Phase Head Marking

Roberta D'Alessandro
Leiden University Centre for Linguistics

Tobias Scheer
Université de Nice Sophia Antipolis, CNRS 7320

Abstract

This article introduces the idea that there is only one chunk-defining device in grammar, i.e. only one mechanism that delineates phonologically relevant stretches of the linear string. This mechanism, it is argued, is Spell-Out, i.e. phase theory in the current minimalist environment. In the perspective exposed, phase structure may mark one of two items at PF: the head of the phase head XP, or its Spell-Out domain (i.e. the complement). The article illustrates the former pattern by looking at complementizer doubling in a southern Italian dialect, Abruzzese. On the phonological side, the carrier of morpho-syntactic information that turns out to be inserted into the linear string is syllabic space (an x-slot). On these grounds, a case is made against diacritics as carriers of morpho-syntactic information: neither SPE-type hash-marks nor units of the Prosodic Hierarchy such as omegas have any intrinsic phonological content (unlike an x-slot): they are arbitrarily chosen, interchangeable and make no prediction (any phonological process and its reverse may be triggered by #'s and omegas). All this is incompatible with a central tenet of modularity in cognitive science, domain specificity.

1. Introduction

When phonological processes are prevented from applying across some morpho-syntactically defined boundary, this is due to one of two reasons. Either an item that carries morpho-syntactic information (and is absent from the morphemic record) is inserted into the phonological representation and inhibits phonological communication across the boundary, or a no look-back device restricts phonological computation so that already computed strings cannot be taken into account anymore (old vs. new computation).

The former blocking is representational in kind. In SPE, a phonological process was blocked by the hash mark # if not otherwise specified in the rule. Prosodic Phonology autosegmentalized hash marks by representing relevant morpho-syntactic information in terms of an autosegmental arboreal structure, the Prosodic Hierarchy. In this environment, processes do not apply across word boundaries because they are made sensitive to a condition that specifies their domain of application, for example "process X applies within the Prosodic Word", and the Prosodic Word grossly correlates with the morpho-syntactic word.

The latter blocking is derivational: nothing is inserted into the phonological representation, but cyclic derivation distinguishes, for every cycle, the portion of the string that has already undergone phonology on a previous pass (old) from the one that has not (new). Since Chomsky (1973), the idea is that there may be restrictions on the accessibility of the old string when the new string is computed. Implementations (regarding phonological computation) include the Strict Cycle Condition (Mascaró 1976, Kiparsky 1982), bracket erasure (Mohanan 1986) and robustness (Kaye 1995) (see Scheer 2011: §287 for a more detailed discussion). In current minimalist syntax, the incarnation in terms of the Phase Impenetrability Condition (PIC) plays a central role (Chomsky 2000, 2001 and following) and on the phonological side is explored by, among others, Dobashi (2003), Kratzer & Selkirk (2007), Ishihara (2007), Pak (2008) and Samuels (2011a,b).

The typical division of labour that is practised in phonology since the early 80s is that a derivational solution (i.e. Lexical Phonology and its modern incarnations) is applied to internal sandhi (i.e. processes that can(not) cross morpheme boundaries), while the representational tools of the Prosodic Hierarchy deal with external sandhi (i.e. processes that can(not) apply across word boundaries) (e.g. Hayes 1989 [1984], see Scheer 2011: §423, 2012b for discussion). This perspective also roots in a ground rule of Lexical Phonology which holds that post-lexical phonology (i.e. external sandhi, among items of word size and bigger) is non-cyclic (i.e. that there are no derivationally defined chunks in phonology at and above the word level).

We have argued elsewhere (D'Alessandro & Scheer 2012, 2013, see also Scheer 2011: §823, 2012a: §307) that the PIC is phase-specific: some phases are equipped with it (and then induce freezing effects), others are not (which means that there is no inhibition for

phonological computation at the phase boundary in question). The PIC is also module-specific: it may marshal the computation of a given phase in syntax, but not in phonology (or the reverse, or both).

This is what we call modular PIC, of which a corollary is that (pace Prosodic Phonology) the *only* means to define domains of phonological computation is derivational: this is the labour of phases. Representational devices do not delineate anything by themselves. Rather, they are parasitic on the cyclically defined phase skeleton (i.e. the set of access points for spell-out in morpho-syntactic structure which is lexically defined, either universally or on language-specific grounds, cf. Gallego 2010).

We provide more detailed background information regarding Modular PIC in section 2. Modular PIC itself, however, is not the focus of the present article. Rather, we zoom into one specific issue that is of more general interest in the recent literature, but obeys specific restrictions in an environment with only one chunk-defining device: the pages below are about the nature of representational items that carry morpho-syntactic information in phonology, and where exactly they are inserted. We argue that insertion is not size-driven along the aforementioned traditional view that small pieces are ruled derivationally, while bigger pieces are managed representationally. Rather, derivational definition of chunks and insertion of objects that carry morpho-syntactic information may be concomitant.

