1 Introduction: the PF interface

(1) Goal for today: provide evidence from Basque for “phonological derivation by phase.” PDbP combines elements of Lexical Phonology (Kiparsky 1982), Distributed Morphology (Halle & Marantz 1993), & Derivation by Phase (Chomsky 2001), and allows a direct reference conception of the PF interface (Kaisse 1985, Odden 1990, Cinque 1993).

(2) Larger goal in Samuels (2009a, et seq.), following Chomsky (2007): “how little can be attributed to UG while still accounting for the variety of I-languages attained?” ⇒ Contra Pinker & Jackendoff (2005), very few (if any) phonological operations/representations are unique to humans or to language (Samuels 2009b).

(3) Phonological representations are ‘flat’ due to S-M interface requirements; it does not build hierarchical structures/domains (e.g., no feature geometry or prosodic hierarchy).

(4) The path from syntax to phonology (Idsardi & Raimy In press:2)

<table>
<thead>
<tr>
<th>Module</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow syntax</td>
<td>hierarchy, no linear order, no phonological content</td>
</tr>
<tr>
<td>LINEARIZATION-1</td>
<td>= <strong>Immobilization</strong></td>
</tr>
<tr>
<td>Morphosyntax</td>
<td>hierarchy, adjacency, no phonological content</td>
</tr>
<tr>
<td>LINEARIZATION-2</td>
<td>= <strong>Spell-out</strong></td>
</tr>
<tr>
<td>Morphophonology</td>
<td>no hierarchy, directed graph, phonological content</td>
</tr>
<tr>
<td>LINEARIZATION-3</td>
<td>= <strong>Serialization</strong></td>
</tr>
<tr>
<td>Phonology</td>
<td>no hierarchy, linear order, phonological string</td>
</tr>
</tbody>
</table>

(5) Immobilization (Embick & Noyer 2001)

\[
\begin{align*}
\text{XP} \\
X & \text{YP} \\
Y & \text{ZP}
\end{align*}
\]

- Sisterhood ⇒ adjacency: \(X [* Y * ZP]\)
- This underdetermines linear order in cases of mutual c-command
- Either Y or ZP’s c-command over its sister must be ignored; this varies parametrically (Epstein et al. 1998, Richards 2004)

(6) Spell-out (Raimy 2000, Samuels To appear)

\[
\begin{align*}
nP \\
n \\
\text{NumP} \\
\pi_i & \rightarrow s \rightarrow % \\
\# & \rightarrow k \rightarrow \ae \rightarrow t \rightarrow % \\
\# & \rightarrow k \rightarrow \ae \rightarrow t \rightarrow % \\
s & \rightarrow % \rightarrow s \rightarrow %
\end{align*}
\]

(7) Serialization (Idsardi & Shorey 2007, Samuels To appear)

\[
\begin{align*}
\# & \rightarrow g \rightarrow u \rightarrow s \rightarrow % \\
\uparrow \iota & \rightarrow i \\
\# & \rightarrow g \rightarrow i \rightarrow s \rightarrow %
\end{align*}
\]

(8) This much is universal (except perhaps Serialization for signed languages) and results in ‘SM-compliant’ representations, which then receive language-particular treatment in the phonology.
2 (Phonological) derivation by phase

(9) The basis for PDbP is the notion that phonology is cyclic; this is the direct consequence of cyclicity (=phases) in syntax. This is the “best-case scenario” according to Chomsky (2004:107):

“Assume that all three components [syntax, semantics, & phonology] are cyclic, a very natural optimality requirement and fairly conventional. […] In the best case, there is a single cycle only. […] Φ is greatly simplified if it can ‘forget about’ what has been transferred to it at earlier phases; otherwise, the advantages of cyclic computation are lost”

(10) Marvin (2002:74): “If we think of levels in the lexicon as levels of syntactic attachment of affixes, we can actually say that Lexical Phonology suggests that phonological rules are limited by syntactic domains, possibly phases.”

(11) Phase Impenetrability Condition$_2$ (Chomsky 2001)
For [ZP Z . . . [HP α [H YP]]]): The domain of H is not accessible to operations at ZP, but only H and its edge.

(12) Assume PIC$_2$ holds in phonology. An ‘accessible’ string of phonology is visible to SEARCH and modifiable by COPY & DELETE. The PIC prevents ‘reaching back’ in the derivation (strict cyclicity): a rule can only affect something on its own cycle and/or the previous one.

(16) So in order to do PDbP we must locate all the phase heads.
- The ‘clause-level’ inventory: C, v, D, HAppl…

(17) All phonological rules obey the PIC, but in two different ways.
- Lexical rules obey at both the morpheme and clausal levels. The relevant notion is accessibility (as per PIC$_2$).
- Post-lexical rules obey at the clausal level. The relevant notion is the domain (no interaction between domains).

(18) Syntax and morphology are crucially different: syntax follows a P-N-P-N pattern with specifiers and adjuncts additionally. Morphology is P-P-P-P, without specifiers and (arguably; see Newell (2008)) without adjuncts.
3 Lexical rule application

(21) A slightly tricky point: no morpheme undergoes phonology alone. The first cycle includes the lowest phase head and its complement. If things worked otherwise, every derivation involving X would result in X taking the exact same shape. Since X would not participate in any alternations, it would simply be learned as-is with all stored forms fully licit.

