DUAL PHONOLOGY

1. Description

(1) purpose
to explore a perspective where phonology falls into two distinct computational systems that work on distinct vocabulary. Work since Scheer (2012c).

(2) melodic
   a. input: segmental/melodic properties (place, manner, laryngeal), syllabic affiliation
   b. output: segmental/melodic properties (place, manner, laryngeal)

(3) syllabic
   a. input: linearity, sonority and carriers of morpho-syntactic information
   b. output: syllable structure (or more broadly: structure at and above the skeleton)

(4) computation
   a. Computation takes vocabulary items as an input and returns structure.
   b. Melodic structure, i.e. the output of (2), are items that occur below the skeleton.
   c. Syllabic structure, i.e. the output of (3), occurs at and above the skeleton.
   d. Sonority is traditionally considered to be a piece of melody ([±son], [±syll] etc.), but there is massive evidence that this is not the case.

(5) examples
   a. melodic computation
      Palatalization or l-vocalization in coda position.
   b. syllabic computation
      syllabification (i.e. the creation of syllable structure based on an unsyllabified linear string).

(6) serial order: syllabic before melodic
Since the latter may require information contained in the output of the former (lenition in coda position for example), syllabic computation must precede melodic computation (in production).
(7) bearing of morpho-syntactic
   a. Both types of computation are subject to the influence of morpho-syntactic information.
   b. Syllabic computation may be influenced by both
      1. derivationally
         chunk definition: cycles, domains, phases etc.
      2. representationally
         insertion of items that carry morpho-syntactic information into the linear string:
         hash-marks, prosodic constituency, moras, CV units etc..
   c. Melodic computation is only exposed to derivational influence.

(8) fragment of grammar: zoom on phonology and its upper relations

morpho-syntactic structure: output of computation based on morph-syntactic vocabulary

output computation 1: syllable structure
phonological structure: output of syllabic computation

vocabulary 1: sonority, linearity

vocabulary 2: melody

melodic computation
output of melodic computation: melody
(9) the global picture
[Scheer 2014]

computational system 1

<table>
<thead>
<tr>
<th>morpho-syntax</th>
<th>spell-out 1: lexical access</th>
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<tbody>
<tr>
<td>Lexicon 1</td>
<td>past tense ↔ -ed</td>
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<tr>
<td></td>
<td>α ↔ x</td>
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<td></td>
<td>β ↔ y</td>
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<td>γ ↔ z</td>
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computational system 2

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<tr>
<th>phonology</th>
<th>spell-out 2: lexical access</th>
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<tbody>
<tr>
<td>Lexicon 2</td>
<td>x ↔ a</td>
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<tr>
<td></td>
<td>y ↔ ã</td>
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<td>z ↔ г</td>
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computational system 3

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<th>phonetics</th>
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2. Motivation

(10) Modularity
   a. domain specificity identifies distinct modules
      Computational systems work on their own proprietary vocabulary and cannot parse or understand items belonging to foreign alphabets.
   b. The segregation of what is usually taken as items of the same vocabulary into two distinct and waterproof sets (2)a and (3)a is a consequence of their behaviour in "phonological" and other grammatical computation.

(11) broad generalization regarding interface communication under (12)
   a. (12)a and (12)b1 are entirely consensual among phonologists,
   b. while (12)b2 requires argument, some of which is provided below

(12) morpho-syntax and melody are incommunicado both ways
   a. morpho-syntax → phonology
      in representational communication, carriers of morpho-syntactic information in phonology are never melodic: hash-marks, prosodic constituency, moras, CV units etc. are inserted at or above the skeleton. There is no case on record where, say, [+labial] is inserted into the linear string as a representative of morpho-syntactic information.
      N.B.: whole morphemes can of course have melodic identities (a plural marker may identify as [front]: Umlaut), but this is not what we are talking about: hash-marks etc. represent so-called boundary information, i.e. non-morphemic information that is absent from the lexicon and only comes into being during morpho-syntactic computation.
   b. phonology → morpho-syntax
      Melody-free syntax:
      1. phonological properties at and above the skeleton are regularly visible and available as a factor in morpho-syntactic computation: intonation, stress, tone, size of lexical items (minimal word constraints: number of syllables or moras), rhythm.
      2. phonological properties below the skeleton are never taken into account by morpho-syntactic computation.
rationale

a. There is no good reason why morpho-syntactic information never incarnates as a piece of melody: this appears to be a design property of grammar.

b. By contrast, the inability of melody to bear on morpho-syntactic computation (12)b is a direct consequence of the basic modular principle: foreign vocabulary cannot be understood.
   1. Syllable structure (or anything above the skeleton) is the structure produced by syllabic computation and hence cannot be vocabulary.
   2. Therefore, melody is the only phonological vocabulary and thus is unparsable by morpho-syntax.
   3. On the other hand, nothing withstands items at and above the skeleton to be taken into account by morpho-syntactic computation.

