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this handout and some of the references quoted at
www.unice.fr/scheer/

DIRECT INTERFACE
A NON-DIACRITIC THEORY OF HOW MORPHO-SYNTAX TALKS TO PHONOLOGY

1. What this talk is NOT about

(1) What this talk is NOT about
   a. Interface Dualism (Scheer 2011:§6)
       there are two ways for morpho-syntax to talk to phonology:
       1. procedural (derivational)
           since Chomsky *et al.* (1956:75) where cyclic derivation is introduced. Known under variable headings:
           - transformational cycle (SPE)
           - phonological cycle (70s, Mascaró 1976),
           - cyclic derivation (Lexical Phonology)
           - lately phases in syntactic theory (Uriagereka 1999, Chomsky 2000 and following)
       2. representational
           carriers of extra-phonological (non-morphemic) information in phonology:
           you INSERT an OBJECT into phonological representations that does NOT carry morphemic information.
           - neogrammarians: various diacritics
           - structuralism: juncture phonemes
           - SPE and 70s: boundaries, e.g. hash-marks #
           - since the early 80s: the Prosodic Hierarchy (Selkirk 1981 [1978] and following)
       ==> this talk is NOT about the procedural (derivational) side of the interface
       [see Scheer 2009a,b, 2011 on that]
   b. One-Channel Translation
       i.e. computational vs. lexical translation (through the lexicon)
   c. how (and whether) phonology eventually bears on morpho-syntax
       a disputed issue: phonology-free (in fact melody-free) syntax
       (Zwicky & Pullum 1986 and following), see Scheer (2011:§412)
       ==> in this talk only the direction morpho-syntax → phonology is considered.
   d. morphology vs. syntax?
       you will learn nothing in this talk about the fiercely disputed question whether morphology and syntax are two distinct or one and the same computational system.
       ==> sometimes, though, this is relevant for phonology, who needs a result of the strong arms above it to be able to do its work:
       ==> the word-spell-out mystery (Scheer 2009c, Scheer 2011:§794)

2. What this talk IS about: representational communication with phonology (Scheer 2012)

(2)   What representational communication with phonology is about
    a.   the 5 issues below are the backbone of what I take representational communication with phonology to be about.
    b.   it is reasonable to believe that the representational side of the interface reduces to these five questions.
    c.   1. some are present and discussed in the literature for a long time:
        #1 modularity and its consequence, translation [transduction]
      2. some were discussed at some point but are not anymore for some time:
      #2 chunk definition
      #3 (non-)privativity of translation
      #4 the diacritic issue
      3. some have never been a concern and are virtually absent from the literature:
      #5 local vs. non-local insertion

Major issues for representational communication with phonology

(3)   #1
modularity and its consequence, translation [transduction]
[is there any translation at all?]
are morpho-syntax and phonology distinct computational systems whose input are distinct sets of vocabulary items? If so, in order to be able to communicate at all, the output of morpho-syntactic computation needs to be translated into phonological vocabulary before phonological computation can proceed.

(4)   #2
chunk definition: procedural or representational?
[is translation responsible for chunk definition?]
everybody agrees that the linear string is cut into a number of chunks that are phonologically relevant in the sense that they limit the application of phonological processes (which are blocked by chunk boundaries). The question is whether the definition of these chunks is done
1. procedurally (derivationally): by cyclic derivation, today called phase theory, or
2. representationally: by prosodic constituents, i.e. the output of translation.

(5)   #3
(non-)privativity of translation
[what exactly is translated?]
it is an observational fact that phonology is **underdetermined** by morpho-syntactic information: only some pieces thereof impact phonology. That is, most of morpho-syntactic information is entirely transparent to phonology. The question is thus whether only phonologically relevant information should be translated, or whether everything, including irrelevant noise, should be shipped to the phonology.

(6) #4
the diacritic issue
[what does the output of translation look like?]
what kind of objects are inserted into the phonological string? Could this be any kind of object, i.e. diacritics such as #, or are there restrictions? Given modularity and domain specificity, diacritics do not qualify: only genuine members of the specifically phonological vocabulary can be carriers of morpho-syntactic information.

(7) #5
local vs. non-local insertion
[how exactly is the output of translation inserted into the linear string?]
how exactly do carriers of (non-morphemic) morpho-syntactic information intervene in phonology? Locally (i.e. as a piece in the linear string that is located between two morphemes) or not (i.e. in form of autosegmental domains that cannot be localised in the linear string)?

3. Direct Interface

(8) Question 1
Is there any translation at all?
Yes. The mind is modular, and so is language. Morpho-syntax and phonology are distinct modules that work with distinct domain-specific vocabulary. Hence any communication requires translation: carriers of morpho-syntactic information are the output of translation.

(9) Question 2
Is translation responsible for chunk definition?
a. No. The chunks that are submitted to phonological computation are defined procedurally by cyclic (inside-out) derivation. Cyclic derivation is needed anyway, whether in the form of modern phase theory or in some other guise, and the chunking labour must not be done twice. Hence there is no place for a representational device that in addition to phase theory defines chunks.
b. An important condition for this perspective to be workable is selective spell-out on the procedural side, i.e. the idea introduced by Halle & Vergnaud (1987) that only a subset of morpho-syntactic nodes, today called phase heads, constitute a spell-out domain. Selective spell-out and its modern incarnation in phase theory is discussed at greater length in Scheer (2011:§§763, 771).

