The Phonology of Accent
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1 Introduction

The pronunciation of a sentence depends in part on the context in which it occurs. If the sentence contains no expressions that count as discourse given, it will be given a default pronunciation. If one or more expressions is discourse given, the given words will typically be pronounced without a pitch accent, which often results in a pronunciation that differs from the default. These facts are illustrated below, where CAPITALS in the target sentence indicate presence of a pitch accent and italics absence of a pitch accent.

(1) a. JOHN saw MARY.
   b. Mary was at the party. JOHN SAW her.

In (1a), intended as discourse initial, none of the words is discourse given. In this case, accent falls obligatorily on the subject John and the object Mary. In (1b), the object her counts as discourse given, leading to its lacking an accent. Here accent falls on John and on saw, but not on her.

Past research (e.g. Selkirk 1996, Truckenbrodt 1995, Wagner 2012) has aimed primarily at accounting for these basic pronunciations. However, the pronunciations in (1) above are not the only ones allowed in the contexts under consideration. In addition to these the pronunciations in (2) below are also possible, if perhaps somewhat less preferred.

(2) a. JOHN SAW MARY.
   b. Mary was at the party. JOHN saw her.

The goal of this paper is to explain these and related variations in pronunciation. I will take it as a working hypothesis that the information status of the sentences with the two pronunciations being contrasted is identical, e.g. that the focus and givenness marking in the two (a) examples is identical, as is that in the two (b) examples.

2 Truckenbrodt (1995)


(3) Prosodic Hierarchy (universal):
    Utterance > Intonational Phrase > Phonological Phrase > Phonological Word
    (= U > I-Phrase > P-Phrase > PWd)

The Prosodic Hierarchy imposes an inclusion relation on phrasings at successive levels. Thus, a PWd needs to be completely contained in a P-Phrase, a P-Phrase in an I-Phrase, and an I-Phrase in a U. While a constituent at a higher level of the hierarchy can contain more than one constituent at a lower level, the reverse is impossible, and nor can a higher constituent contain only part of a lower constituent.

Along with the Prosodic Hierarchy, Truckenbrodt also adopts the assumption that prosodic constituents form a metrical grid, as in Halle and Vergnaud (1987), and that such constituents have a unique head. A P-Phrase, for example, could consist of multiple PWds, but only one of these PWds would be the head of the P-phrase. A phrase constructed from constituents of level n is indicated with a pair of matching brackets on level n+1 that encompasses all of the level n constituents, with a single asterisk in the level n+1 phrase indicating which of the level n constituents counts as the head. To illustrate, sentence (1a) is assigned the following prosodic structure:

(4) (     (*))  U
       (       (*)        )  I-Phrase
       (     (*)         )  P-Phrase
      (*)(*)(*) PWd
       John   saw   Mary

Of particular interest here is the level of the P-Phrase. Mary and John are heads of their respective P-Phrases. An asterisk at this level Truckenbrodt takes to correspond to a pitch accent in the phonetics, and absence of an asterisk to absence of a pitch accent, an assumption that I adopt throughout this paper.
Based on these core, inviolable assumptions, Truckenbrodt proposes an Optimality Theoretic analysis of accent location in English consisting of three violable constraints:

(5) Truckenbrodt's Constraints
   i. The head of a P-phrase is its rightmost expression bearing an asterisk on the ω level.
      (= Align(ϕ,R,xq,R), or Align ϕ1)
   ii. Every lexically headed XP must be contained in a P-Phrase. (= Wrap-XP)
   iii. Every lexically headed XP must contain a phrasal stress xq. (= Stress-XP)

The prosodic structure in (4) above satisfies all three of these constraints. The first P-Phrase contains a single PWd as its head, the subject John. As the only constituent of the P-Phrase, this P-Phrase head trivially satisfies Align ϕ. The NP John is lexically headed, and so by Wrap-XP also needs to be contained within a P-Phrase, which is again satisfied. Finally, Stress-XP requires that this NP contain a phrasal stress, which again it does. The second P-Phrase satisfies all three of these constraints as well: it is right headed as required by Align ϕ, the two lexically headed XPs Mary and saw Mary are both contained in that P-Phrase satisfying Wrap-XP, and each of these XPs contains a phrasal stress satisfying Stress-XP. Finally, there are no other lexically headed XPs in the sentence, making Wrap-XP and Stress-XP completely satisfied.

The constraints in (5) above suffice to account for the pronunciation in (1a). They do not as they stand allow for the pronunciation in (1b), however. To see why not, consider the prosodic structure of that example based on the assumption that accents stand in a one-to-one relation with P-Phrase asterisks.

(6) \((\begin{array}{c} \ast \\ * \end{array})\) U
    \((\begin{array}{c} * \\ * \end{array})\) I-Phrase
    \((\begin{array}{ccc} * & * & * \end{array})\) P-Phrase
    \((\begin{array}{ccc} * & * & * \end{array})\) PWd

John saw her

This representation violates both Align ϕ and Stress-XP: the head of the second P-Phrase is the leftmost saw, not the rightmost her as required by Align ϕ, and the lexical NP her lacks a phrasal stress in violation of Stress-XP.