Based on the phase skeleton, grammar may decide to insert syllabic space (depending on the theory, a skeletal slot, a mora, an empty CV unit) into phonological representations in order to mark one of two items:

   I. a phase head

   II. the complement of a phase head (i.e., a spell-out domain)

In D'Alessandro & Scheer (2012, 2013), we discuss cases where the complement of a phase head (i.e. spell-out domains that are subject to PIC effects) is marked. On the pages below, we illustrate phase head marking. Similar phenomena are discussed in Scheer (2009a,b, 2012a: §§270, 285). Note that the above two-item list of phase-based marking is not meant to be exhaustive: other loci defined by phase structure may turn out to benefit from phonological marking. A candidate is the right edge of a phase, as discussed by Sato (2009), Kahnemuyipour (2009), Samuels (2009: 294ff).

Before going into further detail, let us emphasize that we are acutely aware of the fact that one single article will not be able to reassess the large body of analyses that have been carried out using prosodic constituency. Our claim that the insertion of representational items into the phonological string reduces to syllabic space (and hence excludes prosodic constituency) lies on the programmatic side (as much as the idea that chunks are never defined representationally). Even though there are serious conceptual reasons for doing away with prosodic constituency (its redundancy and diacritic character, see section 2.1), it is obvious that the empirical material that linguists were used to manage with its help will need to be reanalyzed. This is a long-term goal to which the present article only marginally contributes. All this being said, let us prevent a misunderstanding that may arise: we do *not* claim that syllabic space alone can do all the labour that was previously done by prosodic constituency. A good deal of this labour is shifted from the representational to the derivational management of interface information: phase theory and the PIC take over, rather than syllabic space. Note that this option was never explored since, as already mentioned, phonology across word boundaries was held to be non-cyclic. In the modern minimalist environment where it is not, the role of the representational management shrinks significantly (exactly how dramatic its reduction is remains to be seen). We propose that the remaining carriers of morpho-syntactic information are only parasitic on cyclic (phase) structure, and hence take over only a small subset of the labour that was previously done by prosodic constituency.

The roadmap is as follows. In section 2, we provide some background information regarding the positioning of Modular PIC in the interface landscape. Section 3 describes the empirical focus of the paper, Abruzzese complementizer doubling. An excursus into the analysis of central and southern Italian vowel reduction systems in section 4 then provides the phonological tool for the analysis of complementizer doubling, which is introduced in section 5. Finally, some concluding remarks appear in section 6.

2. Modular PIC and prosodic islands

2.1. Prosodic islands and reasons to do away with prosodic constituency

The idea that there is only one chunk-defining mechanism in grammar, phase theory, and that representational units hook on phase boundaries in order to delineate portions of the linear string, may look like a version of prosodic islands at first glance. Our perspective is quite different, though: as will be seen below.

Prosodic islands also insert a representational device, i.e. units of the Prosodic Hierarchy, at phase boundaries (e.g. Dobashi 2003, Piggott & Newell 2006, Ishihara 2007, Kratzer & Selkirk 2007, Kahnemuyipour 2009; Elordieta 2008 offers an informed survey). Kratzer & Selkirk (2007:106), for example, propose that "the highest phrase within the spellout domain is *spelled out as a prosodic major phrase*" (emphasis in original). They assume that only CP and *v*P are phases, and that CPs and *v*Ps therefore correspond to major phrases on the phonological side: this equivalence should be universal. Language-specific variation in prosodic phrasing is then achieved not by the syntax-phonology mapping as it was previously, but purely phonologically by "prosodic markedness constraints, which operate to produce surface prosodic structures that are more nearly phonologically ideal" (Kratzer & Selkirk 2007:126). This is a significant departure from a Prosodic Phonology essential: mapping becomes universal and phase-driven, while the substantial language-specific variation in prosodic phrasing (i.e. chunk definition) is achieved *in* the phonology by purely phonological mechanisms.

The idea that phases (which did not exist in the 1980s when Prosodic Phonology was developed) and constituents of the Prosodic Hierarchy are *isomorphic* may indeed seem appealing. Both delineate chunks of the linear string that serve as domains for the application of phonological processes: this is what prosodic constituency is all about.

However, the question is then why the chunk defining job should be duplicated: if chunks can be defined by phases alone, what is the purpose of prosodic constituents? It should also be noted that the position of a prosodic islands theory is exactly the reverse of both SPE and regular Prosodic Phonology in claiming that morpho-syntactic chunking (phases) and phonologically relevant domains (prosodic constituency) are isomorphic: non-isomorphism was a central claim

of Prosodic Phonology in the 1980s and 1990s (e.g. Selkirk 1981 [1978]:138, Nespor & Vogel 1986:34ff, 124ff).

Another issue is the (non-)impact of prosodic constituency on syntax: Pak (2008, in a Distributed Morphology environment) and Samuels (2011a,b) argue that unlike phases, prosodic constituency has no syntactic import. Therefore, if phase structure provides all relevant information, the Prosodic Hierarchy is redundant and needs to be eliminated (see also Seidl 2001). Or, in other words, the Prosodic Hierarchy may be reduced to phases, but phases cannot be reduced to the Prosodic Hierarchy.