(10) Question 3
What exactly is translated?
a. Only phonologically relevant morpho-syntactic information is translated. Morpho-syntactic properties that have no phonological effect are not translated. Translation serves a purpose: it flags some morpho-syntactic property in the signal. What exactly is flagged and why is a different question that linguists are unable to answer: this is what is called the mapping puzzle in Scheer (2011:§753).
b. In any event, a theory of the representational communication of morpho-syntax with phonology does not need to, or rather, must not care for how chunks are defined: they are defined by some other device (i.e. the spell-out mechanism). What a representational theory of the interface is about is only the transformation of phonologically relevant morpho-syntactic information into the domain-specific phonological vocabulary, and its insertion into phonological representations.

(11) Question 4
What does the output of translation look like?
a. The output of translation is a piece of the domain-specific vocabulary that is used in the phonological computational system. How this vocabulary is identified is shown in (29) below. Beyond this restriction that is commanded by modularity, an empirical generalisation further shrinks the set of possible carriers of morpho-syntactic information in phonology: melody does not qualify.
b. these combined restrictions shrink the window of possible carriers to just
   syllabic space.
c. This also determines which objects do *not* qualify for the output of translation:
   1. diacritics and
   2. (autosegmental) domains.
   The former include all objects that traditional interface theories have used for the representation of morpho-syntactic information in phonology: juncture phonemes, hash marks and prosodic constituency.

(12) Question 5
How exactly is the output of translation inserted into the linear string?
a. Insertion of the carriers of morpho-syntactic information into the linear string of morphemes is
   1. linear and
   2. local
   ==> SPE's hash-marks
b. This means that objects which represent non-morphemic information in phonology
   1. have a left and a right neighbour, and that
   2. these neighbours are morphemes: insertion can only occur at morpheme breaks (there is no insertion in the middle of morphemes).

4. Direct Interface in the broader architecture of grammar

(13) so why is Direct Interface direct?
a. because it eliminates the buffer (or sponge)
==> no specific interface objects exist between morpho-syntax and phonology
==> no #s, ω's, φ's, bananas or apples
b. the output of translation are only truly phonological objects, i.e. ones that exist in phonology **independently of any interface activity**.

(14) Direct Interface is a theory of the interface, NOT of phonology
a. DI is about interface design, not the design of phonological theories.
b. It prohibits the use of diacritics in phonological theories, but is otherwise neutral: other properties of particular phonological theories remain uncommented.
c. Or, in other words, Direct Interface follows the minimalist idea to shape linguistic theories according to the properties of the interface that they are exposed to.
==> **individual phonological theories are refereed by the interface.**

(15) No uniform interface vocabulary
a. the properties of competing phonological theories may only be impacted precisely because there is no difference between regular phonological vocabulary and interface vocabulary.
b. That is, different phonological theories have different vocabulary and promote different representational objects – in the perspective of Direct Interface, they thus make different predictions as to what is a possible output of translation.
c. This output, in turn, defines in which way morpho-syntax influences phonology.
d. This means that in the end the **idiosyncratic vocabulary** of individual phonological theories defines what a possible interface event is (at least as far as the representational side of the interface is concerned).
e. a uniform interface vocabulary (#,ω's, φ's, bananas or apples) evens out differences of individual phonological theories, which may be different in phonology, but are all IDENTICAL at the interface.
==> **no way to ever have them refereed by interface events.**

(16) deforestation
[Scheer 2011:§42, 2012:§9]
a. Direct Interface eliminates arboreal structure: the Prosodic Hierarchy
==> last piece of arboreal structure left.
b. CVCV is a LATERAL project
[Lowenstamm 1996, Scheer 2004, Szigetvári 1999, Szigetvári & Scheer 2005, Cyran 2010]
==> lateralization of structure and causality (Scheer 2004:§166)
example:
coda = **sister** of the nucleus
vs.
coda = **followed** by a governed empty nucleus
c. well-known and fundamental different between morpho-syntax and phonology:
1. there is no recursion in phonology
2. there is no concatenation in phonology (or semantics for that matter)
==> hence there is no tree-building device in phonology

    d. Merge
       1. recursion is the consequence of concatenation.
          ==> no concatenation, no recursion.
       2. trees are the consequence of concatenation
          ==> no concatenation, no trees
       3. recursion supposes trees:
          ==> no trees, no recursion
      ==> hence CVCV *predicts* the absence of recursion in phonology
      [Scheer 2004:§§2, 802ff]
    e. there couldn't be a tree-based interface in the lateral perspective of phonology.

5. Arguments

(17) to be made below
    a. the Prosodic Hierarchy is a diacritic
      ==> diacritics are outlawed by modularity: domain specificity
    b. **the output of translation must be local: domains are necessarily diacritic**
      linear and local (boundaries) vs. domain-based (prosodic constituents)
      ==> only boundaries can be non-diacritic (sic)
      ==> the only possible interface currency are non-diacritic boundaries (sic)
    c. chunk definition: the Prosodic Hierarchy is redundant
    d. the Direct Effect
      diacritic sleepers make no prediction: they may trigger anything and its reverse
      vs.
      phonologically meaningful objects make predictions
      ==> morpho-syntactic information does NOT produce random effects
      (e.g. at the left edge of words)
    e. **conclusion**
      the window for representational items that can carry morpho-syntactic information in
      phonology shrinks to **syllabic space**.