The important difference for Truckenbrodt between these examples is the presence in (1b) of focus: saw is taken to be focused in this example, but not in (1a). To account for the pronunciation in (1b), Truckenbrodt adds a constraint on focus:

(7) Focus: If F is a focus and DF is its domain, then the highest prominence in DF will be within F.

Identification of F and DF is non-phonological, with F being as narrow as possible and DF as broad as possible. I do not concern myself with the specific rules determining F and DF as these are unrelated to the phonology. At issue is only the effect that such identification has on accent location. In order for Focus to affect accent location in (1b), it must allow the representation in (6). It will do this if (i) saw is analyzed as an F and either the sentence or the VP counts as its corresponding DF; and (ii) Focus outranks the two constraints violated in (6), namely Align ϕ and Stress-XP. With these assumptions, the representation in (6) becomes optimal. In particular, it beats out the representation in (4) because that representation violates the high ranking constraint Focus while (6) only violates less highly ranked constraints.

While Truckenbrodt's analysis nicely handles the examples in (1), it does not allow for the alternative pronunciations of these examples in (2) without changing the presumed focus structure of the examples. To see this, consider the prosodic structures required for these examples under the assumption of a one-to-one correlation between P-Phrase asterisks and pitch accents:

(8) a. \((\begin{array}{c} \ast \\ * \end{array})\) U/I-Phrase
    \((\begin{array}{ccc} * & * & * \end{array})\) P-Phrase
    John saw Mary

b. \((\begin{array}{c} \ast \\ * \end{array})\) U/I-Phrase
    \((\begin{array}{ccc} * & * & * \end{array})\) P-Phrase
    \((\begin{array}{ccc} * & * & * \end{array})\) PWd
    John saw her

Both of these representations satisfy the basic assumptions of the Prosodic Hierarchy and the assumption of uniqueness of P-Phrase heads, taken to be inviolable for Truckenbrodt. However, (8a) violates Wrap-XP since the VP fails to be contained in a P-Phrase. Furthermore, since the alternative representation in (4) does not

1 Here and below, ω is the level of prosodic words, ϕ that of P-phrases. xq is the head of a P-phrase.
incur this or any other violation, the violation of Wrap-XP in (8a) is fatal under Truckenbrodt’s analysis. In the case of (8b), both the VP and the object NP lack a pitch accent, in violation of Stress-XP. If we additionally take the context to determine focus location, the fact that focus was required on saw in (6) suggests that saw should be focused here as well, but then the example violates Focus since the highest prominence in the sentence falls on John, not on saw. Furthermore, changing this assumption and analyzing John as a focus in (2b) is not sufficient to account for the pronunciation of that example, since it still needs to compete with a minimal variant in which John is focused and receives the highest prominence but saw her forms an independent right-headed P-Phrase. Such a representation not only satisfies Focus but also satisfies Stress-XP, Wrap-XP and Align q and so should be optimal under Truckenbrodt’s analysis. That representation, however, gives rise to an additional accent on her that is not attested in (2b) and is in fact not possible.

3 Challenges
In this section I examine three additional phenomena that are challenging to Truckenbrodt’s analysis. I show that the default accent pattern of a sentence depends on the choice of words in addition to the syntactic structure, a dependence that is not expected under his analysis. I also show that accents can be optional even in cases where it is implausible to analyze one of the accented expressions as a focus. Finally, I show that there is variability in P-Phrasing that is independent of accent location, but that the variability differs for given expressions and unaccented expressions that are not given.

3.1 Degrees of Accentability
Under Truckenbrodt’s analysis, the accentuation pattern of a sentence depends only on whether the words in it are focused or not. Absence of focus yields a default pattern that can be altered by focus, but both patterns are independent of what specific words the sentence is composed from. That is problematic can be seen by comparing the behavior of names with that of certain quantifiers and pronouns. Consider the following sentences as answers to the question What’s happening? in an otherwise null discourse context.

\[
\begin{align*}
(9) & \quad \text{a. } \text{JOHN kissed MARY} \\
& \quad \text{b. } \#\text{JOHN KISSED Mary} \\
& \quad \text{c. } \#\text{JOHN kissed SOMEONE/ME} \\
& \quad \text{d. } \text{JOHN KISSED someone/me}
\end{align*}
\]

\[
\begin{align*}
(10) & \quad \text{a. } \text{MARY’S singing}^2 \\
& \quad \text{b. } \#\text{Mary’s SINGING} \\
& \quad \text{c. } \#\text{SOMEONE’S/I’M singing} \\
& \quad \text{d. } \text{Someone’s/I’m SINGING} \\
& \quad \text{e. } \text{MARY’s SINGING} \\
& \quad \text{f. } \text{SOMEONE’S/I’M SINGING}
\end{align*}
\]