Finally, Scheer (2008a, 2012a: §93) argues against prosodic constituency because of its diacritic status: the Prosodic Hierarchy is nothing but an autosegmentalized version of SPE-type hash-marks. Translation, or mapping, is a necessary consequence of modularity, i.e. the idea that the mind and grammar are organised in a number of distinct computational units each of which works with a domain-specific vocabulary (Fodor 1983). In the generative tradition, the modular architecture of grammar manifests itself as the inverted T model (Chomsky 1965: 15ff). On modular assumptions, there is no way in which phonological computation could understand, parse or process morpho-syntactic vocabulary such as, say, "adjunct". This is because every computational system works with a specific vocabulary and hence cannot understand or parse any other. In Cognitive Science, the symbolic nature of computation is called *domain specificity* (e.g. Gerrans 2002, Fodor 2000: 58ff).

On these grounds diacritics cannot carry morpho-syntactic information in phonology: they have the same ontological status as bananas and for sure are not part of any domain-specific vocabulary of any module. Like SPE's #, omegas (ω), phis (ψ) and other units of the Prosodic Hierarchy from the word level on are but arbitrarily chosen and interchangeable symbols with no intrinsic properties (Scheer 2011: §399): they therefore do not qualify as carriers of morpho-syntactic information in phonology. Since melodic items such as features (i.e. everything that is located below the skeleton) do not qualify either (for independent reasons, see Scheer 2011: §660), Direct Interface argues that carriers of morpho-syntactic information in phonology reduce to syllabic space (Scheer 2009a,b, 2012a: §148).

2.2. Modular PIC

Let us first consider the representational side of Modular PIC. Given the issue that the chunking labour must not be done twice and the obstacles levelled against prosodic constituency as such, our perspective on phase-based piggyback-riding is different from prosodic islands by the object that is inserted at phase-defined boundaries. Rather than a domain, i.e. something that delineates a stretch of the linear string and hence does the chunking labour a second time (as is the case of prosodic constituents), what is inserted under the assumptions of Indirect Interface and Modular PIC is syllabic space (and nothing else). Syllabic space is not a diacritic (x-slots, morae, onsets, nuclei etc. exist independently in phonological computation) and (unlike hash-marks, omegas etc.) has specific, i.e. non-arbitrary and non-interchangeable phonological properties. Hence syllabic space does not delineate any chunk, but for example predict that neighbouring melodic items may spread on it (while diacritics such as hash-marks and omegas make no prediction at all: they can trigger any phonological effect and its reverse; see the Direct Effect illustrated in Scheer 2009a,b, 2012a: §154).

On the derivational side, the central claim of Modular PIC is that phase theory needs to be (made) flexible enough in order to achieve the delineation of *all* phonologically relevant chunks: chunk definition must not be redundant, and is done by one single device.

In order to allow phase theory to describe all phonologically relevant stretches of the linear string, we propose the separation of the Spell-Out operation from the Phase Impenetrability Condition (PIC henceforth). In the current working of phase theory, both necessarily co-occur. In the amended version, there is a (universal or language-specific) set of phase heads in every language, which will constitute the phase skeleton. When Spell-Out occurs, every individual access point may or may not be associated with a PIC at PF, and the same optional endowment with a PIC also holds for syntax.

As a matter of fact, Spell-Out itself does not leave any trace in phonology or syntax: it is only when it is endowed with a freezing effect that distinguishes "old" (already computed) from "new" (not yet computed) strings that an effect is observed. In current phase theory, this role is carried out by the PIC. It follows that the system is bicompositional and in principle allows for Spell-Out to occur vacuously, i.e., without enforcing the PIC. That is, it is possible for

Spell-Out not to leave any footprint. It remains true, however, that (phonological and syntactic) effects of cyclic derivation are necessarily caused by a Spell-Out operation.

We refer to this modified version of phase theory as Modular PIC because it allows for the PIC to produce an effect in one module, but not in another.[1] This flexible definition of phase heads recalls Chomsky's (2001) original distinction between strong and weak phases. Weak phases were phases without Spell-Out, and in this sense are essentially equivalent to our phase heads with no PIC effect. However, weak phases were propositional according to Chomsky, and did not count for cyclic purposes. While weak phases achieve the same effect as Modular PIC (i.e., the absence of any footprint), a significant difference is that in our perspective Spell-Out does take place, i.e., PF does receive and interpret the content of the relevant spell-out domain. Also, we do not wish to postulate a principled difference in semantic terms between phases that produce an effect (strong) and others that do not (weak). Finally, Modular PIC can generate a situation where a phase leaves a footprint in syntax but not in phonology, or the reverse. By contrast, Chomsky's (2001) distinction between strong and weak phases cannot describe module-asymmetric situations: either there is an effect on both sides (strong phases), or on none (weak phases).

