Prosody as a Diagonalization of Syntax. Evidence from Complex Predicates[†]

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1. The Transformational Cycle vs. XP-Alignment

Chomsky and Halle (1968) derive prosody and phonological domains by an algorithm that recursively operates on sister constituents in a surface tree structure: the transformational cycle. Prosodic phonology, on the other hand, phrases an output string into a universal prosodic hierarchy based on conventions that map certain types of syntactic constituents into certain types of prosodic constituents, e.g via XP-Edge Marking (Chen, 1987; Selkirk, 1986) or XP-Alignment (Selkirk, 1995; Truckenbrodt, 1995, 1999).

An asymmetry in the assignment of prosody is established that connects syntactic relation, linear order, and prosodic structure. The data serves to illustrate why XP-edge marking does not provide a viable model of the syntax–phonology interface, and is used to argue in favor of a syntax–phonology mapping closer to the transformational cycle, along the lines of recent proposals in Cinque (1993) and Arregi (2002).

2. Prosodic Asymmetry

This section presents evidence for the following generalization about prosodic asymmetry:

(1) Prosodic Asymmetry

- When a projecting element A *precedes* its complement B, a sequence of two prosodic domains that are on a par is derived: Á B́. The last domain provides the 'nuclear stress'.
- When a projecting element A *follows* an element from the complement domain B , A is subordinated: B́ A (unless A is focused or B is old information)

In the following, I present evidence in favor of (1) from different dialects of West-Germanic (Dutch, English, German), involving predicates with infinitival and nominal complements.

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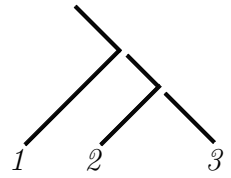
2.1. Predicates and Infinitival Complements

West Germanic languages differ in their prosody. However, once linear order is taken into account, the apparent prosodic differences actually reduce to syntactic differences. This section looks closely at sequences of predicates.[1] Consider first the case of Dutch:

(2) Dutch Predicate Cluster: Final Stress

...[dát hij] [wílde] [hélpen] [vérven].
that he wanted.to help.to paint



The predicates are ordered according to their embedding. The actual output for (2) contains less accents than given here: The accent on 'helpen' is dropped, as indicated in (3a). This seems to be due to rhythmic restructuring, which gets rid of clashes. One indication that this is the correct characterization of the data is example (3b). If a preposition separates the last two predicates, they are separated enough to both maintain their accents.

(3) a. ...[dát hij] [wílde helpen] [vérven]
b. ...[dát hij] [wilde hélpen] [met vérven]

(3a,b) suggest that nuclear stress in the Dutch predicate clusters is final, pre-final predicates may also bear an accent. Predicate *2* in (3a) is in an accented position as indicated in (2), but gets rhythmically deaccented. The sentence in (2) can also be pronounced with only one accent on the last predicate. The rhythmic nature of accent-placement in the pre-nuclear domain is further evidenced by (4a vs. b) and (4c vs. d) respectively.

(4) Hij zéi dat hij...
he said that he....

a. ...wilde vérven.
wanted.to paint

b. ...wílde helpen vérven.
wanted.to help.to paint

c. ...wílde kunnen helpen vérven.
wanted.to be.able.to help.to paint

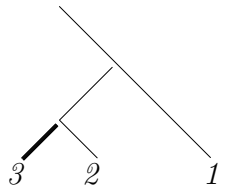
d. ... wílde mogen kúnnen helpen vérven.
... wílde mogen kunnen helpen vérven.

e. Hij wílde mogen kunnen helpen vérven.
'He wants to be allowed to be able to help to paint.'

[1] In presenting the cluster data I am tacitly assuming that they form constituents. These may have been derived via head movement—if we allow for head-movement in the first place. I will not explore the possibilities in detail. The numbers in the examples indicate the path of selection between the predicates, starting from the highest predicate '*1*', to the one selected by it '*2*' and so forth. The tree-representation encodes projecting constituents by uninterrupted lines. Predicates that receive an accent are indicated by a bold-faced branch. All sentences presented involve sentence wide focus.