If Question Answer Congruence identifies expressions as foci, then the sentences themselves will all count as foci, but none of the expressions properly contained within the sentences will do so. Sentence level focus for Truckenbrodt, however, has no effect on accent placement. The Focus constraint requires the most prominent accent within the domain of a focus to be located within the focus, but when both the focus and its domain are the entire sentence as they are here, this constraint is trivially satisfied as long as some expression ends up as most prominent. This leaves the other constraints to do the work of locating pitch accents. In the transitive examples in (9), these constraints are all satisfied in (9a) and (9c). However, (9b) and (9d) violate Align q since the head of the second P-Phrase is not rightmost, and they also violate Stress-XP since the object NPs fail to bear a phrasal stress. Truckenbrodt’s analysis thus predicts that (9a) and (9c) should be the acceptable pronunciations, correctly in the case of (9a), incorrectly in the case of (9c). For the intransitive sentences in (10), Truckenbrodt predicts the pronunciations in (10a-d) to be unacceptable. The optimal pronunciations are those in (10e,f). These latter pronunciations satisfy all three of Truckenbrodt’s constraints. The subject and verb constitute independent P-Phrases which are both right-aligned, both the subject NP and the VP are contained in a P-Phrase as required by Wrap-XP, and the NP and VP both contain a phrasal stress as required by Stress-XP. (10a,c), in contrast, violate two of the constraints: the head of the single P-Phrase is on the left, not the right, in violation of Align q, and the VP fails to contain a phrasal stress, in violation of Stress-XP. (10b,d) fare marginally better in that they satisfy Align q, but these examples too violate Stress-XP, this time because the subject NP fails to contain a phrasal stress, and given that (10e,f) violate none of the constraints, this single violation is fatal.

\footnote{Sentences with this accent pattern were initially brought to bear on the analysis of accenting rules in Schmerling (1976).}
The facts in (9) and (10) above could potentially be accounted for by analyzing someone, I and me as inherently given, and though Truckenbrodt does not explicitly take givenness into account, it would be easy to modify his analysis to do so. I argue in Tancredi (2015) based on the existence of given foci that givenness and focus need to be represented separately in the syntax. If givenness leads to a lack of accent, then an inherently given expression should pattern exactly as someone, I and me do in the (a-d) examples in (9) and (10) above. Explaining the accent on someone/in (f) is challenging on this view, though perhaps not insuperably so. Such an analysis, however, will not explain the contrast between the behavior of the name Mary above and most below.

(11) Ten women went to a party. By 10:00,
   a. JOHN met MOST
   b. #JOHN MET most
   c. Most LEFT
   d. #MOST left
   e. MOST LEFT

The name Mary was obligatorily accented both as the object of a transitive sentence and as the subject of an intransitive in (9) and (10). Most, in contrast, is obligatorily accented only in the object position, not in the subject position. Since the choice of NP has no effect on accent location in Truckenbrodt’s analysis, here once again that analysis wrongly predicts that the only accenting possibility for the intransitive sentence should be the dual accent option in (11c). And while treating most as inherently given could account for the acceptability of (11c) and the unacceptability of (11d), such an analysis would wrongly predict (11b) to be good and (11a) to be bad.

The data in this section suggest that different expressions have different inherent degrees of accentability, and that these differences affect pitch accent location. Names have the highest degree, someone and first person pronouns the lowest, and most is somewhere in the middle. An analysis like Truckenbrodt’s that fails to take these differences into consideration cannot explain the range of variation in accent location that exists.

3.2 Optional Accents
As we already saw with respect to intransitive sentences, there is often more than one pattern of accenting that is acceptable for a sentence in a fixed context. Below we see that the same is true with transitive sentences.

(12) Q: What happened?
   A1: JOHN kissed MARY
   A2: JOHN KISSED MARY
   A3: #John kissed MARY

Truckenbrodt’s analysis accounts readily for the acceptability of A1 with John constituting one P-Phrase and kissed Mary another. Under such an analysis, A1 will satisfy all three of Truckenbrodt’s constraints. It also accounts for the unacceptability of A3, since the subject NP John fails to contain an accent, in violation of Stress-XP. However, the analysis incorrectly fails to allow for A2. To generate accents on all three words as in A2, each word has to head its own P-Phrase. The VP, however, will then fail to be contained in a P-Phrase, in violation of Wrap-XP. Crucially, in this example the sentence as a whole is analyzed as a focus and so all three answers satisfy Truckenbrodt’s Focus constraint.

When the object of a transitive sentence is an expression of low inherent accentability, the sentence shows a pattern of accenting possibilities parallel to what we saw in section 3.1 with intransitives.