These differences are also reflected in the definition of phases: rather than calling on propositionality, in our view both PIC-endowed and PIC-lacking phases are as those heads where unvalued (and uninterpretable) features are merged. Phase heads are then the "motor" of the derivation.

In D'Alessandro & Scheer (2013), we show that all four logical possibilities occur in natural language: Spell-Out leaves a trace 1) in both phonology and syntax, 2) neither in phonology nor in syntax, 3) in syntax, but not in phonology, 4) in phonology, but not in syntax. A quick illustration that may be provided here is the trivial fact that PF-neutral Spell-Out is the unmarked case. There is certainly syntactic reason to believe that *v*P is a phase head in English.
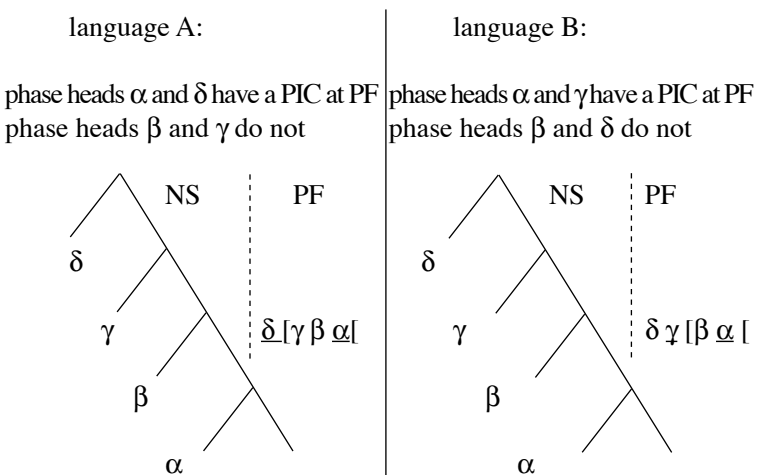
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[1] In principle this is also true for the relationship between syntax and LF, but this question lies beyond the scope of this article. Note, however, that mismatches between PF- and LF-domains are recurrently detected in the literature, and according to some authors (but pace Chomsky 2004: 107) require asymmetric spell-out, i.e., one where syntax accesses PF and LF independently. This is indeed what we expect under Modular PIC. Relevant literature includes Marušič (2005), Matushansky (2005), Truswell (2005) and den Dikken (2007).

However, it is invisible for a phonological process like t-flapping, which is reported to operate across *all* word boundaries regardless of the syntactic relationship between the words (provided the /t/ is word-final and intervocalic). Some examples from descriptions of relevant American varieties (Kahn 1976, Kiparsky 1979, Kaisse 1985: 25ff, Nespor & Vogel 1986: 46f, 224ff) are *at issue*, *a white owl*, *invite Olivia*, *at eleven*, *just the other night a racoon was spotted in our neighbourhood*. Jensen (2000: 208) specifically mentions a case where flapping applies across a vP boundary: *a very dangerous wild cat escaped from the zoo*. Hence vP produces a syntactic, but no phonological effect.

Phenomena such as English t-flapping leave us with only two logical solutions: either there is no phase/PIC at *v*P, or there is a phase at *v*P, but it is not associated with a PIC on the phonological end. It is the latter option that we wish to explore: the phase skeleton (i.e. the set of phase heads) is invariable for a given language, and a decision is made for each phase head with regard to whether or not it is endowed with a PIC at PF. Whether or not a particular phase head is associated with a PIC is part of its lexical properties. Two languages may thus have the same phase skeleton, i.e., identical sets of phase heads, but differ with respect to which access point is associated with a PIC at PF. This is shown in (1) below.

(1) Modular PIC: languages choose which access points are endowed with a PIC

language A:

language B:

phase heads α and δ have a PIC at PF
phase heads β and γ do not

phase heads α and γ have a PIC at PF
phase heads β and δ do not

In current practice, phase heads, and hence phase structure, are determined on the basis of morpho-syntactic evidence alone. Under the perspective of a unified interface theory in which the same mechanism defines syntactically and phonologically relevant chunks, phonological evidence for phases needs to be taken just as seriously as syntactic evidence. A situation where a computational system is insensitive to its input conditions, i.e. never marks the boundaries of its input string, appears to be implausible. Hence if phases transport chunks between morpho-syntax and phonology, it is to be expected that they leave footprints in the latter, at least in some cases.

2.3. Minimalist issues

That syntactic phases should be informed by phonology in fact follows from the Strong Minimalist Thesis (SMT) as formulated in Chomsky (2000:97):

(2)   Language is an optimal solution to legibility conditions.

The SMT outlines a methodological procedure for the definition of language, which we can understand here as the core computational system of syntax. In order for an expression π to meet legibility conditions, i.e., for it to be legible at the interfaces, it must satisfy the conditions of Full Interpretation (FI). The question is how this Full Interpretation can be granted. We propose that the answer is that PF instructs syntax on FI conditions for any expression π that syntax will produce. Therefore, phonologically relevant chunks can and must be reflected in syntax.

