default cases (via the NSR). Pragmatics gets us to shift to alternatives. Under our story the syntactic constraint is the weakest constraint. The constraint ranking considered captures not only the standard cases of nuclear accent placement, but also interesting cases of stress shift. Ultimately we would like to incorporate this into a broader theory of

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[3] The viewer learns of the death from a newspaper headline.

[4] A classic example of a stressed pronoun leading to a change of reference comes from Lakoff (1971):

(i)   a.   Paul called Jim a Republican. Then he insulted him.   (Paul insulted Jim)

       b.   Paul called Jim a Republican. Then HE insulted HIM.   (Jim insulted Paul)

nuclear accent, so as to give a more complete account of the examples in section 11.4.

Appendix

Table 7: (full version)

		FSR	Destress	NSR
☞	My neighbour is building [a DESK]$_F$			
	My neighbour is [building]$_F$ a DESK	!*		
☞	My neighbour [is building a DESK]$_F$			
☞	[My neighbour is building a DESK]$_F$			
	[My neighbour]$_F$ is building a DESK	!*		
	My neighbour is BUILDING [a desk]$_F$	!*		*
☞	My neighbour is [BUILDING]$_F$ a desk			*
	My neighbour [is BUILDING a desk]$_F$			!*
	[My neighbour is BUILDING a desk]$_F$			!*
	[My neighbour]$_F$ is BUILDING a desk	!*		*
	My NEIGHBOUR is building [a desk]$_F$	!*		**
	My NEIGHBOUR is [building]$_F$ a desk	!*		**
	My NEIGHBOUR [is building a desk]$_F$	!*		**
	[My NEIGHBOUR is building a desk]$_F$			!**
☞	[My NEIGHBOUR]$_F$ is building a desk			**

Table 8: (full version)

		FSR	Destress	NSR
☞	John$_i$'s cat ate [HIM$_i$]$_F$		*	
	John$_i$'s cat [ate]$_F$ HIM$_i$	!*	*	
	John$_i$'s cat [ate HIM$_i$]$_F$		!*	
	[John$_i$'s cat ate HIM$_i$]$_F$		!*	
	[John$_i$'s cat]$_F$ ate HIM$_i$	!*	*	
	John$_i$'s cat ATE [him$_i$]$_F$	!*		*
☞	John$_i$'s cat [ATE]$_F$ him$_i$			*
☞	John$_i$'s cat [ATE him$_i$]$_F$			*
☞	[John$_i$'s cat ATE him$_i$]$_F$			*
	[John$_i$'s cat]$_F$ ATE him$_i$	!*		*
	John$_i$'s CAT ate [him$_i$]$_F$	!*		**
	John$_i$'s CAT [ate]$_F$ him$_i$	!*		**
	John$_i$'s CAT [ate him$_i$]$_F$	!*		**
	[John$_i$'s CAT ate him$_i$]$_F$			!**
☞	[John$_i$'s CAT]$_F$ ate him$_i$			**