(13) Q: What happened?
   A1: JOHN HIT someone
   A2: JOHN hit someone
   A3: #John HIT someone
   A4: SOMEONE/I HIT someone

Wagner (2006) proposes something similar, namely that someone can be readily analyzed as given since the presupposition that results from marking it as given is trivial and hence satisfied in any context. That this explanation is problematic can be seen in the different behaviors of the synonyms people and human beings below, both of which should behave just like someone under Wagner’s proposal.

i. A: This company is no fun to work for.
   B: The BOSSES CRITICIZE people/#human beings
   B2: The BOSSES criticize #PEOPLE/HUMAN BEINGS
A5: #SOMEONE/1 hit someone
A6: Someone/1 HIT someone

(14) Ten women went to a party. By 10:00,
A1: MOST MET someone
A2: #MOST met someone
A3: Most MET someone

Here just as with the intransitive examples Truckenbrodt’s analysis could easily be extended to account for (13.A5) and (13.A6) by treating someone/1 as inherently given, but such an extension fails to account for different behaviors of John and most in the single accent cases in the A2 and A3 examples and also fails to allow the accent on someone/1 in (13.A4).

3.3 Optional P-Phrasing

If pitch accents are assigned to all and only heads of P-Phrases, then accounting for the optional accents seen in sections 3.1 and 3.2 requires allowing for different P-Phrasings for a single sentence in a fixed context. However, this is not the full extent to which P-Phrasing can vary: discourse given predicates can be contained in a P-Phrase headed by a word that precedes it or in one headed by a word that follows it. To see this consider the following examples, where I employ parentheticals to mark the boundary between two P-Phrases.⁴

(15) A: John kissed Sue. Then,
B1: {MARY} (and this I know first hand) {kissed BILL}
B2: {MARY kissed} (and it shocked me) {BILL}

(16) Q: Who kissed who?
A1: {MARY} (and this I know first hand) {kissed BILL}
A2: {MARY kissed} (and it shocked me) {BILL}

In both examples the verb kissed qualifies as given, while Mary and Bill are focused. In each case, both P-Phrasings, indicated with set brackets, are acceptable. This is again problematic for Truckenbrodt’s analysis. Focus has the potential to change pitch accent location if it requires a pitch accent to fall somewhere where it would not fall otherwise. In these examples, however, the pitch accents fall in the same place that they would if there were no focus (and no givenness). This makes it possible for all of Truckenbrodt’s proposed constraints to be satisfied, Focus included, as they are in (15.B1) and (16.A1). The P-Phrasings in (15.B2) and (16.A2), however, violate Align ϕ and Wrap-XP: the first P-Phrase is left headed rather than right headed, and the VP fails to be contained in a single P-Phrase. These latter P-Phrasings should thus be blocked, but they are in fact acceptable.

The above examples in which kissed is discourse given contrast with those below in which it is not.

(17) A: John talked to Sue. Then,
B1: {MARY} (and this I know first hand) {kissed BILL}.
B2: #{MARY kissed} (and it shocked me) {BILL}.

(18) Q: What happened?
A1: {MARY} (and this I know first hand) {kissed BILL}
A2: #{MARY kissed} (and it shocked me) {BILL}

Here we find the exact behavior that Truckenbrodt’s analysis predicts: the verb has to be part of a P-Phrase containing the object, not one containing the subject. Truckenbrodt gives no indication, however, that the status of a verb as discourse given or not should affect what P-Phrase the verb should belong to.

The situation becomes further complicated when we consider sentences with embedded sentences. Unlike with simple transitive and intransitive sentences, multi-clausal sentences with a lexical subject in the embedded clause cannot satisfy all three of Truckenbrodt’s basic constraints. Wrap-XP requires that the matrix VP be contained in a single P-Phrase. Stress-XP, however, requires separate accents on the embedded subject and the embedded VP, which is only possible if these are part of separate P-Phrases. What we find is that multiple P-Phrases are required in these cases, as illustrated below.

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⁴Parentheticals presumably also mark a boundary between I-phrases, but since P-Phrases need to be properly contained in I-Phrases according to the Prosodic Hierarchy in (3), parentheticals serve to identify P-Phrase boundaries as well.
Q: What happened?
A1: {JOHN said} (and this I know first hand) {MARY} (and it shocked me) {kissed BILL}
A2: {JOHN} (and this I know first hand) {said MARY} (and it shocked me) {kissed BILL}
A3: #JOHN (and this I know first hand) {said Mary kissed BILL}

Truckenbrodt can account for this fact by ranking Stress-XP higher than Wrap-XP. A1 and A2 violate Wrap-XP, but since this violation is less serious than A3's violating Stress-XP, A1 and A2 can in principle survive as optimal options. The problem for Truckenbrodt comes in comparing A1 and A2 with each other. In addition to violating Wrap-XP, A1 also violates Align \( \omega \), whereas A2 incurs no further violations. This makes A2 the optimal candidate under Truckenbrodt's analysis, and yet while A2 is acceptable, A1 is acceptable as well.