Based on the idea that there can only be one chunk-defining device because theory cannot afford to have the same work done twice, Modular PIC unifies the two currently co-existing chunk-defining devices (representational: the Prosodic Hierarchy, derivational: cyclic spell-out) in favour of the derivational mechanism: phase theory has independent syntactic motivation, while this is not the case for prosodic constituency on the phonological side.

As was mentioned, the need to make phase theory more flexible so that it can delineate all phonologically relevant chunks follows on from this unification. As it stands, phase theory is unable to do this job: phonologically relevant chunks are too small and too diverse. In order to qualify as the only chunk-defining device in grammar, phase theory thus needs to be adapted to the demands of phonology.

Both directions described are minimalist in kind: parallel and competing grammatical devices are shrunk into one, and a central piece of current syntactic thinking, phase theory, is adapted to interface conditions. In sum, the existence of phase theory triggers a domino chain which first substantially modifies the phonological landscape (prosodic constituency has to go), and then floats back to syntax in order to amend the mechanism itself. This back and forth is expected in an interface-driven environment. It also arbitrates between competing views in one module by bringing the properties of another module to bear (intermodular argumentation, Scheer 2008b, 2009c).

3. Marking the phase head: when grammar delineates C phonologically

3.1. Abruzzese complementizer doubling

One of the most interesting phenomena concerning some old as well as modern Italian vernacular varieties is so-called complementizer doubling. What is at stake is the apparently vacuous reduplication of complementizers. An example from Old Salentino can be found in (3).

(3)   Vede' che si illo non avesse la   consilho de Sidrac,
      he-saw che if he   not had   the advice   of Sidrac
      ca illu non potea   nulla   fare
      ca he   not could.indic. nothing do.inf
      'he realized that, if he did not receive Sidrac's advice, he could not do anything'
                              [Sidrac 2v, 21-22, in Ledgeway 2005:381]

Complementizer doubling is still found in many southern Italian varieties, as evidenced by D'Alessandro & Ledgeway (2010), and exemplified in (4) for Abruzzese.[2]

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[2] Abruzzese is spoken in Abruzzo, a central region of Italy. Unless otherwise stated, all examples from Abruzzese quoted in the article come from the variety spoken in Arielli (CH), Abruzzo, classified as an Eastern upper-southern Italian dialect.

(4)   So vistə ca   mendrə stevə a parla' 'nghə la mamme
        am seen that while   was to speak with the mother
        ca ji   facevə nu segnə
        that to-him/her   made   sign
        'I saw that while she was speaking to her mother she was mak-
        ing some sign to her'

The first explanation that could be proposed for all sorts of dou-
bling phenomena including complementizer doubling is functional
in nature: one needs to keep track of what one is saying, therefore
one repeats the complementizer. Especially when the topicalized
or focused phrases are too long, the complementizer is repeated to
mark where the main clause starts again. This kind of performance-
based explanation is however unsatisfactory for two reasons. On the
one hand, in written texts it is quite easy to identify the dislocated
phrases, and there is no need to repeat the complementizer. As shown
by old Italian vernacular texts, however, complementizer doubling
was pervasive and in some cases compulsory (Ledgeway 2005,
2009). But also, were we facing a purely interpretational problem,
we would expect more languages to exhibit it. On the other hand,
the topicalized and focused phrases that appear between the two
complementizers are not necessarily long. Sentences like (5) are
perfectly grammatical in Abruzzese.

(5)   Ca Marijə ca li   so vistə
        that Mario that him am seen
        'Mario, I saw him'

Building on Rizzi's theory of a fine-grained left periphery of the
clause, D'Alessandro & Ledgeway (2010) argue that *ca* doubling is
a device for isolating the topic phrase. In (4), for instance, the back-
ground setting topic phrase *mendrə stevə a parla' 'nghə la mammə*
(underlined) is included among the two *ca* complementizers. The
two *ca*'s are viewed as some kind of topic domain markers. If this
analysis is on the right track, there is still an unsolved issue though,
regarding the choice of the complementizer used for doubling. South-
ern Italian dialects make use of a complex complementizer system
whereby a different complementizer is selected depending on the kind
of embedded clause that is being introduced. The standard southern
Italian system displays two complementizers: one for subordinate

clauses in declarative sentences, another for *irrealis* subordinate clauses (Rohlfs 1969: 190). However, some varieties show an even more complex system. As described by D'Alessandro & Ledgeway (2010) and D'Alessandro & Di Felice (2010), Abruzzese for instance is more complex in all stages of its existence: there seem to have always been at least three complementizers. The first, *ca*, is the default complementizer for declarative embedded clauses (like (4) and (5)); the second, *chi*, introduces *irrealis* unselected clauses of the sort exemplified in (6); the third complementizer, *occhə*, introduces jussive subordinates, of the kind exemplified in (7).