(18) made elsewhere
    [Scheer 2008, 2011:§§400, 457, 757 2012:§§83, 78]
    aside from its diacritic character, the Prosodic Hierarchy cumulates violations of what
    was identified as a correct interface design:
    a. it is a non-privative means of doing translation: (almost) everything is shipped to the
      phonology, including irrelevant noise (question 3).
    b. the adaptation of the Prosodic Hierarchy to the constraint-based environment of OT
      has produced constraint-based mapping, which transfers translation *into* the
      phonology and thereby destroys the original modular architecture of Prosodic
      Phonology: translation is necessarily done in modular no-man's land.

6. Modularity and Translation
6.1. Modularity

(19)   the mind is made of specialized computational systems
        [introduction to cognitive science for linguists:
        - Isac & Reiss (2008)
        - Boeckx (2010)
        - Scheer (2011:§586)]
   a. Franz-Josef Gall (1758-1828), phrenology
   b. implicit in the Turing - von Neumann model that underlies the so-called cognitive revolution of the 50s-60s (Gardner 1985)
   c. Chomsky & Halle's (1968) description of the phonological rule system:
        "The rules of the grammar operate in a mechanical fashion; one may think of them as instructions that might be given to a mindless robot, incapable of exercising any judgment or imagination in their application. Any ambiguity or inexplicitness in the statement of rules must in principle be eliminated, since the receiver of the instructions is assumed to be incapable of using intelligence to fill in gaps or to correct errors." Chomsky & Halle (1968:60)
   d. modern and explicit incarnation: Fodor (1983) and following

(20)   competing model of the mind: connectionism
   a. Rumelhart *et al.* (1986) and following
   b. issues:
        – parallel, instead of serial computation
        – colourless (content-free) computation: computation is all-purpose, rather than (domain) specific
        – consequence: computation is non-symbolic
        – non-distinction between storage and computation: rule-list fallacy
        – reductionsim (eliminativism): there is no mind, the brain is the only relevant entity
   c. in linguistics: "Cognitive" Linguistics, Langacker (1987) and following, see e.g. Taylor (2002) for an overview.
   d. overview literature:
        Pinker & Mehler (eds.) (1988), Dinsmore (1992), Pylyshyn (1999), Rumelhart (1989), Stillings *et al.* (1995:63ff), Thagard (2005:111ff)

(21)   core properties of cognitive modules according to Segal (1996:145)
   a. **domain specificity**
   b. **informational encapsulation**
   c. obligatory filtering
   d. fast speed
   e. shallow outputs
   f. limited inaccessibility
   g. characteristic ontogeny
   h. dedicated neural architecture
   i. characteristic patterns of breakdown

(22)   how do we identify modules?
   a. **domain specificity**
   b. **informational encapsulation**
   c. based on pathologies: double dissociation
        e.g. Curtiss (1981, 1988, 2012), Smith & Tsimpli (1995)

(23) **domain specificity requires translation**
    a. a direct consequence of the fact that different modules speak different languages (of the mind) is their inability to understand each other. Modules can only parse objects that belong to their own language, i.e. which are part of the domain-specific vocabulary that they are designed to process.
    b. "'Mixed' representation[s] should be impossible. Rather, phonological, syntactic and conceptual representations should be strictly segregated, but coordinated through correspondence rules that constitute the interfaces." Jackendoff (1997:87ff)

(24) **domain specificity rules out diacritics**
    if only items of the domain-specific vocabulary of module can be parsed and computed, diacritics are out: they do not belong to any proprietary vocabulary.

6.2. Modularity in language

(25) the standard model: inverted T
    a. three independent and domain-specific computational systems:
        1. (morpho-)syntax = the concatenative system, whose output is interpreted by
        2. phonology (PF) = assigns a pronunciation
        3. semantics (LF) = assigns a meaning
        Chomsky (1965:15ff)

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                      morpho-syntax

                           |
                           |
                           |
          PF ——————————————|—————————————— LF
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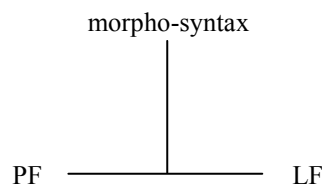
(26) **phonology vs. the rest**
    a. if we go by domain specificity,
    the major ontological gap in language is between phonology and the rest.
    Vocabulary used in

syntax, morphology, semantics:	phonology:
number	
person	labiality
gender	friction
animacy	voicing
quantification	occlusion
aspect	

(26) **phonology vs. the rest**
    b. Jackendoff's (1987, 1992, 1997) Representational Modularity
    (called Structure-Constrained Modularity today, Jackendoff 2002:218ff)