(22) met[ə]r vs. metric vs. met[ə]ring

(23) Structural minimal pairs (Marvin 2002):

   a. VOWEL RAISING (obligatory)
      $V[\!-[HI]\!] \rightarrow [+HI] / _{-V}$
   b. VOWEL ASSIMILATION (optional; fed by raising)
      $V_{2} \rightarrow V_{1} / V_{1}\_\text{when } V_{2} \text{ is } [-RD]$

(25) Hualde & Elordieta (1992) note assimilation behaves in many respects like a lexical rule, yet it can apply across (some) word boundaries and appears sensitive to morphosyntactic information.

(26) Elordieta (1997 et seq.) claims these rules apply within a feature-checking chain: (C, T), (T, v), (T, D), (v, D), or (D, N). Relevant here: T-v and D-N chains.

(27) I argue that correlation is accidental: there are cases in which two assimilating items are not part of the same feature chain. Both rules are lexical. Their application is restricted to two adjacent spell-out domains (all phase heads count).

(28) One application context is between a noun and an inflectional affix:
   a. ume-en → umin‘child-GEN.PL “of the children”
   b. gixon altú-ak → gixon altúuk ‘tall-DET.PL “the tall men”

(29) Following Etxeberria (2007) for Basque and Johns (1987), Compton & Pittman (2007) on Inuit: two Ds are present, but only one is pronounced [in this dialect; in others, both are pronounced]. Note that the roots here are sitting in Spec of n/aP; each is therefore accessible to the closest D.
A noun and an adjective cannot interact, as suggested by the structure posited above. Assimilation is blocked because the roots are in the complement domains of two different Ds.

\[
\begin{align*}
\text{ortu estu-a} & \rightarrow \text{ortu estuu} \\
\text{field narrow-DET.SG} & \rightarrow \text{‘narrow field’}
\end{align*}
\]

Assimilation occurs between an adjective and a derivational affix: feature chains cannot involved. There are few vowel-initial derivational suffixes in Basque, and the superlative is in fact the only one that triggers assimilation; the comparative and excessive trigger raising of the root-final vowel but are exceptions to assimilation. See Elordieta (1997 ch.2, ft. vii).

\[
\begin{align*}
\text{soro-én-a} & \rightarrow \text{soruúna} \\
\text{crazy-SUP-DET.SG} & \rightarrow \text{‘the craziest’}
\end{align*}
\]

There are a few other circumstances in the nominal domain in which elements that are linearly adjacent to one another do not undergo assimilation. This is largely due to nominals being rendered inaccessible by D.

\[
\begin{align*}
\text{nire alabi-a} & \rightarrow \text{nire alabii} \\
\text{my daughter-DET.SG} & \rightarrow \text{‘my daughter’}
\end{align*}
\]

Alabi is blocked from interacting with the genitival -re by the D (-a) in the lower DP.

Outside of DP, assimilation occurs between V and Aux. Movement of V to \( v \) (Irurtzun 2007), AspP Laka (1990), or T (Elordieta 1997 et seq.) all produce the correct result: V + Aux are spelled out together in the complement of C.
Assimilation cannot occur between (the D head of) a subject and a verb, but a syntactic reason for this is not readily apparent.

lagun-a etorri da friend-DET.SG come AUX ‘the friend has come’

If feature-checking triggered the assimilation rule, this would also be unexpected, since the subject agrees in φ-features with the verbal complex. Since there are no cases in which a verb either triggers raising or undergoes assimilation, we may simply say that these rules are simply not triggered by verbs.

a. arrañ-a eroa da fish-DET buy AUX ‘(s)he has bought fish’
   b. paga eraían neutzan pay make AUX ‘I made him/her pay’

This also rules out assimilation between the verb and object in the example below, even though it would otherwise be permitted. Following Irurtzun (2007), pied-piping of the embedded CP₂ triggers V-I-C movement V/AUX.

[barristuren nova] house-DAT.DET.SG say AUX ‘They said they would renovate the house that is on the square.’

There is also no interaction between a topicalized/focalized argument or an adverb and a verb. Assimilation of the verb to the topic would be ruled out even if verbs could trigger assimilation because two phase heads, D and C, separate the topic from the verb.

a. lagun-arí emon dotzo diru-a friend-DAT give AUX money-DAT.SG ‘To the friend, (s)he has given the money.’
   b. beti amaitxuten dau askanen always finish-PRG AUX last ‘(S)he always finishes last.’
(40) Assimilation between objects is blocked (ApplH; see Arregi & Molina-Azaola (2004)). The dative -ri is too far from erregalú: the former is spelled out by v and the latter by its own D, with ApplH transferring its complement in between.

amumá-ri erregalú-a-ø ein dotzagun grandmother-DAT present-DET.SG-ABS make AUX ‘We have made a present for grandmother.’

(41) **Conclusion:** All the application and non-application environments of the Lekeitio Basque vowel raising and assimilation rules are compatible with a PDbP analysis.

- Both rules are lexical: carried on D and Aux, plus derivational suffixes (subject to a few exceptions)
- Although we have seen cases in which the rules might be expected to apply but do not, this is not problematic for the analysis
- The more crucial point is that the rules *never* apply when two morpheme-level phase boundaries intervene, which is predicted to be impossible for lexical rules in PDbP. The only elements which we must say cannot trigger this rule are verbs; otherwise we would expect a wider range of application.

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For further info: [http://ling.umd.edu/~bridget](http://ling.umd.edu/~bridget)

**References**