3. Further evidence I: phonology and foreign information

category-sensitive phonology

=> morpho-syntactic information cannot bear on melody (12)a

a. syntactic categories (N, V, A) impact phonology at and above the skeleton, never below.

b. Example
   English stress. In items such as récord - recórd, pérvert - pervért or éxtract - extrác, stress is a function of category: it falls on the penultimate vowel in nouns, but is final in verbs.

c. Smith (2011) has gathered relevant empirical material and concludes (p. 2439) that "nouns show greater phonological privilege than verbs. The phenomena range over suprasegmental and prosodic effects; no straightforward segmental or featural cases of noun privilege have been identified."

d. Smith's summary of category-sensitive phonological properties
   - stress
   - accent
   - tone
   - prosodic shape
   - diachronic segment deletion

e. other relevant literature

syntax cannot see melody (12)b

a. basic observation that has led to Zwicky & Pullum's (1986) principle of phonology-free syntax: there are no cases where, say, verbs are raising verbs only if they begin with a labial.

b. That melody is also invisible for morphology is shown by the two observations under (16) - infixation and (17) - allomorphy
(16) infixation
Scheer (2012c, 2016)

=> melody does not contribute to the definition of the anchor

a. Yu (2007) has studied 154 infixation patterns from 111 languages belonging to 26 different phyla and isolates (see also Moravcsik 2000 and Samuels 2009: 147ff).

b. anchor points that infixes look at in order to determine their landing site are either
- edge-oriented or
- prominence-oriented
1. for the left edge for example, documented situations are:
   "after the first consonant (or consonant cluster)", "after the first vowel", "after the first syllable", "after the second consonant"
2. prominence-based attractors are:
   stressed vowels, stressed syllables, stressed feet.

c. no melody
In no case is melody reported to be relevant for the definition of the landing site. Hence cases where infixes are inserted after, say, the first labial consonant of a word (and in absence of labials are prefixed) are not on record.

(17) allomorphy
Scheer (2016)

a. phonologically conditioned allomorphy is never melodically conditioned. [sonority is not melody: see below]

b. all cases where phonological properties are a factor in determining allomorph selection
   1. either do not involve melody (a large majority of cases)
   2. or may be reduced to a single underlier (floating segment analysis) and hence turn out not to be allomorphy in the first place (small residue of cases).

(18) Chunk definition (mapping)

=> melody does not contribute

a. is the delineation of phonologically relevant chunks in the linear string.

b. traditionally, there are two means of chunk definition:
   1. the cycle (today phase theory) => procedurally
   2. constituents of the Prosodic Hierarchy => representationally
Scheer (2012a: §99, 2012b)

c. on the representational side
empirical picture emerging from 30 years of Prosodic Phonology:
prosodic phrasing is done on the basis of morpho-syntactic information, plus the following phonological information:
   1. information structure
      [extra-phonological]
   2. eurythmy Ghini (1993)
      [probably extra-phonological]
   3. size of the string:
      longer strings have a tendency to be cut into more pieces.
      Nespor & Vogel (1986: 42ff)
      This generalization, however, is disputed: data have been reanalyzed in terms of morphological or syntactic complexity. Cf. Wagner (2005a,b), Sandalo & Truckenbrodt (2002), Scheer (2011: §421).
4. Further evidence II: phonology proper

(19) phonology proper
   a. a trivial but hardly ever mentioned fact about the computation of supra-skeletal structure is that melody is never involved.
      [sonority is not melody: see below]
   b. That is, melody never plays a role when
      1. stress,
      2. tone,
      3. syllable structure
      4. positional phenomena
      are computed, or when
      5. computational domains
      are defined (cycles, phases, prosodic constituents etc.).
   c. there is no such thing as
      1. "stress the penultimate when preceded by a labial, otherwise the ante-penultimate"
      2. "contour tones may only appear on long vowels or short vowels followed by a labial coda"
      3. "a C₁C₂ cluster is a branching onset iff C₁ is a labial"
      4. "l-vocalization occurs before another consonant, but only when the preceding vowel is back"
      5. "start a new computational domain every time you hit a labial"

(20) sonority is not melody
   a. it has a special status:
      depending on phonological theories, it may or may not be a melodic prime
      1. [±son], [±syll] etc. traditionally
      2. Government Phonology
         no specific prime, the sonority of a segment is a function of its complexity (i.e. the number of primes involved) and the intrinsic properties of existing primes (L, H, A).
   b. everybody agrees that
      1. sonority is an information that is present in phonological vocabulary
      2. syllable structure is a projection of 1) sonority and 2) linear order
   c. but
      1. since sonority is projected to syllable structure, it may be read off syllable structure:
         if one knows that there is a branching onset, it can be deduced that the first member is more sonorous than the second member.
      2. this is NOT the case for labiality, voicing etc.:
         labiality is not projected above the skeleton and cannot be read off syllable structure:
         if one knows that there is a branching onset, nothing is known about whether its first member is a labial, a velar etc.
when sonority is visible for morpho-syntax (in allomorphy for example), the information is not accessed from below the skeleton, but from above.