       "The overall idea is that the mind/brain encodes information in some finite number of distinct representational formats or 'languages of the mind.' Each of these 'languages' is a formal system with its own proprietary set of primitives and principles of combination, so that it defines an infinite set of expressions along familiar generative lines. For each of these formats, there is a module of mind/brain responsible for it. For example, phonological structure and syntactic structure are distinct representational formats, with distinct and only partly commensurate primitives and principles of combination. Representational Modularity therefore posits that the architecture of the mind/brain devotes separate modules to these two encodings. Each of these modules is domain specific.
       […] The generative grammar for each 'language of the mind,' then, is a formal description of the repertoire of structures available to the corresponding representational module." Jackendoff (1997:41)

    c. Chomsky (2000)
       "The phonological component is generally assumed to be isolated in even stronger respects: there are *true* phonological features that are visible only to the phonological component and form a separate subsystem of FL [the Faculty of Language], with its own special properties." Chomsky (2000:118, emphasis in original)

    d. Late Insertion = segregation of phonological vocabulary
    while up to Government & Binding (80s), morpho-syntactic computation was done on the basis of complete lexical information that included syntactic, morphological and semantic features as much as phonological material (sealed suitcases), Late Insertion is the idea that phonological material is absent from morpho-syntactic computation

7. The Prosodic Hierarchy is a diacritic
[Scheer 2011:§§365, 399, 2012:§93, 2008]

(27) Prosodic Phonology lays claim to boundaries: they are the old buffer, prosodic domains are the modern buffer
    a. In an overview article that anchors the legitimacy of Prosodic Phonology (with respect to Direct Syntax), Vogel & Kenesei (1990:344) review the arguments in favour of Indirect Reference. One point they make is historical: all interface theories have been indirect thus far, so there is probably something to this approach. They single out SPE as a forerunner of Indirect Reference.
    b. "Working within the SPE framework, Selkirk [1972] modifies the original proposal by showing that at least in certain types of phonological phenomena, interaction between the two components is only indirect. Word boundaries (#'s) inserted into a string on the basis of syntactic structure determine where external sandhi rules apply. Phonological rules thus do not directly 'see' syntactic structure, but rather access only strings of segments and boundaries." Vogel & Kenesei (1990:344)
    c. Representatives of Prosodic Phonology thus lay claim to the equivalence of #s and the modern prosodic constituency.
    d. The same line of reasoning is found in another overview article by Inkelas & Zec (1995). The authors call p-structure the level of representation that mediates between morpho-syntax and phonology; they explicitly identify boundaries as the ancestor of this mediating structure, whose more recent incarnation is the Prosodic Hierarchy.
    e. "An early version of p-structure was proposed in SPE and developed in subsequent work (Selkirk, 1972, 1974; Rotenberg, 1978). According to this view, domains of phonological rules are expressed in terms of phonological boundary symbols, generated by rules. […] Far more constrained is the 'prosodic' view of p-structure. Under this view, p-structure occupies a level with its own hierarchical organization and a high degree of autonomy." Inkelas & Zec (1995:537f)

(28)   prosodic units are autosegmentalized hash-marks
a.   If thus prosodic constituency is but a more advanced version of boundaries that presents a number of advantages, it must have the same formal properties as its predecessor.
b.   The two quotes clearly show that prosodic constituency, just as hash marks, is a diacritic: it serves no other purpose than replicating phonologically relevant morpho-syntactic information in phonology.
c.   This is the essence of diacritic translation, which is based on a buffer (or a sponge): phonologically relevant information is stored into a diacritic, which is transported into phonology where its load is released.
d.   We have seen that this is true for the original implementation of the Prosodic Hierarchy where translation was rule-based, as much as for the OTed version thereof, constraint-based mapping.

(29)   a diacritic is an alien
a.   A formal definition of what exactly counts as a diacritic must rely on the alien status of the object in question in the environment where it evolves. A workable definition appears below.
b.   definition of the term "diacritic"
a diacritic is a non-native object in module X: it is only used when information from outside of X is processed. It is absent from events that do not appeal to extra-Xal information.

(30)   Hash marks and omegas (i.e. prosodic words) alike meet these conditions
a.   **intruders**
they are non-phonological intruders in the phonological world which are injected for the *exclusive* purpose of storing extra-phonological information.
b.   **absent from phonological processes that are not impacted by extra-phonological information**
Also, they are systematically absent from phonological processes that do not use extra-phonological information. For example, an ordinary palatalisation that turns k into t͡ʃ before front vowels involves consonants, vowels, velarity, palatality, occlusion, affrication and the like, i.e. all pieces of the proprietary vocabulary that is used and managed in phonological computation. Such a process does not appeal to any extra-phonological information: this would only be the case if the description were, say, "k turns into t͡ʃ before front vowels, but only in case there is a morpheme boundary between the trigger and the target."
c.   **how to identify domain-specific vocabulary: by reference to extra-phonological information**
There is thus an objective and pre-theoretical means to tell processes apart that use extra-phonological information, and processes that do not. Therefore, we can be sure that *only* domain-specific vocabulary, i.e. the one that is used in the computational system which carries out phonological computation, occurs in the former process. By contrast in the latter, the information that is processed by phonological computation is blended: the specifically phonological vocabulary cohabitates with a carrier of extra-phonological information (a morpheme boundary).
d.   If some item, then, never occurs in the "pure" processes, i.e. those that only use specifically phonological vocabulary, we can safely conclude that it is an alien.