One way to make sense of this pattern is to say that the mapping to prosody places accents on *each* predicate, which are then rhythmically organized resulting in the omission of certain accents. This would explain non-local effects such as in (4e), where the first predicate counts for rhythm although it has risen to second position. The syntactic and phonological conditions on rhythmic restructuring are beyond the scope of this paper.[2] Consider now the German counterparts of the Dutch predicate clusters:

(5) German Predicate Cluster: Initial Stress



...dass er málen helfen wollte.
...that he paint help want.

Main stress in German falls on the first predicate. No accents are possible under neutral focus in the post-nuclear domain although secondary stresses are present. This is true independent of the number of predicates that follow.

(6) [Er ságte dass er] [málen helfen kònnen dürfen wòllte].
he said that he paint help can be.allowed wanted

The two languages also differ in the linear order of predicates, apart from the linear location of main word stress: while the predicates in Dutch are ordered according to embedding, the order in German is the exact inverse. The two differences, initial vs. final stress, embedding vs. inverse order, conspire to the following communality: Both languages keep main stress on the *most deeply embedded predicate according to the path of selection*.

The following paradigm shows three of the possible orders of a particular predicate sequence in German. When predicates are ordered according to embedding as in (a), this order is often taken to involve 'extraposition'. Haider (1997) convincingly argues that 'extraposed' material is actually within VP and in-situ, resulting in a right branching structure for (7). Different orders are possible, however, in so-called 'restructuring' environments (e.g. in b,c). There are many syntactic differences between 'extraposition' and 'restructuring' constructions that I will not address in this paper—restructuring derives what appear to be monoclausal constructions that, e.g. , facilitate scrambling between clauses, and allow pronouns that are arguments in the lower clause to be affixed on the matrix verb in second position, etc. (cf. Wurmbrand, 2003). Restructuring, however, does not always result in a different word order between the predicates (Haider, 1994).

It could very well be that these syntactic differences play a crucial role. For example, one could argue that subordinated predicates are not really XPs, but heads, which is part of the restructuring process. A syntax–phonology theory that makes reference to XP-status could then exploit this difference to predict the asymmetries. A first problem with

[2]Some speakers are not able place the middle accent in (4d). As will become apparent in the discussion later, the reverse solution with assigning nuclear stress to the most embedded predicate and subsequent insertion of accents in the pre-nuclear domain is not tenable.

this approach is that it makes no prediction about the directionality of the asymmetry. More serious problems will be pointed out in the last section. The important point here is that the prosodic asymmetries already follow from the generalization in (1), *without* reference to these differences.

(7) '...weil er ihr...
'...because he...

a. [versprách] [zu versúchen] [zu schwéigen]. *1́≺2́≺3́*
b. [versprách] [zu schwéigen zu versuchen]. *1́≺3́≺2*
c. [zu schwéigen zu versuchen versprach.] *3́≺2≺1*

be silent try promise
'...promised her to try to be silent.'

The example (7a) is similar to predicate clusters in Dutch (4), in that main stress is rightmost and secondary accents precede the main one. The fact that the median predicate does not necessarily lose its accent rhythmically as in the Dutch example (2) (although it may in fast speech), maybe due to the fact that there is unstressed phonological material—the preposition—intervening, preventing a clash. Remember the similar pattern in the Dutch example in (3), where also a preposition separated two predicates. The prosody in Dutch extraposition constructions is generally equal to that of the German cases. Note also that the facts are equivalent in the relevant constructions in English:[3]

(8) He wánted to be áble to hélp to succéed.

That Dutch and German indeed do not differ in their prosodic systems is also evidenced by those word orders in predicate clusters that are attested in both languages (Wurmbrand, 2003, for discussion of possible word orders):[4]

(9) Dutch and German

[3]The asymmetry equally holds in other syntactic domains. consider complex nominals. Again, the following constructions obviously differ in their semantics and syntax in various ways, and the compound could be argued to include less functional structure, similar to restructured predicates—the correlation is certainly not accidental. The crucial observation here is that the prosody follows the expected pattern:

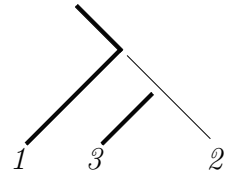
(1) a. [A téacher] [of sláyers] [of vámpires]
b. A vámpireslayerteacher.