While bridge verbs like say allow for optionality in P-Phrasing even when they lack an accent, non-bridge verbs like resent do not. Resent gives rise to the pattern of accenting predicted by Truckenbrodt, as can be seen below:

Q: What's the situation next door?
A1:  #JOHN is resenting (and this I know first hand) {that MARY} (believe it or not) {kissed BILL}
A2:  {JOHN} (and this I know first hand) {is resenting that MARY} (believe it or not) {kissed BILL}

In the sentence embedding case, the difference in P-Phrasing possibilities depends on choice of verb, but is independent of the status of that verb as given or new. In all of the examples considered, the verb can only plausibly be analyzed as new, not given. Once again we have a case in which the choice of words used – this time of verbs – affects prosodic possibilities, but Truckenbrodt’s analysis makes no allowance for such an effect.

4 Analysis

4.1 Default Prominence

We saw in section 3.1 that we need to make a three-way distinction in accentability of expressions. I propose to encode this distinction as a lexical distinction in metrical prominence. In particular, expressions like someone that disprefer being accented I represent as non-prosodic words, i.e. as words lacking an asterisk at the PWd (\( \omega \)) level. Bridge verbs too I put in this category. Non-bridge verbs and quantifiers like most I take to be prosodic words and hence to have a lexically determined \( \omega \)-level asterisk. Finally, names I analyze as having not only an \( \omega \)-level asterisk but a P-phrase (\( \psi \)) level asterisk as well. This will lead to the following lexically determined metrical structure for the sentences in (9) and (10).

As seen here, expressions with the highest lexically determined asterisks obligatorily bear a pitch accent (pa), while other expressions bear a pitch accent only optionally (optionality indicated with parentheses) or not at all. I propose to follow Truckenbrodt in taking pitch accents to correlate with asterisks at the \( \psi \) level and in taking such asterisks to count as \( \psi \)-level heads of P-Phrases built on the \( \omega \) level. The initial challenge is then to take the above representations as input and generate the following P-Phrasing possibilities.

The first set of possibilities is derived by forming P-Phrases directly from lexically determined metrical structure. The only divergence from (21) arises in Someone’s singing, where singing has been promoted to a P-
Phrase head, a necessity if the sentence is to be exhaustively parsed into headed P-Phrases at all. The second set is derived by forming P-Phrases with some heads optionally promoted. Two restrictions can be observed in this latter case. First, a PWd, i.e. a word with only an ω-level asterisk, will preferentially be part of a right-headed P-Phrase when there is an option. This restriction is responsible for the P-Phrasing \(\text{[JOHN] kissed MARY}\) and the absence of \(\text{[JOHN kissed] MARY}\) when the sentence is all new. I call this restriction R>L. Second, within a P-Phrase a non-PWd cannot be promoted over a PWd. I call this Minimal Promotion (MP). MP is responsible for the absence of \(\text{[JOHN] kissed SOMEONE}\) when all new.

R>L does some of the work that Truckenbrodt's Align ω accomplishes, in that it favors right-headed P-Phrases over left-headed ones. However, we cannot simply identify R>L with Align ω. The sentence \(\text{MARY's singing}\) clearly violates Align ω and yet is acceptable. However, the alternative representation \(\text{MARY's [SINGING]}\) in (23) satisfies Align ω as well as all other proposed constraints, and so as things stand comes out as the only available option. To allow both possibilities within OT, this latter representation would have to incur a violation ranked identically to Align ω. We could perhaps add such a constraint, perhaps a constraint disallowing promotion of an expression to a P-Phrase head. Let's call the hypothetical constraint *Promote, without specifying its exact nature. While adopting such a constraint can account for the two pronunciations of Mary's singing, unfortunately it causes problems for John kissed Mary. The two-accents version of this sentence in (22) satisfies both Align ω and *Promote, no matter how the latter constraint is spelled out. The three-accents version of the sentence in (23), however, looks like it would have to violate *Promote. That is, it is unclear how *Promote could be formulated so that it is violated in \(\text{[MARY's [SINGING]}\) but not violated in \(\text{[JOHN] [KISSED] MARY}\). Clearly, none of the candidate formulations in footnote 4 has this property.

In order to account for the need for right-headed P-Phrases in \(\text{JOHN kissed MARY}\) while simultaneously allowing a left-headed P-Phrase in \(\text{MARY's singing}\), I propose a constraint that incorporates preference directly:

(24) **R>L**: Non-head PWds are preferentially incorporated into right-headed P-Phrases.

R>L only affects examples with PWds that are not P-Phrase heads. If such a PWd can be incorporated into a right-headed P-Phrase, R>L will require it to be so incorporated. Incorporation into a left-headed P-Phrase will only be an option when no right-headed P-Phrase alternative exists. Importantly, R>L does not compare P-Phrasing options for non-head PWds with alternatives in which those PWds are analyzed as P-Phrase heads. This means that R>L will not favor the representations in (22) over those in (23) or vice versa, allowing both options in principle.