(6)   Jè mmejə chi n'gi   vi'
      is better   that not-there you-go
      'It's better that you don't go there'

(7)   Jə   so dittə occhə le faccə
      him am said that   it does-subj
      'I told him to do it'

Complementizer doubling in sentences with "non-default" complementizers, like (6) and (7) shows that what is at stake is not pure doubling. The marker chosen to define the left "border" of the Topic/Focus phrase is the default complementizer *ca*, not the complementizer selected by the verb. Consider example (8), which is sentence (7) into which a topic phrase has been inserted. While the complementizer selected by the verb to introduce the subordinate clause is the jussive *occhə* , the complementizer appearing to the left of the topic clause is the "default" *ca* (8). Repeating the complementizer *occhə* results in an ungrammatical sentence, as shown in (9).

(8)   Jə   so dittə ca sə lə vo   fa occhə le faccə
      him am said that if it wants do that   it does
      'I told him that if he wants to do it he may do it'

(9)   *Jə   so dittə occhə sə lə vo   fa occhə le faccə
       him am said that   if it wants do that   it does

Hence we are facing some sort of topic marker, but not a simple reduplication. It may be assumed that the complementizer *occhə* occurs in a lower position than the standard complementizer *ca*. *Ca*

arguably realizes the Force head according to Rizzi's (2007) fine structure, and *occchə* the lower *Fin* head. Given examples like (6), there would be no need to insert a *ca* in a sentence containing *occchə*. We wish to argue that *ca* is inserted instead to mark the phase head C, as illustrated in (10):

(10)

      CP   - - - - -   NS   PF

          TopP

C   **ca** [sə lə vo fa] **occchə**

   Top   FinP
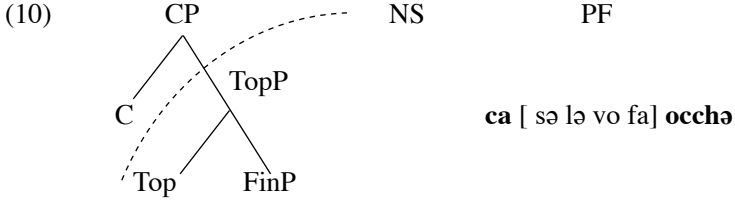
This marker might be needed in case the CP is split, to identify the phase head, i.e., the head onto which unvalued features enter the derivation (Chomsky 2001). Note that the higher complementizer *ca* does not contribute any meaning to the sentence: it is a seemingly vacuous element whose only "function" is to signal the presence of a phase head when this head is otherwise silent.

For the sake of completeness, note that the situation is more intricate for the complementizer introducing unselected clauses. Speakers tend to avoid doubling, possibly because the phase head is the complementizer *chi*, hence *ca* and *chi* cannot easily coexist like *ca* and *occchə*.

3.2. Abruzzese a-insertion

The fact that the C head must be marked in Abruzzese is also evident when observing another, so far unexplained, peculiar phenomenon involving the insertion of an [a] before the word spelling out the phase head C.

Most Abruzzese words have undergone reduction of the final vowel and therefore end in -ə. This -ə is sometimes substituted by an [a], as shown by Passino (2013) and D'Alessandro & van Oostendorp (2013), and exemplified in (11)-(12) for the DP.

(11)   li muturə
       the motors

(12) li mutura nuvə
      the motors new
      'the new motors'   [D'Alessandra & Van Oostendorp 2013]

While this [a]-insertion is reported in old Abruzzese grammars (Giammarco 1979) the exact syntactic conditions under which it takes place are unclear. Passino (2013) provides a careful analysis of [a] insertion within the DP, and D'Alessandro & van Oostendorp draw a correlation between domains of [a] insertion and domains where metaphony applies. A-insertion at the complementizer level, however, remains unexplained. Sentences like (14) are considered lexical accidents by Passino: there seems to be no apparent reason for the alternation between (13) and (14).

(13) Comə
      how

(14) Coma sti?
      how you-stay
      'How are you?'

The distribution of inserted [a] is quite straightforward: it appears between the specifier of C (*comə*) and C itself (*sti*). Under the assumption that it is a boundary marker, it may either be interpreted as a right-edge marker of the XP that spells out Spec,CP, or as a left-edge marker of the phase head C. There is reason to believe that the latter solution is correct: what is marked is prominence, i.e. heads.

Finally, note that it is not the spell-out domain of CP, i.e. its complement, that is marked (eventually owing to the PIC): marking of the complement of C would result in an [a] appearing after the word spelling out C. This is not the case: the marking appears to the left of the phase head, for no apparent reason.

Abruzzese offers a number of examples of the pattern described. See for instance (15)-(17), where the forms in (a) are the basic lexical items:

(15) a. Quandə   b. Quand**a** vi
          when   when you-com
                                        'When are you coming?'

(16) a. Chi ccosə   b. Chi ccosa vu?
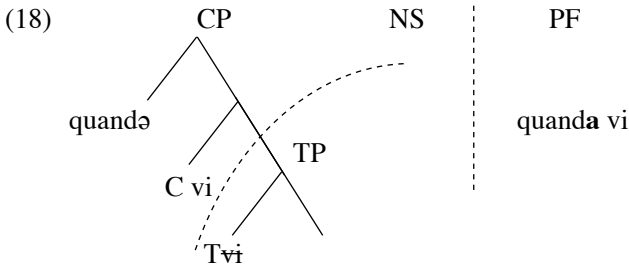   which thing   which thing you-want
                                          'What do you want?'