(30) Hash marks and omegas (i.e. prosodic words) alike meet these conditions
    e. **"purely" phonological processes do not make reference to hash marks or omegas**
        Obviously, hash marks as much as omegas (prosodic words), phis (prosodic phrases) or any other prosodic constituent from the prosodic word upwards, are never found to participate in processes that do not use morpho-syntactic information. For example, there is no palatalisation of the pure kind "k turns into t͡ʃ before front vowels" where a hash mark, an omega, a phi or anything of that kind is needed. Therefore all of these items are diacritics.

(31) Apples and bananas in phonology, but not in syntax
    a. Another obvious issue is that like boundaries, the units of the Prosodic Hierarchy are arbitrarily chosen and named: "ω" (the phonological word), "φ" (the phonological phrase) etc. are not any less arbitrary than "+" or "#".
    b. Calling a unit whose exclusive purpose is to store and release some information a hash mark, an omega, a banana or an apple does not make any difference: any label will do.
    c. For some reason, though, phonologists always point out the arbitrariness of the typewriting symbol #, but do not mind talking about omegas and phis.
    d. Saying that an omega is only shorthand for a real linguistic object, the phonological word, does not help: the same may be said about + and #, only that a regular scientific-sounding terminology has never been introduced for these objects.
    e. pointing out that omegas and phis represent certain stretches of the linear string which coarsely correlate with morpho-syntactic divisions does not make them less arbitrary. Everybody knows that the linear string is chunked into stretches that define the domain of application of phonological processes, and that these stretches more or less closely follow morpho-syntactic structure. The issue is not the coarse equivalence between morpho-syntactic structure and phonologically relevant stretches – it is the nature of the items that are supposed to be inserted into the phonology in order to carry this information.
    f. 🍌P ?
        Finally, it is interesting to observe that only phonologists seem to be happy to live with apples and bananas in their theory: there is no equivalent in morphology, syntax or semantics.
        No representative of these disciplines would accept, say, an ωP (omega phrase), a #P (hash mark phrase) or a 🍌P (banana phrase). Nodes in morpho-syntactic structure project something, and this something is recorded in the lexicon: items only qualify if they belong to the domain-specific vocabulary of the morpho-syntactic computational system (number, gender, person etc., but no bananas, omegas or hash marks).

(32) projection of nothing
**prosodic constituents are the projection of nothing.**
Nodes of the (higher layers of the) Prosodic Hierarchy are not projected from terminals, and do not represent any of the terminals' properties.

8. Output of translation: local vs. non-local insertion

8.1. Morphemic vs. non-morphemic information (and their distinct translation)

(33)   translation in generative interface thinking
       Two Channel
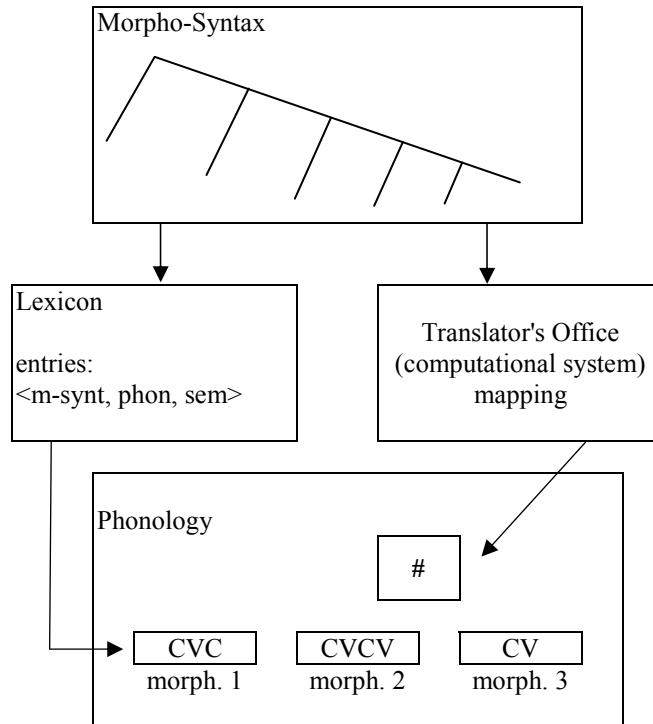
(34)   morphemic vs. non-morphemic information
       mixed lexical and computational translation
       a. lexical translation
           morphemic information is transformed into phonological material through a
           lexicon:
           - <number = sg>
           - <person = 3>
           - <verb class = X>
           ==> morpheme injected into phonology: -s (English)
       b. computational translation
           non-morphemic (boundary) information is transformed into phonological objects by
           a computational process:
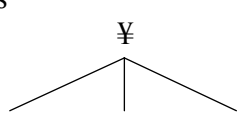   párent   = bare root, penultimate stress
           parént-al   = root + class 1 affix, penultimate stress
           párent # hood = root + class 2 affix, root stress (stress assignment blocked)

8.2. Local vs. non-local insertion
[Scheer 2012:§§132f]

(35) insertion has always been local
    a. since the 19th century, the insertion of carriers of morpho-syntactic information into phonological structure was always local
    b. this is true for
      - neogrammarian work,
      - Trubetzkoy's Grenzsignale,
      - structuralist juncture phonemes,
      - SPE-style boundaries.