While replacing Truckenbrodt's Align ω with R>L goes part of the way toward accounting for the accenting possibilities of all-new sentences, it does not yet go far enough. It is also necessary to do something about Wrap-XP and Stress-XP. Wrap-XP requires a VP to be contained in a single P-Phrase, something that is satisfied by \(\text{[JOHN] MARY}\) but not by \(\text{[JOHN] MARY}\). If we maintained Wrap-XP as it is, we would be at a loss for explaining the acceptability of the latter. The easiest way to overcome this problem is to simply eliminate Wrap-XP altogether. As for Stress-XP, this constraint requires every lexically headed XP to contain a P-Phrase head. We see in (9) and (10), however, that someone violates this requirement and yet this violation does not lead to unacceptability. More significantly, Stress-XP was seen to be violated in Most LEFT in (11c), where most surfaces without an accent despite its being obligatorily accented in \(\text{JOHN met MOST}\). Once again the easiest way to account for the variations found is to eliminate the constraint in question.

### 4.2 Focus and Givenness

Truckenbrodt takes focus to correlate with having the highest prominence in the focus's domain. Examples like the following show that this cannot be maintained under standard assumptions about focus:

(25) Farmers who grow rice often only EAT rice.

Here, under Rooth’s (1992, 1995) analysis of association with focus, rice needs to be analyzed as a focus having the VP as its domain in order for it to associate with only, and yet the highest prominence within the VP falls on the new eat, not on rice. Here I follow Katz and Selkirk (2012) in taking focus to only affect relative prominence of an expression, with presence or absence of an accent on all expressions depending instead on whether that expression is new or given. As in Tancredi (2015) I take givenness rather than newness to be marked in the syntax, surfacing as G-marking. The phonological effect of G-marking on a lexical item is absence of an accent on
that item. G-marking of a higher projection I take to have no phonological repercussions. To generate these effects I adopt the following constraint on the Syntax-Phonology interface:

(26) DemoteG: A syntactically G-marked lexical item is not a PWd in the phonology.

As an interface constraint, DemoteG is logically prior to any phonology-internal constraints such as R>L. I take this to result in DemoteG outranking all phonology-internal constraints.

DemoteG eliminates any lexically specified prosodic structure from a word, resulting in that word being unable to head a P-Phrase and hence unable to bear an accent. To make sure that demotion is limited to given expressions we have to ensure that demotion only applies to G-marked lexical items and not to non-G-marked expressions. This I accomplish by adopting a Faithfulness constraint that requires lexically specified prosodic structure to be present in the phonology. Faithfulness then blocks random demotion. The effects of DemoteG can still surface as long as DemoteG outranks Faithfulness, but demotion will be thereby limited to G-marked expressions as desired.  

If focus is independent of givenness but still has effects on pronunciation, then focus must also be marked in the syntax. I follow a long tradition of using F-marking in the syntax to mark focus. While focus results in increased prominence for an expression, it does not directly affect accent location. Under our assumptions about prosodic structure, this means that focus must not produce any change in basic metrical structure at the P-Phrase level. That is, focus must not result in addition or subtraction of \( q \)-level metrical asterisks/P-Phrases. To account for the effect of focus on prominence, however, F-marking must have some effect on phonological representation. Observationally, focus on an expression \( X \) makes the most prominent word within \( X \) more prominent than any non-focused words outside of \( X \) that have asterisks at the same metrical levels. To accomplish this, I translate a syntactic F-mark into phonological left and right F-brackets surrounding all the words contained in the F-marked constituent. Phonetically, F-bracketing is a prominence booster that has no effect on any but the phonologically most prominent expressions within the brackets.

Applying the analysis to the example in (25) above, *rice* is both a focus and given, hence both F-marked and G-marked in the syntax. Lexically I assume it behaves like a name, hence having both \( \omega \)-level and \( q \)-level asterisks inherently specified. However, DemoteG eliminates these asterisks, leaving *rice* unable to bear an accent. Phonologically, *rice* is surrounded with F-brackets, phonetically boosting the prominence of the most prominent word contained therein. Since *rice* is the only word in the F-brackets, it will have its prominence boosted, which in this case will affect only the loudness and length of the word since it has no accent to boost. The remainder of the sentence has neither F-marking nor G-marking. This results in all remaining lexically specified asterisks, illustrated in (27), surfacing in the final phonological representation.

(27) 

\[
\begin{array}{cccccc}
* & * & * & F & * & * \\
\end{array}
\]

Farmers who *grow* *rice* often only *eat* \([\text{rice}]\)

If we form P-Phrases directly from these remaining asterisks, the result will incur three violations of R>L: *grow*, *often* and *only* will fail to be contained in right-headed P-Phrases.\(^7\) We can avoid all violations of R>L, however, by adding a \( q \)-level asterisk to *eat*. This will allow for the P-Phrasing below.