It is certainly possible that the fact that (b) is a called a compound and (a) is not is a factor, or that the fact that the phrases in (a) are full DPs and can be modified plays a role. However, the prosodic asymmetries are also already captured by (1)—so there may be *no need* for phonology to refer to these differences. More discussion of this point follows in the last section.

[4]Here, the DP argument preceding the cluster is made 'given' (old information), in order to prevent subordination of the cluster (see next section)

a. ...dat Ján Maríe$_{\textit{given}}$ kan$_1$ gezíen$_3$ hebben$_2$.
that Jan Mary could seen have

b. ...wéil sie ihn hat$_1$ málen$_3$ wollen$_2$.
because she him has paint wanted

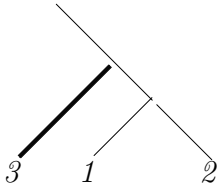


In this example, the second predicate 'hebben' is preceded by its complement 'gezien', which effects its subordination. The modal is unstressed, which is unsurprising since it in a position that loses stress via the rhythmic principles that disallow clashes. The next example again illustrates that it is in fact sufficient if a subconstituent from the complement domain precedes.

(10) Dutch and German

a. ...dat Ján Maŕie$_{\textit{given}}$ gezíen$_3$ kan$_1$ hebben$_2$.
'that Jan could have seen Mary.'

b. ...wéil er es káufen$_3$ wird$_1$ können$_2$.
because he it buy will can



The distribution of accents so far follows the generalization in (1) plus rhythmic deaccenting. A theory placing accents stricty by XP–alignment would have to posit arbitrary XP–boundaries inside clusters in cases of non-peripheral accents. Consider the following cases of particle climbing:

(11) Climbing up the Cluster (cf. Evers, 2001, and ref. therein)
Het labyrinth waar we hem niet over...

a. zul len hoeven laten **ná** denken. *1̀≺2≺3≺5́≺4*

b. zul len hoeven **ná** laten denken. *1̀≺2≺5́≺3≺4*

c. **ná** zullen hoeven laten denken. subordination *5́≺1≺2≺3≺4*
about will need let think
'The labyrinth about which we won't let him reflect.'

The correlation between prosody and syntax in predicate clusters and extraposition constructions was already observed in Bech (1955/57). While the generalization that nuclear stress falls on the most deeply embedded constituent is already predicted based on the approach based on major and minor projection lines in Cinque (1993, 269ff), the asymmetry observed here is not: predicates are subordinated exactly when their complement or a subconstituent from their complement precedes. This generalization appropriately covers the distribution of accents in the constructions discussed here—without reference to $\bar{X}$-status (XP vs. non-XP).

2.2. Predicates and Nominal Complements

Predicates preceding their complement can receive an accent in English (a). This is also true for DP-complements (b).

(12) a. She wánted to hélp to succéed.
b. She wánted to hélp to páint the hóuse.

The case of an infinitival complement preceding its selector is unattested in English, but consider DP-complements:

(13) What did she want to change before moving in?
She wánted to have the wálls painted.

Integration with *subjects* is in generally possible in English, both with unaccusative (a) and unergative (b) verbs[5]. Subordination is also observed when there is more than one predicate (c):

(14) a. [Gasolíne evaporated].
b. [the déan/a télemarketer called]
c. [The déan was expected to come.]

Subordination of predicates following arguments can also be observed in Dutch and German when multiple predicates follow an argument.[6]

(15) a. ...dat hij [een múur$_6$ wilde$_1$ mogen$_2$ kùnnen$_3$ helpen$_4$ vèrven$_5$.]
that he a wall want allow can help paint
'he says that he wants to be allowed to be able to help to paint a wall.'
b. ...wéil er [einen Míxer$_3$ versprach$_1$ zu kaufen$_2$.]
because he a blender promised to buy

[5]It has been reported, however, that unaccusatives tend to phrase with the subjects whereas unergatives don't (Selkirk, 1995; Hoskins, 1996)

[6]At this point, we can look at evidence that the asymmetry outlined in (1) also applies to accentual domains that are pre-nuclear. Consider the case of a complement of a predicate that is not the lowest predicate in a sequence:

(1) a. Sie hat María versprochen zu schwéigen.
she has mary promised to be.silent
b. Sie hat María versprochen zu versúchen/versuchen zu schwéigen.
she has mary promised to try/try to be silent.

