

Modular PIC

Domains of phonological computation are phonologically relevant chunks of a linear string, i.e. strings that are computed by phonology in one go. Traditionally, there are two ways to define them: derivationally and representationally. The former perspective is represented by cyclic derivation (cycles in SPE, levels in Lexical Phonology) in earlier models of the architecture of grammar, and by strata (Stratal OT) or phases today. On the representational side, chunks are defined by prosodic constituents such as the Prosodic Word (Prosodic Phonology). Since the representational alternative was developed, in the early 80s, both ways of defining chunks are considered to coexist peacefully, and the division of labour is roughly defined by the word size: cycles determine chunks below the word level, while prosodic constituents define chunks of word size or larger. That is, Lexical Phonology is competent for strings of morphemes but cannot slice larger units because postlexical phonology is understood to be non-cyclic (Kiparsky 1982). Strings of words are therefore structured by prosodic constituency. This complementary distribution of competences is made explicit for example by Hayes (1989 [1984]).

In this paper we evaluate the impact of Chomsky's (1998 ff. 1998? which paper is that?) Phase Theory on the landscape of the phonological dichotomy just described. Two main points are made. First, phase theory does away with the idea that there are no derivationally defined chunks above the word level: the very essence of phase theory is to define chunks that are bigger than a word, and to send them to PF (and LF). In Chomsky's (1998) initial incarnation, *v* and *C* are phase heads defining chunks to be sent to PF that are larger than words. Phonology, then, is constantly fed by these syntax-determined chunks. While it is reasonable to assume that a computational system is shaped by its input conditions, it is not reasonable to have the chunking labour done twice, i.e. first by phases in syntax and then again by prosodic constituency at PF. The concept of phase emerged as a conceptual necessity (Chomsky 1998, Uriagereka 1999, M. Richards 2007). The same is not tenable for prosodic constituency, we maintain. Hence, a direct consequence of *syntactic* phase theory is to eliminate the *phonological* Prosodic Hierarchy. This is a case of intermodular argumentation, i.e. where properties of a given module referee competitors in another module (Scheer 2008, 2009; see also Nevins 2010, Arregi & Nevins 2012 for some intermodular parallelism debate). Prosodic constituency can only be justified if it does labour in phonology which could not possibly be handled by phases.

However, and this is our second point, in the recent evolution of the Prosodic Hierarchy (e.g. Kratzer & Selkirk 2007), prosodic constituents (so-called prosodic islands) are designed as being isomorphic with phases, rather than being distinct from them in identifying different domains. Once again, isomorphism of phases and prosodic units makes the latter redundant.

This situation is reason enough, we submit, to pursue a perspective where all chunk-defining labour is done by phases. We illustrate this approach through a case study from Ariellese, a dialect spoken in Eastern Abruzzo (Italy), where *Raddoppiamento Fonosintattico* (syntactic doubling, henceforth RF) is both lexically determined and syntactically conditioned. It is shown that as far as this phenomenon is concerned, phases and phonologically relevant domains are strictly isomorphic, and hence additional prosodic constituency is useless.

RF in Ariellese obtains between an auxiliary and a participle in passive, but not in active constructions [cf. *so vviste* ('I am seen') vs *so viste* ('I have seen')]. Biberauer & D'Alessandro (2006) show that this alternation is obtained in the syntax, under the condition that the auxiliary is a lexical RF trigger. Specifically, there is a phase boundary between *so* and *viste* in the active construction, by virtue of *v* being a phase head, but there is no phase boundary between *so* and *viste* in the passive, by virtue of *v* being defective, hence not a phase head. The phase boundary blocks RF, hence actives do not exhibit it. No phase boundary exists in the passive between *v* and the participle in *V*; hence RF can freely apply at PF. This is a straightforward case, we submit, in which a *syntactic* phase boundary determines a *phonological* domain.

Having phases as the only defining device for both syntactically and phonologically relevant chunks has repercussions also on the syntax side: in order to be able to define all phonologically

relevant chunks that occur cross-linguistically, phases need to be flexible. It is a trivial cross-linguistic observation that not all phases leave a phonological trace. In Ariellese, for example, the boundary between *v* and its complement blocks RF at PF, as we have seen, while the boundary between C and its complement does not (*che sseme fitte*, that are done, ‘that we have done’). In the overwhelming majority of cases, chunks that have been identified by phases on the syntactic side do not impact phonology in any way.

This means either that phases have no impact in phonology at all, and hence that phase theory is wrong, or alternatively that phonological computation is insensitive to its input conditions. For the reasons discussed, we are not inclined to follow the latter track. Much more promising, we submit, is a modification of phase theory according to the demands of phonology, which opens the way for a unified theory of chunk definition on both the syntactic and the phonological side. This can be achieved by what we call Modular PIC (*Phase Impenetrability Condition*, Chomsky 2001): rather than being automatically associated to every phase, a PIC may or may not hook on a phase. Since only the PIC, not the phase in itself, is responsible for freezing effects, phases that are endowed with a PIC at PF will leave a phonological trace, while bare phases (with a PIC only at syntax) will not. This is parallel to what we know from the interaction of morphology and phonology: some morphological boundaries are visible to the phonology (e.g. class two affixes in English: *párent-hood* where stress is computed only over the root), while others are invisible (e.g. class one affixes: *parént-al* where stress is computed over the entire word, which behaves just like if it were monomorphemic).

The take of Modular PIC is thus that phases exist independently of the PIC: a phase can be associated with a PIC on a parametric basis. Two languages may thus have the same phase skeleton, i.e. identical sets of phase heads, but differ with respect to which phase head is associated to a PIC at PF. This is shown in (1) below.

- (1) language A:
phase heads α and δ are armed with a PIC at PF
phase heads β and γ have free rides at PF
- language B:
phase heads α and γ are armed with a PIC at PF
phase heads β and δ have free rides at PF
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This view is compatible with the original conception of phase theory where the set of phase heads is the same for all languages. Under (1), the phase skeleton is identical for both languages, and the only source of parametric variation is the way it is interpreted at PF (with or without a PIC). The system is also compatible with a view whereby the set of phase heads is subject to cross-linguistic variation (Gallego 2009, 2010). In this case there are two distinct sources of parametric variation: the phase skeleton itself and its interpretation at PF.

Note that Modular PIC also implies that the presence of a PIC for a given phase is specific to each of the three computational systems (modules) that are related by the phase skeleton: under (1), PICs *at PF* are depicted. Phases which leave no footprint in phonology, and hence to which no PIC is associated *at PF*, may well have a syntactic motivation for being armed with a PIC *in syntax*. This is the case for *vP* in English for example, where t-flapping is reported (e.g. by Nespor & Vogel 1986:46f, 224ff) to go into effect across *all* word boundaries no matter what the syntactic relationship of the words (provided the /t/ is word-final and intervocalic). The same should be true for the third computational system that is related by the phase skeleton, LF.

Heuristically, then, in a landscape with Modular PIC, two things need to be identified when a language is described: 1) the phase skeleton, 2) the association of a PIC to a given phase in syntax, at PF and at LF. Evidence for 2) are the footprints that are left behind: the presence or absence of a PIC for a given phase needs to be worked out for each of the three modules independently, and it needs to be based on evidence from that module alone. Evidence for 1) are the combined effects of 2): whenever there is a syntactic, a phonological or an LF footprint, there must be a phase head (armed

with a PIC). The reverse, however, is not true: there can be phases that have no effects in a given module. Put differently, the set of phase heads that are armed with a (syntactic and/or a phonological) PIC are a proper subset of the phase skeleton.