(21) stress I
on the consonantal side
a. only positional (syllabic) factors define stress placement, **EXCEPT sonority**

b. Syllable Weight determines stress placement
   Weight-by-Position (Hayes 1989): VC is heavy
   Regarding consonants, it is well-known that codas may or may not make a syllable heavy (and hence attract stress).

c. weight by coda sonority: VR is heavy (but VT light)
   1. Weight-by-Position, however, allows for more fine-tuning: in some languages, sonorant, but not obstruent codas, contribute to the weight of their syllable.
   2. Documented cases are found in native American Wakashan languages (e.g. Wilson 1986, Zec 1995:103ff, Szigetvári & Scheer 2005: 44f).

d. The literature on stress has a strong typological orientation
   ==> as far as I can see, no pattern was identified where truly melodic properties such as labiality, palatality etc. influence stress placement.

(22) stress II
on the vocalic side
a. de Lacy (2002) and Gordon (2006: 52) have established the same generalisation, which is also based on broad cross-linguistic evidence.

b. sonority, but no other property of vowels may influence stress placement.

c. "One issue this typology raises is not why stress is sensitive to sonority, but rather why it is not sensitive to so many other properties. There are no stress systems in which subsegmental features such as Place of Articulation or backness in vowels plays a role in assigning stress. The same goes for features such as [round], [nasal], and secondary articulation." de Lacy (2002: 93)

(23) tone
positional restrictions for the occurrence of contour tones
==> no melody properties play a role, except sonority
a. restrictions are governed by the same properties as for stress: Syllable Weight

b. typology (e.g. Gordon 2006: 34, 85, based on the examination of some 400 languages)
   contour tones occur on the following syllable type
   
<table>
<thead>
<tr>
<th></th>
<th>CV</th>
<th>CVT</th>
<th>CVR</th>
<th>CVV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Somali</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>yes</td>
</tr>
<tr>
<td>2. Kiowa</td>
<td>–</td>
<td>–</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>3. Hausa</td>
<td>–</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>4. no restriction</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

c. onsets play no role
   - undisputed for tone
   - classically admitted, but today disputed for stress
d. difference between tone and stress in the commonness of Weight patterns

“One of the more striking distributional asymmetries between different phenomena is one discussed earlier: the difference in weight criteria found in stress systems compared to those found in tone systems. In particular, the CVV(C), CVR heavy criterion is quite common in tonal systems, but extremely rare in stress systems. Conversely, the CVV(C), CVC heavy criterion is vanishingly uncommon for tonal weight, but well attested in stress systems.” Gordon (2006: 52)

(24) syllable structure
   melody does not impact syllable structure
   a. syllable structure is a function of
      1. sonority of consonants
      2. linear order of segments
   b. there are no cases on record where, say, labials cannot be syllabified into codas and therefore have to go into onsets.
   c. of course there are coda restrictions and the like, and these may be melodically defined (e.g. only dentals allowed in codas). Here the conditioning is the other way round, though: a specific type of melody cannot exist in a particular position. This is commonplace: cf. lenition.

(25) positional phenomena
   a. are never sensitive to melodic properties of the environment.
      1. Except for sonority, which may bear on the definition of the strength of a consonant.
      2. \( \Rightarrow \) sonority is not a melodic prime.
   b. examples
      1. vowel reduction in unstressed syllables concerns ALL vowels, not just, say, back vowels.
      2. coda consonants are weak
         - no matter what the post-coda consonant. There are no cases where \( C_1 \) in \( VC_1.C_2V \)
         is a coda only when \( C_2 \) is, say, a labial.
         - and no matter what the preceding vowel.
      3. post-coda consonants are strong [the Coda Mirror]
         no matter what the coda. There are no cases where \( C_2 \) in \( VC_1.C_2V \)
         is strong only when \( C_1 \) is, say, a velar.

5. Melody may not be under grammatical control

(26) crazy rules
   a. crazy rules are rules that make no phonetic sense
   b. literature
   c. example: Sardinian (Contini 1987, Scheer 2015)
      \( l \rightarrow k / V__V \), including in external sandhi
d. crazy rules are only ever melodically crazy: there are no cases on record where craziness occurs in
- stress systems
- syllabic processes (say, closed syllable lengthening, compensatory shortening etc.)
- positional strength (say, intervocalic strengthening, post-consonantal weakening).