(17) a. Chə   b. Ch'a si fattə?
          what   what are done
                                          'What have you done?'

All examples feature an alternation between the basic lexical form, ending in schwa, and a form that bears an [a] instead. The structure of (15b) is depicted in (18).

(18)

In sum, there is reason to believe that an item is inserted into the linear string of phonological representations in order to mark the phase head C, i.e., its left boundary to be precise. The issue that arises if this item were the vowel [a] is why the result is not a sequence schwa-[a]: the insertion of something should leave its neighbours untouched. It may sure be argued that a-insertion creates a hiatus, and that the language reacts by deleting the schwa. We believe that there is a more promising solution, though, one that does not derive the surface result by brute force.

The basic observation is that the schwa and the [a] are not two distinct items: they are the *same* vowel which appears in full ([a]) and reduced (schwa) form according to the syntactic context. In order to understand the schwa-a alternation, in the following section we consider a pattern found in Apulo-Barese where full vowels also alternate with schwa.

4. Virtual long vowels in Central and Southern Italian dialects

4.1. Sharing makes us stronger in Corato

Vowel reduction is characteristic for central and southern dialects of Italy. Particularly interesting is the case of Apulo-Barese studied by D'Introno & Weston (1997) and Bucci (2013, forthcoming). In the village of Corato (40 km North of Bari), unstressed vowels (other than [a]) reduce to schwa, except if they share a melodic (i.e., articulatory) property with a neighbouring consonant.

(19)   vowel reduction in Corato

    a. reduction: adjacent consonants do not share any melodic property

        o   róte   rət-éddə   wheel, dim.

        u   fənúccə   fənəcc-éddə   fennel, dim

        e   mélə   məl-éddə   apple, dim.

        i   ríkkə   rəkk-ónə   rich, dim.

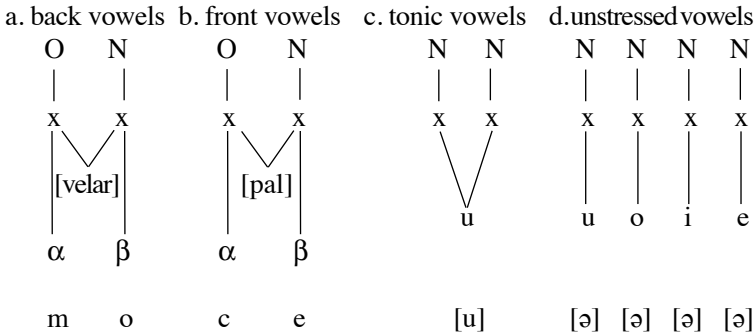   b. no reduction: adjacent consonants share a melodic property

        o   mólle   moll-éttə   rubber band, dim.

        u   latúke   lattukw-éddə lettuce, dim.

        e   cése   cesar-éddə   church, dim.

        i   fíɟɟe   fíɟɟ-éttə   firl, dim.

As may be seen, when back vowels o and u are adjacent to a labial or a velar consonant, as under (19b), they are protected against reduction even in case they are unstressed. The same is true for front vowels, which do not reduce when they can lean on an adjacent palatal (note that [c] denotes a palatal voiceless stop).

Bucci (2013, forthcoming) follows basic autosegmental principles: when a vowel shares a melodic prime (a feature) with an adjacent consonant, we are facing a branching structure as under (20)a,b below.

(20) branching structures

a. back vowels b. front vowels c. tonic vowels d. unstressed vowels

O N	O N	N N

x   x   x   x   x   x   x   x   x   x

[velar]   [pal]

α   β   α   β

m   o   c   e   [u]   [ə] [ə] [ə] [ə]

It is thus the fact that a vowel branches on another skeletal slot that makes it immune to reduction. This is one effect of a well known pattern which shows that *sharing makes us stronger*, as Honeybone (2005) puts it. The classical example for the conservative action of branchingness is (overt) geminates, which do not undergo lenition etc., (e.g. Steriade & Schein 1984).

Bucci (2013, forthcoming) straightforwardly concludes that tonic vowels must also be branching structures, since they do not reduce. That is, all branching structures are shielded against reduction. This means that tonic vowels are in fact long: in autosegmental terms, branching vowels are long vowels (20c). Therefore, the surface opposition full vs. reduced in fact is one of length: long vowels are spelt out as full during phonetic interpretation, while short vowels are pronounced as schwa.

Note that in this perspective on vowel reduction is *not* phonological in kind: as shown under (20d), short vowels that appear as schwa on the surface are fully distinct in autosegmental representations. There is no phonological computation that turns, say, an *u* into a schwa. Rather, reduction is operated post-phonologically when phonetic implementation decides how the output of phonology is pronounced: in Corato all vowels that do not branch come out as schwa, while those that branch are pronounced with their full melodic identity.