(36) local insertion
    a. local insertion means that the object at hand is made a member of the linear string of morphemes (or Vocabulary Items):
    b. a # has a lefthand and a righthand neighbour and (unless it is labelled, which is a different issue) does not entertain any relationship with other hash marks.
    c. and of course a # does not define any domain to which phonological processes can make reference.[1]
    d. the locality of intervention is well incarnated by the traditional notion of sandhi: sandhi phenomena occur at the break of two morphemes (internal sandhi) or words (external sandhi), and are triggered (or not impeded) by this division.

(37) non-local insertion
only representative: prosodic constituency of Prosodic Phonology
    a. nothing is inserted into the linear string
    b. rather, autosegmental domains are superimposed onto it.
    c. non-local insertion is a child of autosegmentalism
    this conception of the output of translation took over in the early 80s when all areas of phonology were autosegmentalised, and since then stands (almost) unchallenged.

(38) local vs. non-local insertion
output of translation: ¥
    a. local: ==> **boundaries**
      ¥ is inserted at morpho-syntactic divisions

    b. non-local: ==> **domains**
      ¥ dominates a number of pieces

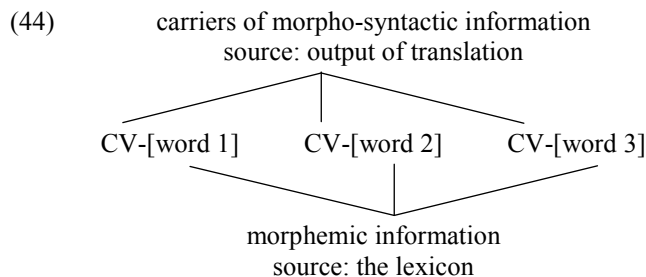[piece 1] ¥ [piece 2] ¥ [piece 3]   [piece 1]   [piece 2]   [piece 3]

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[1] See McCawley's (1968) attempt, though, to define phonologically relevant domains as stretches that are delineated by a pair of (identical) boundaries (Scheer 2011:§113). The discussion thereof in the early Prosodic Phonology literature is reported in Scheer (2011:§373).

(39) difference
    a. (38)b:
       1. a number of pieces of the linear string are spanned by a domain
       2. labelled clusters are created: an individual piece *belongs* to a domain (a ¥).
    b. (38)a:
       a piece cannot *belong* to a boundary (to a ¥).
    c. linear order
       1. a boundary has a linear location: it follows some piece, and precedes some other piece.
       2. it does not make sense to talk about domains that intervene between two pieces: domains are *made* of pieces, but they are not defined by a linear precedence relation with the items that they dominate.

(40) a first argument
    morpho-syntax cannot influence phonology morpheme-internally
    a. this is a consensual, if tacit empirical generalisation:
       phonology is impacted by morpho-syntax only at morpheme edges, never morpheme-internally.
    b. there is a structuralist precedent:
       juncture in the middle of morphemes, a necessary correlate of the structuralist idea that juncture is a phoneme, whose distribution must be free.
       ==> disastrous consequences
       [Scheer 2011:§69]
    c. 1. the absence of morpheme-internal impact follows from local insertion
       2. while nothing withstands morpheme-internal impact when insertion is non-local

8.3. Non-diacritic boundaries (can exist)

(41) non-diacritic boundaries: proposals
    a. Lass (1971), Lass & Anderson (1975:178)
       Old English: "/#/ is functionally an obstruent, though one with no features, but [+obs], or more probably, also [-voice]."
    b. Lowenstamm (1999)
       syllabic space: the beginning of the word materialises as an empty onset-nucleus pair, the so-called **initial CV**.

(42) melody and morpho-syntax are incommunicado
    [Scheer 2011:§660, 2012:§124]
    a. a consensual if tacit empirical generalization is that melodic primes, i.e. the items that occur below the skeleton,
       1. cannot influence morpho-syntax:
       phonology-free syntax (Zwicky & Pullum 1986) is actually melody-free syntax there is nothing like "verbs move if they begin with a labial"

2. cannot be influenced by morpho-syntax
since the 19th century, carriers of morpho-syntactic information have always been located at or above the skeleton:
- juncture phonemes
- hash-marks
- prosodic constituents
Nobody (except Lass) has ever claimed that a feature represents morpho-syntactic information in phonology.

(43) properties of syllabic space
   a. syllabic space is certainly not a diacritic since it is a necessary ingredient of phonology even in absence of extra-phonological factors.
   b. at the same time, it is local, rather than domain-based: just like SPE-type boundaries, syllabic space is necessarily inserted into the linear string at morpho-syntactic divisions.
   c. Table (44) below provides a schematic representation of how initial CV units concatenate with regular morphemic material.