The argument *Maria* is selected by *versprochen* 'promise', which then takes a second argument *zu bleiben* 'to stay'. This example illustrates that indeed only those predicates subordinate that are preceded by an element from its complement domain—not all predicates in a cluster blindly subordinate to a preceding DP argument. The nuclear stress falls on the rightmost accentual phrase, provided by the predicate 'bleiben'. This example illustrates that the distribution of secondary accentual phrases obeys the same principles and shows the same asymmetry. It is not simply guided by rhythmic principles. This is not a rhythmic effect, as is illustrated by (b). While predicates that do get an accent may optionally omit if adjacent to an accent (b, try), 'promise' obligatorily subordinates (a,b) since an argument locally precedes.

Not that the secondary prominence in post-nuclear position has an least severely reduced pitch range. The predicates are distinctly subordinated, nuclear stress is on the object.[7]

As is well known, the subject phrases separately from the verb when it is 'given' in the context. The following context is set up to facilitate wide focus in the embedded clause—but with a backgrounded subject.

(16) What did you say the dean did?
I just said that [The déan] [arríved].

Consider the following example:

(17) Why did they close the factory?
a. [The fáctory] [went báckrupt]
b. [Gasolíne evaporated].
c. [A wórker] [eváporated].

'The factory' is given in (17a) and thus the verb receives main stress. A DP containing new information (as in 17b) shows the normal pattern. 'A worker' in (17c) can be treated as a member of a set inferred from the background (the factory). As in (a), the verb receives an independent accent.[8] Similar asymmetries exist with unergative verbs. In (18b), the subject is again an indefinite that is interpreted as a member of set made salient by the discourse (i.e. a partitive relating to a set in the background).

(18) Why did they interrupt the play?
a. [A chíld was crying].
b. [An aćtor] [was crýing].

These prosodic contrasts may point to a structural difference. Consider the case of 'scrambled' vs. 'unscrambled' word order in German. Given or partitive DPs in German undergo scrambling. This may involve adjunction of the scrambled constituent. The prosodic difference follows from this syntactic restructuring. I refer the reader to the discussion of scrambling and focus in Dutch in Neeleman and Reinhart (1998, 343). I will not explore issues relating to focus further at this point.[9]

[7]The post-nuclear rhythmic pattern is actually almost the *same* as in German (6)—despite the different order. A detailed investigation of the rhythmic patterns remains to be undertaken.

[8]Also, the unlikelihood of the predicate may play a role. See also discussion of the thetic/categorical distinction in Krifka (1984).

[9]The stage-level, individual-level distinction has also been argued to be relevant Schmerling (1976); Diesing (1992). Individual-level predicates resist subordination, and this may in fact indicate a structural asymmetry as proposed in Kratzer (1989).

(1) a. [Your éyes a red].
b. [Your éyes] [are blúe].

Again, we may speculate about a higher structural position of subjects relative to the predicates in the case of individual level predicates, which may ultimately explain the prosodic difference.

(19) a. Er will das Búch verkáufen.
he wants the book sell

b. Er will das Búch wahrscheinlich verkáufen.
he wants the book (probably) sell

The asymmetry relevant here is that in a neutral context, *two* accentual phrases are derived when the predicate *precedes* the complement—while *one* accentual domain is derived in cases the predicate *follows* the complement. Relevant data were already noted in Newman (1946); Bresnan (1971), though only looking at nuclear stress.

(20) a. He had pláns to leave. (selectee $\prec$ selector)

b. He had pláns to léave. (selector $\prec$ selectee)

The discussion so far contradicts the common assumption that in English the verb phrases together with a *following* argument, usually the direct object, thus contrasting with Dutch and German in the directionality of phrasing. One piece of evidence adduced in favor of this is the application of the rhythm rule, claimed to apply within phonological phrases.

(21) Evidence for Phrasing Kenesei and Vogel (1995)

a. ...in English: Rhythm Rule:
[They mánaged] [to óutclass] [Délaware's cantéen].

b. ...in German: No Accent on Verb
[Sie haben Délaware's Kantíne übertroffen].