(28) 

\[
\begin{array}{cccccc}
* & * & * & (F) & * & * \\
\end{array}
\]

Farmers who *grow* *rice* often only *eat* \([\text{rice}]\)

The analysis as it stands still over-generates. In particular, it will wrongly allow the following metrical structure.

\(^6\)While both pure given expressions and given foci surface without an accent (see Tancredi 2015 for discussion of given foci), given topics surface as accented. This suggests that topics need to be marked in the syntax and that topic marking results in an expression being a P-Phrase head. To get topic marking effects to trump givenness effects, a constraint of topic promotion (PromoteT) can be ranked above DemoteG. I put off a full consideration of topic marking for future research.

\(^7\) Crucially, *eat* does not violate R>L since there is no possibility of its being a non-head member of a right-headed P-Phrase.
Here, *often* and *only* have been promoted to P-Phrase heads by addition of \( \omega \)-level asterisks. The resulting structure satisfies R-L since *grow* is part of a right-headed P-Phrase and no possibility exists for *eat* to be a non-head constituent of a right-headed P-Phrase. Recall that an exactly parallel analysis was seen above to be necessary to generate *MARY's dancing*. Indeed making allowance for such an analysis was a large part of the motivation for the formulation of R-L. Here, however, it is an unwanted consequence. To eliminate this possibility, I re-analyze promotion as involving not merely addition of a \( \varphi \)-level asterisk but also simultaneous identification of the promoted expression as a right-hand head. That is, promotion involves addition of a right bracket at the \( \omega \) level as well as addition of an asterisk on the \( \varphi \) level. We can accomplish this result within OT by adopting the following constraint:

(30) Right-Headed Promotion (RHP): A P-Phrase with a non-lexically determined head is right-headed.

RHP will rightly allow left-headed structures headed by words with lexically specified \( \varphi \)-level asterisks, as in *MARY's dancing*, but will block structures like (29) above where the head of a left-headed P-Phrase is not lexically specified as a head.

### 5 Applications and Extensions

The analysis proposed in the above sections consists of the following inviolable assumptions and violable constraints.

(31) **Inviolable assumptions:**
- Prosodic Hierarchy (= (3))
- Headedness: Every P-Phrase has a unique head
- Accentuation: The head of a P-Phrase is accented
- Lexical specification of metrical structure: Words are underlingly specified as containing no asterisks, an \( \omega \)-level asterisk but no \( \varphi \)-level asterisk, or both an \( \omega \)-level asterisk and a \( \varphi \)-level asterisk.

**Violable constraints:**
- DemoteG: A syntactically G-marked lexical item is not a PWd in the phonology.\(^8\)
- Faithfulness: Lexically specified metrical structure cannot be deleted.\(^9\)
- R-most: Non-head PWds are preferentially incorporated into right-headed P-Phrases.
- RHP: A P-Phrase with a non-lexically determined head is right-headed.
- MP: Within a P-Phrase a lexical non-PWd cannot be promoted over a lexical PWd.

In this section I apply the analysis to select examples from section 3 that have not yet been covered.

### 5.1 Degrees of Accentability

The proposed analysis distinguishes degrees of accentability via differences in underlying lexical specification of metrical structure. Nouns like *I* and *someone*, along with linking verbs like *say* and *think*, have no underlying metrical structure. Quantifiers like *most* as well as other verbs are underlingly specified as PWds, i.e. with an \( \omega \)-level asterisk but no \( \varphi \)-level asterisk. Finally, names and most common nouns are underlingly specified as P-Phrase heads, i.e. as having both an \( \omega \)-level asterisk and a \( \varphi \)-level asterisk. In all new contexts, this will give rise to the following patterns for intransitive sentences:

\(^8\)DemoteG needs to accomplish two things. First, it needs to block an expression from getting accented, and thus needs to ensure that it does not end up as the head of a P-Phrase in the phonology. Second, it has to differentiate given expressions from non-given expressions even when neither shows up with an accent. Shigeto Kawahara (p.c.) points out the oddness of identifying given expressions as non-prosodic words since many given expressions (like names, for example) strongly resist the further phonological reductions that are the hallmarks of pronouns and other expressions that can act like clitics. Clearly, if the proposals of this paper are to be adopted, then status as a non-PWd may still be a necessary condition for such reduction but must not be a sufficient condition.

\(^9\)What I'm calling Faithfulness here is according to Shigeto Kawahara (p.c.) a MAX constraint: one that allows addition (of asterisks) but no deletion.
As R>L is currently formulated, both of these representations violate this constraint: *met*, as a non-head PWd, could be contained in a right-headed P-Phrase if *someone*/most were promoted. This gives us the right results for the second example, but not for the first. Furthermore, while we could appeal to the fact that promotion of *someone* would violate MP to account for the acceptability of the first representation, for example by ranking MP above R>L, such an analysis would fail to explain why a single-accent option exists at all, since the two-accent version of the sentence seen in (34) above incurs no violations. To overcome this problem, I propose to interpret R>L as only comparing representations having the same PWds. Since *someone* in (36) does not count as a PWd,
this representation does not get compared to one in which someone is promoted, at least not for the purposes of R>L. The following adjustment to R>L will have the desired effect.