(44)   carriers of morpho-syntactic information
              source: output of translation

         CV-[word 1]   CV-[word 2]   CV-[word 3]

                  morphemic information
                  source: the lexicon

(45) variable incarnations of syllabic space
   syllabic space can take on various guises, depending on the theory. It can be
   a. a mora
   b. an x-slot   (Chierchia 1986)
   c. some syllabic constituent: onset, rhyme, coda
   d. an (empty) onset-nucleus pair   (Lowenstamm 1999)

8.4. Non-diacritic domains (cannot exist)

(46) Let us now try to conceive of non-diacritic domains.
   top-down constructions are diacritic by definition (prosodic word and higher)
   a non-diacritic domain would have to exist in phonology independently of any issue related to extra-phonological information. Clearly, this excludes all higher layers of the Prosodic Hierarchy.
   a. it is a recognised and admitted fact in Prosodic Phonology that prosodic constituents fall into two categories: those that are top-down, and those that are bottom-up constructions (e.g. Nespor & Vogel 1986:109, Nespor 1999:119, Scheer 2011:§401).

b. All higher constituents, i.e. from the prosodic word on, represent the former type:
- the prosodic word
- the prosodic phrase
- the intonational phrase
- the phonological utterance
in the traditional six-layer system.

c. these have the additional characteristic that no phonological property contributes to their construction: they come into being through translation, and through translation only (see Scheer 2011:§421).
==> **no projection of any phonological property.**

(47) On the other hand, prosodic constituents below the word level, i.e.
- feet
- syllables
- eventually moras
are **bottom-up constructions**.

a. they are projections of genuinely phonological vocabulary (ultimately of melodic primes).

b. Also, the computation that produces them is purely phonological, i.e. in no way influenced by extra-phonological information.

c. Put differently, the existence of syllables and feet (eventually of moras) is entirely independent of any extra-phonological information: if there were no interface, syllables and feet would still exist, while prosodic words and higher constituents would not.

(48) But:
(bottom-up) projections created by phonological computation cannot be the output of translation either

a. the lower units of the Prosodic Hierarchy pass the diacritic filter for legitimate carriers of morpho-syntactic information

b. They are faced with another problem, though:
if they are exclusively phonological, i.e. if no extra-phonological property contributes to their construction, how could they ever carry morpho-syntactic information?

c. **The property that makes them non-diacritic also disqualifies them for being the output of translation.**

d. syllables and feet (eventually moras) cannot be carriers of morpho-syntactic information because they are the result of phonological computation.
Like all other domains (except, precisely, the higher layers of prosodic constituency), syllables and feet (eventually moras) are projections of basic vocabulary: syllables (and moras) are a function of segments, while feet are built on syllables.

e. Carriers of morpho-syntactic information, though, are necessarily created outside of the phonology, and by a means that is independent of phonological computation.

f. Syllables and feet (moras), however, are *entirely* determined by the properties of their terminals. Therefore they do not qualify as the output of translation.

8.5. Only syllabic space can be the output of translation
[Scheer 2012:§148]

(49) combining the constraints
   a. melody does not qualify as the output of translation.
   b. prosodic constituents do not qualify either
   c. only one type of representational vocabulary is left:
       syllabic space

9. Evaluating phonological theories according to their behaviour at the interface
[Scheer 2012:§151]

(50) uniform interface vocabulary kills competition at the interface
   a. ==> phonological theories will be distinct, but uniformized at the interface: all will use
       - juncture phonemes
       - #s
       - omegas etc.
   b. ==> distinctions are levelled out at the interface
       ==> phonological theories cannot be evaluated according to their behaviour at the interface: they all behave the same.

(51) Direct Interface: no uniform interface vocabulary
   a. 1. different theories work with different vocabulary
       2. THIS vocabulary will also be used for interface purposes
       3. different predictions will be made by the different vocabulary chosen
   b. hence competing theories can be **assessed according to their behaviour at the interface**.
   c. a very minimalistic thing to do: phonological theories marshalled by interface requirements.

10. The Direct Effect

(52) sleepers
   a. **their mere existence has no effect**
       diacritics are sleepers in the sense that they have no effect at all by simply existing: the existence of an "#" in the phonological string does not influence the course of phonology in any way.
       They only have an effect when they are accessed by some phonological instruction (rule/constraint): "process X applies within ω/ before #".
   b. **they can have any effect and its reverse**
       diacritics have no PREDICTABLE effect: they may trigger any process and its reverse.
       This, however, is counterfactual since the processes that are observed at word margins for example are anything but random: word margins have very specific and well-known effects. More on this below.

(53) anything and its reverse can happen at the left edge of a prosodic word
    a.   equally probable rules?

          1. $V \rightarrow \emptyset$ / #C__CV
          2. $\emptyset \rightarrow V$ / #C__CV

    b.   both rules are equally probable and equally natural from the point of view of a theory that uses diacritic boundaries: no property of the theory favours or disfavours the epenthesis into an initial cluster, or the deletion of a vowel in this context.
    c.   it is obvious, though, that rule 2) is an attested phonological process, while rule 1) is not on record. That is, there is no "masochistic" language that would delete vowels in initial clusters (and *only* in this context).[2]
    f.   therefore theories that cannot discriminate between the two rules have a problem, and the reason why they are in trouble is that **the critical information, i.e. word-initiality, is conveyed by a diacritic hash mark**.
    g.   the result is the same in case the prosodic word or some other prosodic constituent carries this information:
       ==> anything and its reverse may happen at the left edge of a prosodic constituent.