The application of Rhythm rule presupposes assignment of Accent—however, in Dutch and German, the verb does not receive an accent due to subordination. The phrasing of a predicate together with the object in English must be a higher level prosodic domain. It will leave two adjacent accentual phrases (verb and object) within a single higher prosodic domain—and thus result in later rhythmic restructuring if there is a clash. Note, finally, that both Dutch and German show a similar prosody to English when the verb precedes a direct object:

(22) Sie tánzte Tángo
she danced tango

Considering the evidence discussed, it seems that the three languages have a very similar if not identical mapping from syntax to prosody, and all show the asymmetry outlined in (1).

3. Deriving the Asymmetry

How does the syntax–phonology mapping work? The claim proposed here is that prosody can be derived using exactly one type of syntactic information: the information of which

of two sister constituents projects,[10], by a recursive mechanism following the transformational cycle in SPE, similar to the proposals in Jacobs (1991, 1992); Cinque (1993); Arregi (2002). Relative prominence will be represented by metrical grids (Liberman, 1975; Libermann and Prince, 1977). The prosodic foot structure imposed on the grid marks prosodic phrasing. I assume a version of the bracketed grid as outlined in Halle and Idsardi (1995). Higher grid marks are introduced by grid mark projection:

(23) Projection: Project all top-line grid-marks of a constituent to a new top grid-line, and foot them.

Projection as proposed here leaves relative prominence within the projected material intact, contrary to projection in the literature on the metrical grid, where only the head of a foot projects. This is a necessary modification of the theory, since the claim is that subordination is only negotiated via syntax.

(24) Examples of Projection

```
a.                              (  ×
        (  ×                    (  ×
     ×  (  ×  ×      →       ×  (  ×  ×
    zu schweig en           zu schweig en

b.                                 (×                 ×
       (×          (  ×            (×              (  ×
    × ×(×   ×   ×  (  ×  ×   →   × ×(×   ×   ×     (  ×  ×
    zu vers uch enzu schweig en  zu vers uch enzu schweig en
```

The conventions about what to project when computing the relative prominence between sisters constitutes the phonology-syntax interface. 'Equalize' is a different version of the stress equalization principle proposed in Halle and Vergnaud (1987)[11].

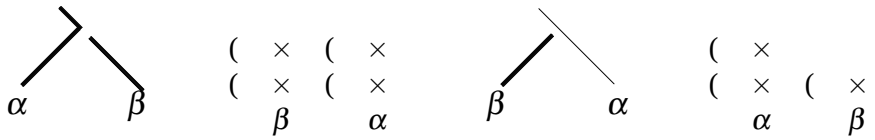
(25) Projection convention for $< \alpha, \beta >$, where α projects:
  a. Equalize if α precedes β: Project α and Project β.
  b. Subordinate if β precedes α : Project β.

The two types of cases that have to be distinguished are the following:

(26) Two Cases
  a. Head Intial Structure   b. Head Final Structure

[10]Following (Wagner, 2002), where evidence from phrases, compounds and derivatives is presented. Johnson (2002) posits an asymmetric operation MERGE (essentially, the formation of an ordered pair), argues that focus projection and island conditions can be derived from properties of recursive Merge. This proposal contrasts with Chomsky (2001), who assumes a symmetric operation of set-merge. I assume that the relation between sisters is asymmetrical at least at the interface to phonology.

[11]The reason why I adopt a different version relate to the pre-nuclear rhythmic pattern. The approaches to stress in SPE, Libermann and Prince (1977), and Halle and Vergnaud (1987) are modeled based on the assumption that in the pre-nuclear domain, prominence is declining. In terms of relative prominence: 2 3 4 5 1, whereas the present proposal derives a sequence of equal stresses that are rhythmically organized. The output of the algorithm here is similar to the output of Libermann and Prince (1977) *after stress leveling has applied*. The last or nuclear accent is special in that it is not subject to rhythm, and is followed by a boundary.



To illustrate how this works, consider first a right-branching structure.