4.2. Virtual length

The idea that stressed vowels are long is both phonetically and phonologically plausible: phonetic length in terms of duration is a universal correlate of stress, and since Chierchia (1986) stress has been analyzed as an insertion of syllabic space (pending on the theory, an x-slot, a mora, an empty CV unit) next to the tonic vowel (Larsen 1998, Ségéral & Scheer 2008).

Also note that there is no length distinction either phonetically or phonemically in the language: what we are facing is phonological length, which grammar may decide to transport onto the surface in terms of duration (as in English), or of some other marker (vowel reduction in Corato). There is indeed no reason why a given grammatical structure should always be spelt out by the same phonetic property: the distinction needs to somehow reach the surface, but as long as distinctiveness and learnability are guaranteed, any phonetic marking will do. This situation is identical to what we know from morpho-syntactic spell-out: grammar in general and morpho-syntax in particular do not care for the phonological shape of the items that realize, say, person or number.

Items that are phonologically long, but whose length is phonetically marked by some property distinct from duration, are known as virtual long vowels and virtual geminates: see Lowenstamm (1991), Larsen (1998), Ségéral & Scheer (2001). Vowel length has been found to be expressed by ATRness in French (Rizzolo 2002) and vowel reduction in Semitic (Lowenstamm 1991, 2011) and Kabyle Berber (Bendjaballah 2001, Ben Si Saïd 2011). On the consonantal side, phonological geminates may be expressed by the length of the preceding vowel in German (Caratini 2009), the Cologne dialect of German (Ségéral & Scheer 2001) and English (Hammond 1997), by the (non-)inhibition of a preceding vowel-zero alternation in Somali (Barillot & Ségéral 2005), by aspiration in English (Ségéral & Scheer 2008) and by preaspiration in Icelandic and Andalusian dialects of Spanish (Curculescu 2011).
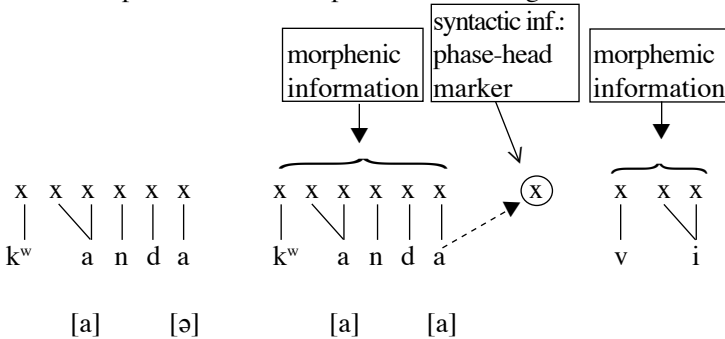
5. What is really inserted in Abruzzese: syllabic space

We are now equipped to return to "a-insertion" at the left boundary of the CP head. The problem that we were left with in section 2 was that schwa and [a] seem to be the same object, rather than two distinct items, which appear in different guises according to the syntactic context. This description precisely fits the virtual length-based analysis of alternations between schwa and a full vowel in vowel reduction systems of the Corato kind. Note that vowel reduction systems are found all over central and southern Italy: Abruzzese belongs to this reduction area.

Following this convergence, items such as *quandə* "when," *ccosə* (the gemination is because of *raddoppiamento*) "thing," *comə* "how," and *chə* "what" are lexically equipped with the melody of /a/, but provide only one x-slot, as under (21a). When spelled out by themselves without additional syllabic space, the /a/ will be pronounced schwa because it is short. It is only when additional syllabic space is inserted in order to mark the CP head that the /a/ can be long and hence is pronounced [a], as under (21b).

(21) CP head marked by syllabic space

a. lexical representation   b. phase head marking: insertion of x-slot

What is really inserted in Abruzzese is thus syllabic space: an x-slot under (21b) (which is the theory-neutral expression of what may be, depending on the theory, a mora or an empty CV unit).

6. Conclusion

On the pages above we have illustrated a case where phase struc-
ture produces the marking of the (left boundary of) the phase head.
This is an interesting pattern insofar as the phonological footprint is
not left by the spell-out domain, i.e., the complement of the phase
head XP, which is what is expected given the input conditions to
phonological computation.

The analysis of Abruzzese complementizer doubling also illustrates
how morpho-syntactic information can reach phonology in the guise
of a representational object that does not define a domain (as the units
of the Prosodic Hierarchy do), but rather marks a morpho-syntactic
division in order to signal a syntactically prominent item (the phase
head). This is much in the spirit of Trubetzkoy's Grenzsignale.

The object at hand, syllabic space, has specific phonological prop-
erties (hence unlike hash-marks, omegas etc. is not a diacritic) and
therefore makes predictions. That is, it can provoke the lengthening
of surrounding segments (which it does), but could not be responsible
for their shortening (while both are possible effects of diacritics such
as hash-marks and omegas).

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