(37) R>L: For a given string of PWds, non-head PWds are preferentially incorporated into right-headed P-Phrases.

A note is in order here about the two accent versions of the sentence JOHN MET someone. This version derives from optionally promoting met to a P-Phrase head. The P-Phrase that it heads, however, also contains someone to its right. If this were to render the P-Phrase non-right headed, then it would be excluded by RHP. This is exactly the right result in the case of #JOHN MET most, but not for JOHN MET someone. We can account for the contrast in these examples by analyzing headedness entirely in terms of prosodic structure. Since someone has no prosodic structure, it is appropriately ignored in determining the headedness of the P-Phrase it is contained in.

5.3 Optional P-Phrasing

In section 3.3 we saw that while neither given expressions nor non-head PWds get accented, their behavior with respect to P-Phrasing differs. An expression that is given can be incorporated into a P-Phrase whose head is to its left even when there is also an option of being incorporated into one whose head is to its right. For a non-head PWd this is not possible. If we allow R>L to ignore parentheticals in comparing options, then the case of non-PWds is already accounted for in the analysis from section 4. In particular, among the representations spelled out in (38) below, the first violates R>L since there is in principle an option of including the verb kissed in a right headed P-Phrase. This holds despite the fact that the parenthetical (indicated as …), having to form an independent I-Phrase, actually makes such a P-Phrasing impossible in the second representation. With a parenthetical between the verb and the object, the only P-Phrasing that is possible is the third.

(38) * * * * * * Ω
#JOHN kissed ... MARY #JOHN kissed ... MARY JOHN KISSED ... MARY

The case where kissed is given differs in that DemoteG forces kissed to be analyzed as a non-PWd, and hence to not have an asterisk at the Ω level. This leads to the following relevant potential representations for the sentence with a parenthetical in the same location as above.

(39) * * * * * * Ω
JOHN kissed ... MARY #JOHN kissed ... MARY #JOHN KISSED ... MARY

With kissed analyzed as a non-PWd, the first representation satisfies R>L, vacuously since there are no non-head PWds in the representation at all. It does violate Faithfulness, but this violation is necessary if DemoteG is to be satisfied, and DemoteG we have already seen outranks Faithfulness. This first representation, then, qualifies as optimal. The second representation also satisfies R>L and DemoteG, and also violates Faithfulness. However, it additionally violates whatever principle it is that requires a parenthetical to form an independent P-/I-Phrase, presumably fatally so. Finally, the third representation violates DemoteG: the G-marked verb kissed surfaces with Ω-level and Ω-level asterisks. Since DemoteG is the highest ranked constraint, and since the first two representations satisfy DemoteG, this violation is fatal. The end result is that our analysis predicts the P-Phrasing in the first representation to be the only possibility, correctly so.

6 Conclusion

In this paper I have been concerned with spelling out the phonology of accents. I showed that Truckenbrodt’s (1995) analysis of English accentuation, though highly principled, is empirically inadequate since it fails to allow for variation in the number of accents a sentence has. I propose to overcome this problem by basing accent location on an underlying assumption that lexical items come with inherent metrical structure, with different words having potentially different such structure. The role of the phonology was then seen as one of organizing words into P-Phrases, with the unique head of every P-Phrase bearing an accent. The metrical structure of a full sentence was claimed to have to include lexically specified metrical structure (Faithfulness) except in the case in which a word is identified as given and hence G-marked in the syntax. A word that is G-marked has its metrical structure erased (DemoteG). Additional metrical structure is allowed to be added for free provided that it respects DemoteG and a few other general constraints: promoted heads have to be at the right edge of a P-Phrase (RHP), and promotion cannot reverse the lexically determined relative prominence relation that holds between expressions in a single P-Phrase (MP). Non-head PWds were additionally argued to be preferentially
included in a right-headed P-Phrase when possible (R>L). Of the constraints proposed, DemoteG was argued to be ranked above all the others, though ranking among the remaining constraints was left undetermined.

The analysis presented involves a fair degree of stipulation, though the constraints proposed were shown to give rise to some interactive effects beyond the simplest cases on which they were based. The analysis further involves a push toward right-headedness that shows up in two otherwise unrelated constraints, RHP and R>L, again something that is far from ideal. At present, however, I do not see a way to reduce the degree of stipulation without sacrificing empirical coverage. Finally, the analysis does not yet explicitly incorporate the effects of topic marking, and in this way is clearly incomplete. All of these shortcomings I hope to address in future work.

Bibliography

Truckenbrodt, Hubert: 1995, Phonological Phrases: Their Relation to Syntax, Focus and Prominence, PhD dissertation, MIT.