(27) versprach zu versuchen zu schweigen
promised to try to be.silent
'promised to try to be silent'

a. First Step: Create γ

(×
× (× ×
z u schweig e n

b. Second Step: Create β

(×
× × (× ×
z u vers u ch e n

c. Third Step: $< \alpha, \beta >$

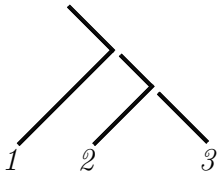
(× (×
(× (×
× × (× × × (× ×
z u vers u ch e nz u schweig e n

d. Fourth Step: Create γ

(×
× (×
versprach

e. Fifth Step: $< \gamma < \alpha, \beta >>$

(× × ×
(× (× ×
(× (× (×
× (× × × (× × × (× ×
versprachzuvers u ch e nz u schweig e n



The representation derived has a crucial property: Three accents, i.e. top-level grid marks, are derived, which are essentially on a par. They count as the heads of three accentual domains. There are several lines in the grids that would seem superfluous. Why would the simpler version not suffice?

(28) versprach zu versuchen zu schweigen
'promised to try to be silent'

(× (× (×
× (× × × (× × × (× ×
versprachzuvers u ch e nz u schweig e n

When two complex right-branching structures are put together, e.g. in coordination, the need for further structure becomes apparent. Otherwise, the expectiation would be a sequence of accents on a par.

(29) Two complex Right-Branching Structures

'promised to try to be silent and asked to allow to whisper'

```
(  ×       ×          ×       ×    ×       ×
(  ×       ×          ×      (×    ×       ×
(  ×      (×          ×      (×    ×       ×
(  ×      (×       (  ×      (×   (×       ×
×(  × × ×(×  ×  ×  (  ×  ( × (×××(×  × ×  (×  ×
versprachzuversuchenzuschweigenundbatzuerlaubenzuflüstern
```

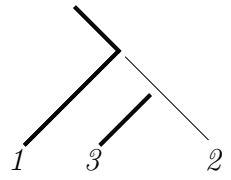
The additional grouping in (29) is necessary, since the pitch level is reset at the break between the two predicate sequences. Within each predicate sequence downstep between the three accents can be observed. The relative pitch level of the six accents in the structure can be approximated by looking at the left brackets: the highest left bracket in the column represents the relative pitch level. The grouping arises through the brackets that delimit feet at the relevant grid line. Consider now two different linearizations:

(30) $1 \prec 3 \prec 2$

versprach zu schweigen zu versuchen
promised to be silent to try

‘promised to try to be.silent’

```
(  ×      (  ×
(  ×      (  ×         (×
×(  × (×  (  × ×  × ×(×  ×
versprachzuschweigenzuversuchen
```



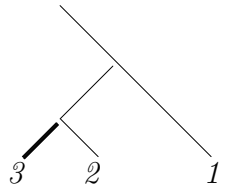
The next example illustrates the case of a completely inverted structure.

(31) $3 \prec 2 \prec 1$

zu schweigen zu versuchen versprach
to be silent to try promised

‘to promise to try to be silent

```
    (  ×
    (  ×          (×       ( ×
(×  (  × ×  × ×(×  × ×( ×
zuschweigenzuversuchen versprach
```



The recursive projection mechanism outlined here derives the corrrect prominence relations between constituents. The foot structure imposed on the grid marks models intuitions about prosodic domains, serves to mark domains for down-stepping and reset, and captures mismatches in constituency between syntax and prosody.

The linear order effect was stipulated here: ultimately, the very mechanism that fixes linear order should be linked to the prosodic differences. One way to conceive of how this works is to view subordination as a syntactic PF-operation of postponement, that is of linearizing a projecting element to the right of the non-projector. Exploring this possibility would go beyond the scope of this paper.

