

The workings of phonology and its interfaces in a modular perspective

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Since its inception in the 1950s, the Chomskian enterprise is modular in kind: distinct computational systems using distinct and mutually unintelligible vocabularies concur to produce and perceive language. This perspective represents the application to language of the more general take on how the human cognitive system works (the so-called cognitive revolution of the 1950s, condensed in Fodor 1983). It contrasts with the connectionist approach that has emerged in the late 1980s which promotes indistinction: there are no distinct computational systems or distinct vocabulary sets.

The modularity of mind has a number of consequences when applied to language. The grammatical architecture resulting from this perspective is the so-called inverted T that is in place since Aspects (Chomsky 1965) where one concatenative system (morpho-syntax) and two interpretative modules (semantics and phonology) are distinguished (in production). The mutual unintelligibility of those systems is due to the distinct vocabulary that they process (domain specificity): things like person, number, animacy in morpho-syntax, against items such as labial, plosiveness etc. in phonology. As a consequence modules are incommunicado as such and need a translation device in order to talk to each other: this is what interface theory is about.

In the history of generative linguistics the interface between morpho-syntax and phonology was always more developed than the one that relates phonology to phonetics. Regarding the former nobody doubts that the translational process is achieved through a lexical access (an operation called spell-out): a morpho-syntactic structure that describes, say, past tense of a weak verb in English is realized as *-ed* because there is a lexical entry stored in long-term memory that specifies this equivalence (past tense [weak verbs] ↔ *-ed*). Since lexical properties by definition do not follow from anything (at least synchronically speaking), the relationship between the input and the output of this spell-out is *arbitrary*: there is no reason why, say, *-ed*, rather than *-s*, *-et* or *-a* realizes past tense in English.

The arbitrariness of the categories that are related by the translational process is thus a necessary property of this process: it follows from the fact that vocabulary items on either side cannot be parsed or understood on the other side. By definition, the natural locus of arbitrariness is the lexicon: therefore spell-out goes through a lexical access.

If grammar is modular in kind then all intermodular relationships must instantiate the same architectural properties. That is, what is true and undisputed for the upper interface of phonology (with morpho-syntax) must also characterize its lower interface (with phonetics): there must be a spell-out operation whose input (phonological categories) entertain an arbitrary relationship with its output (phonetic categories). That is, there is no automaticity or necessity for, say, [+labial] to be pronounced as a labial articulation [p,b,v,u,o etc.]. It could as well be pronounced as [χ] or [t]. Arbitrariness in the phonology-phonetics interface is counter-intuitive because unlike at the upper interface our experience is that the relationship is 99% faithful: what is labial in phonology is also labial in phonetics. There are distortions, though, which show that translation may be non-faithful, such as the variable pronunciation of the phonological sonorant /r/, which appears as [ʀ,ʒ] in Polish, [h] in Brazilian Portuguese or [ʁ,χ] in French and German.

Building among other things on so-called crazy rules (phonological processes that make no sense phonetically speaking, such as $l \rightarrow \text{ʁ} / V_V$ in Sardinian), the goal of the talk is to convince the audience that the lower interface of phonology is just as arbitrary as its upper interface. Two reasons will be shown to account for the fact that 99% of lower translational relations are faithful (while faithfulness is not even a relevant category at the upper interface):

the ontology of morpho-syntax (grammar-internal, no real-world categories involved) as opposed to phonetics (concerned with real-world categories) and the diachronic origin of non-faithful relationships at the lower interface (rules and phonology-phonetic mappings are not born crazy, they become crazy through aging).

Another issue that the talk develops is the decomposition of what is commonly considered as phonology into two distinct computational systems: two phonologies. As will be shown by a number of empirical diagnostics, the area below the skeleton (segmental, melodic) has workings and uses a vocabulary that are completely distinct from the area at and above the skeleton (prosody). Hence a palatalisation belongs to the melodic module, while stress assignment, syllable structure or infixation are negotiated by the prosodic module. The communication with morpho-syntax also evidences the split at the skeleton: the melodic world is completely incommunicado (in both directions), while the prosodic world does interact (i.e. is conditioned by and does condition morpho-syntax).