(54) only one thing can happen after an empty CV unit
    a.   a look at a non-diacritic alternative shows that the two rules at hand are discriminated as soon as the extra-phonological information comes as a real phonological object that impacts phonology directly and does not need to be explicitly mentioned in rules (or constraints) in order to produce an effect.
    b.   deletion vs. insertion of the first vowel in a word in CVCV

        1. deletion: ill-formed   2. insertion: structure saved

            Gvt

    C V_3 - C V_2 C V_1 C V_3 - C V_2 C V_1
        C V C V   C   C V
                            V
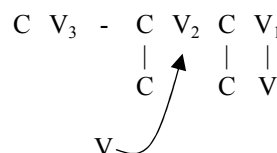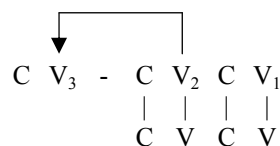
11. Interface effects are not random: the beginning of the word

(55) cross-linguistically stable effects of the beginning of the word
      [Scheer 2004:§87, 2009a,b, 2012:§246]
    a.   restrictions on word-initial clusters
       in some languages initial clusters are restricted to #TR. In others they have the same distribution as internal clusters. But there is no language where they are restricted to #RT (#TT, #RR).[3]

---

[2]   Note that rule 1) says that vowels are deleted *only* when they occur in word-initial clusters. Of course there are languages where vowels are deleted in this context (e.g. Czech *pes - ps-a* "dog Nsg, Gsg"), but they will then also be deleted elsewhere (Czech *loket - lokt-e* "elbow Nsg, Gsg").

[3]   In this book, T is shorthand for any obstruent, R for any sonorant.

(55) cross-linguistically stable effects of the beginning of the word
       [Scheer 2004:§87, 2009a,b, 2012:§246]
       b. strength of word-initial consonants
           in some languages word-initial consonants are especially strong. In others, they do
           not have any peculiar behaviour regarding strength. But there is no language where
           they are especially weak.
       c. deletion of the first vowel of the word
           in some languages the first vowel of words is unable to alternate with zero. In
           others it does not show any peculiar behaviour when compared to other vowels.
           But there is no language where non-initial vowels are unable to alternate with zero,
           while initial vowels do.

(56) languages seem to make a binary choice
       a. either the beginning of the word is in no way peculiar in comparison to what
           happens morpheme-internally,
       b. or it is outstanding and allows only for a characteristic subset of the options that are
           well-formed elsewhere.

(57) this is all not random
       a. if the effect of the beginning of the word is not arbitrary, the representational
           identity of the object by which it is represented must not be arbitrary either.
       b. rather, we are looking for one single object that produces the three effects at hand:
           three for the price of one.
       c. in any event, objects such as the hash mark or some prosodic constituent that do
           not produce any effect at all (or rather, that tolerate any effect and its reverse under
           the appropriate rule or constraint) do not qualify.
       d. if the effect is predictable, the identity of its trigger cannot be arbitrary.

(58) typological predictions made by the initial CV

	in a language where the initial CV is present	in a language where the initial CV is absent
a.	word-initial consonants are strong	word-initial consonants are non-strong
b.	initial clusters are restricted to #TR	there are no restrictions: #TR, #RT, #TT and #RR clusters may occur
c.	first vowels of words may not alternate with zero	first vowels of words may alternate with zero

(59) presence vs. absence of the initial CV: predictions
       a. initial clusters: initial CV present   b. initial clusters: initial CV absent

```
  C   V   -   C   V   C   V                      C   V   C   V
      #           |       |   |                      |       |   |
              T  <=   R   V                  #   T       R   V
          *   R           T   V              #   R       T   V


  1.   *#RT: two ø's in a row              1.   #RT ok
```
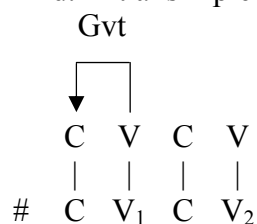
(59) presence vs. absence of the initial CV: predictions

c. initial simplex C: initial CV present

Gvt

```
 C   V   -   C   V   C   V
     #           |   |   |   |
             C   V₁  C   V₂
```
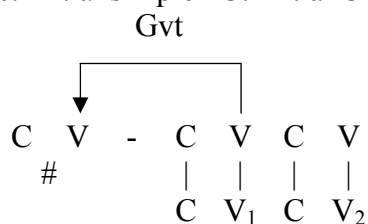
d. initial simplex C: initial CV absent

Gvt

```
             C   V   C   V
             |   |   |   |
     #   C   V₁  C   V₂
```

2. #C strong: #C escapes Gvt
3. V_1 cannot be absent: two ø's in a row

2. #C is governed (=intervocalic)
3. V_1 can be absent: only one ø

(60) review of some languages

vocabulary items:
- TR-only language = language where #RT, #TT and #RR do not occur
- anything-goes language = language where #RT, #TT and #RR do occur

		initial clusters		first V alternates		#C strong	
		#TR	#RT	no	yes	yes	no
a.	Czech	x	x		x	?	
b.	Polish	x	x		x		x (?)
c.	Moroccan Arabic	x	x		x	?	
d.	Greek (classical and modern)	x	x	?			x
e.	German (standard)	x		x		x	
f.	Belarusian	x		x			

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