The syntax–phonology interface proposed here transforms the asymmetric relations of syntactic trees into a prosodic representation. It provides a ‘diagonalized’ representation,

in that, similar to the diagonalized representation of a matrix in algebra, it encodes all the relevant information, just in transposed form, facilitating further computation in phonology (rhythm), and making the relevant syntactic information available for parsing.[12]

4. Against XP-Aligment

So far, evidence was presented to argue that the information of projection is sufficient to derive the correct prosody. The theory of XP-alignment presupposes an $\bar{X}$-theory, and predicts a correlation between phrasing and XP-status. In this section I present evidence that there is no such correlation and that the prosodic hierarchy is 'diagonal' (in the sense of 'lying or passing astray', OED) to the assumed $\bar{X}$-hierarchy. First, modifiers often subordinate despite of their XP-status (the prosody of modification is discussed in Wagner (2004)):

(32) a. Oh no, I léft the ínbox open *yesterday/again*.
b. María hat getánzt, *den ganzen Abend*.
Mary has danced, the entire evening

Second, particles (e.g. Toivonen, 2001, argues they are non-projecting X^0) are treated just like XP-objects for NSR, whether or not the verb raises to second position:

(33) a. She próbably went óut.
b. Sie gíng wahrscheinlich áus.
c. Sie íst wahrscheinlich áusgegangen.

Maybe: Particles are stranded inside VP, XP-alignement kicks in although it only contains X^0, thus the edge of VP receives nuclear stress. But: Dutch 'creepers' (11) show the effect of nuclear stress assignment even within the cluster, presumably deep inside of the VP—there is a loss of generalization if one wants to link the accent in (33) to the particle being at the edge of VP, while all prosodic facts follow from the projection approach.

Third, multiple accents domains *within words* are unexplained under XP-edge marking. Right-branching words show multiple accents (just like right-branching structures involving XPs). Compare:

(34) Right-branching constituent in NSR position: multiple accents.
a. He was hóping for her to see Dón in Bóston.
b. She hóped for it to be nón-prepáckaged.

The prefixes in (34b) can receive an accent. Of course not all prefixes can—but those that form a foot can bear an accent. The accent on 'pre' is deleted for rhythmic reasons[13]

[12] Whether or not phonological and syntactic derivations apply cyclically as was suggested in Bierwisch (1968), Bresnan (1971), and Adger (2003) is not apparent from the data discussed here, and requires further research. An obvious alternative to the flattened prosodic representation chosen here would be so say that prosodic structure itself allows recursive constituency, as most recently assumed in Truckenbrodt (1999). This issue will have to remain undiscussed at this point.

[13] Note that the observations on rhythm observed in this paper mirror those observed in Halle and Kenstowicz (1991). This points to a parallel in the way main word stress relates to structure and higher level stress and should be discussed elsewhere.

Derivational Affixes that form a foot are not always allowed to bear an accent—precisely those that are *suffixes* are subordinated[14], as expected based on (1):

(35) fríendshipworthy

Fourth, consider compounds. Again some readjustment according to rhythm takes place. Still, right-branching compounds show multiple accents:

(36) a. She was tŕying to pass the láw degree éntry requirements.
b. She prómised to try to lóok for the Éast Boston Mónthly.

To summarize, there are ample mismatches between XP-boundaries and the distribution of accents. There are XP's that do not line up with accentual domain boundaries, and at the same time there are accentual domain boundaries in the absence of XP-boundaries, namely within predicate clusters, as outlined in the first part of the paper, and also within words and compounds. The unifying factor in all the cases of accentual domain–whether or not they coincide with what one may want to call the edge of an XP–is that they involve right-branching configurations, that is configurations in which the projecting and selecting element is on the left. This follows from the suggested principle of subordination that only uses linear order and the asymmetry of projection.

XP-edge marking/alignment runs into various empirical problems, once a wider array of facts than just accented XPs are considered. It also rests on an unspecified $\bar{X}$-theory. How many different $\bar{X}$-categories for alignment are needed to cover all accent domains, within and above the word level? Are they independently motivated? No extra assumptions are necessary under the projection approach: the pattern above and below the 'word' does not differ (cf. Wagner, 2002, for more examples from derivational morphology and compounding).

5. Conclusion

This paper presented a pattern of prosodic asymmetry, and proposed to compute prosody by recursively looking at the syntactic asymmetries of projection and of linear order, without reference to syntactic categories such as 'XP'-status. Apparent prosodic differences between the three languages reduce to independently motivated syntactic differences.

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[14]This of course does not hold true for so called level-one affixes, which are only not just not subordinated, but they in fact receive main word stress or at least shift them to a closer syllable. I will not discuss their structure here.

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