(27) absolute agrammaticality (phonologically driven)

a. absolute agrammaticality occurs when a cell in a morphological paradigm remains empty for phonological reasons, and no repair will do. Speakers avoid these forms and even when urged refuse to produce anything at all. Circumlocation then is the typical way to express the meaning.

b. literature includes

c. reasons for phonologically driven absolute agrammaticality:
1. sonority: Norwegian
2. (minimal) size: Turkish, English
3. clustering: Hungarian
4. stress: English, German
5. autosegmental association: Chaha

d. Norwegian (Rice 2003)

imperatives *…VTR !
ok: elsk !, gift !, følg !, frykt !
but: åpne → *, kvikne → *, padle → *, takle → *, ytre → *

e. no cases appear to be on record where melody causes absolute agrammaticality. For example, where imperatives are ill-formed when ending in a labial.

6. Consequence: substance-free phonology and phonetic arbitrariness

(28) The observation that melody appears to escape grammatical control ties in with Substance-Free Phonology

a. Substance-Free Phonology
- Hale & Reiss (2000, 2008),

b. That is, melodic computation (2)
1. works with phonological primes that have no intrinsic content (α, β, γ instead of [labial], [nasal] etc.)
2. and are related to a phonetic value only through a dictionary-type relation that defines how the output of phonological computation is pronounced.
3. This relation is arbitrary in kind and represents spell-out in a modular architecture (Scheer 2014), i.e. is the same operation as the spell-out familiar from the upper interface where morpho-syntactic vocabulary is converted into phonological material.
c. example I

Dresher & Compton (2011)

Proto-Eskimo modern dialect

\[
\begin{align*}
\alpha & \leftrightarrow i & \text{no change} & \text{palatalizing i} \\
\beta & \leftrightarrow a & \text{no change} \\
\gamma & \leftrightarrow u & \text{no change} \\
\delta & \leftrightarrow \varepsilon & \rightarrow \delta & \leftrightarrow i & \text{non-palatalizing i}
\end{align*}
\]

the phonology of the modern dialect and Proto-Eskimo is exactly the same, nothing has changed. The only thing that changed is the way the output of phonological computation is pronounced: spell-out.

d. example II

South-East British posh girls

Henton (1983), Harrington et al. (2008)

1. pronounce /uu/ as /ii/: "boot" is pronounced [biit].
2. but: gliding in external sandhi

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<thead>
<tr>
<th>O</th>
<th>N</th>
<th>O</th>
<th>N</th>
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<tbody>
<tr>
<td>β</td>
<td>α</td>
<td>γ</td>
<td>δ</td>
</tr>
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</table>

see [ii j] it

see [ii j] it

do [uu w] it

do [ii w] it

3. \(\Rightarrow\) the vowel in "do" is still underlyingly /uu/ (rather than /ii/): this is witnessed by the glide.

4.

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<th>O</th>
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<tbody>
<tr>
<td>β</td>
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<td>γ</td>
<td>δ</td>
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↓ ↓ ↓ ↓

spell-out

| d | ii | w | i | t |

phonetics

\[
\begin{align*}
\alpha & \leftrightarrow u & \text{when associated to one N} \\
\alpha & \leftrightarrow ii & \text{when associated to two Ns} \\
\alpha & \leftrightarrow w & \text{when associated to an O}
\end{align*}
\]

(29) phonetic arbitrariness

a. consequence of spell-out

the relationship between phonological and phonetic categories is arbitrary: phonological computation does not care for the phonetic properties of the items it manipulates.

b. relevant literature


c. phonological computation

any segment may be turned into any other segment in any context.

1. \(\Rightarrow\) SPE was right.
2. the stab of conscience Chomsky & Halle had in chapter 9 and which in popular belief disqualified it in the 70s (this is what we all teach) was unfounded – as far as melody is concerned.
3. it was not unfounded regarding syllable structure and other things at and above the skeleton: these items are under grammatical control.
d. grammar has no say on what happens with melody:
   1. given the life cycle of phonological processes (Bermúdez-Otero 2014), phonetic patterns are phonologized as phonological processes;
   2. they are well-behaved at first (regular, "make sense") but in further evolution may take on properties that estrange them from their initial phonetic transparency, leading to craziness (Bach & Harms 1972).

e. phonological computation happily manages all of these diachronic stages, including melodic craziness, since it is blind for substance: melody is absent from the phonology and only comes into play when phonological computation is done and its output is spelt out into phonetic categories.

References


Törkenczy, Miklós & Péter Rebrus 2010. Covert and overt defectiveness in paradigms. Modeling ungrammaticality in optimality theory, edited by Sylvia Blaho & Curt Rice,