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M A N U S C R I P T



REPRESENTATION VS DERIVATION: THE CASE FOR A MODULAR VIEW OF PHONOLOGY¹

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Abstract. Plurilinear representations and constraint-based derivation have been the tools used in the last 40 years by autosegmental approaches and OT respectively in order to get rid of *SPE* rule-based serialism. It will be argued here that the border between representation and derivation depends on another key division in phonological theory: in phonology proper, there are no such things as "allophonic processes" involving feature propagation or delinking; only by virtue of allomorphy, that is of phonology/morphosyntax interaction, may an object be said to change into a different one. Thus, representational theories better describe core phonology, i.e. the internal workings of phonology seen as an autonomous module of grammar, while constraint-based models are more appropriate to deal with phonology's upper interfaces.

Keywords: Phonological representation, phonological derivation, allomorphy, modular grammar.

¹ This squib resumes and elaborates two papers that were presented at the 1st meeting of the Phonological Theory Agora (Lublin, 2015) and at the 40th anniversary conference of the Centro de Linguística da Universidade do Porto (Porto, 2016). I am grateful to Noam Faust and Francesc Torres Tamarit for their input on previous versions of this article, and to Marc van Oostendorp who considered it "reactionary".

1 THE DUAL LEGACY OF *SPE*

1.1 FROM RULES TO CONFIGURATIONS

It is instructive to look back upon the last forty years of research in phonology. The crisis caused by Chomsky & Halle's (1968) book (henceforth *SPE*) came to a provisional end in the mid-seventies, when Goldsmith (1976) introduced a break whose effects are felt to this day and are commonly labeled under the term "autosegmental phonology". It was, according to Encrevé (1988:146), a "spectacular innovation" in the history of phonological representations since the invention of the alphabet. From then on, it has no longer been possible to view words as mere sequences of letter-like tokens: phonologists have come to the conclusion that a distinction has to be made between the phonemes of a morpheme and the positions they occupy, that the phoneme has an internal structure, and that representations are based on how melodies and positions are synchronized, segmental features behaving much in the same manner as only tones were previously supposed to do.

While the number of possible phonological operations has been drastically reduced to two (spreading and delinking), this milestone naturally made representations much more complex – and possibly more abstract as well: for example, there is nothing more abstract than a pure timing slot. It should be noted that abstraction is not, in itself, a reason for criticism or rejection. A theory should not be dismissed because it is too abstract; it should, however, if it is arbitrary. Arbitrariness was precisely the "serious flaw" of their own proposal that Chomsky & Halle emphasized in the last chapter of their book: *SPE*-like rules are arbitrary as they are not able to distinguish a commonplace phenomenon from one that is unlikely or even impossible. By contrast, within autosegmental approaches, processes are supposed to be motivated if they obey a small number of principles, i.e. well-formedness conditions, imposed to autosegmental configurations (OCP, No Line-cross-

ing, Alignment, etc.), contrary to other processes which are therefore claimed to be ungrammatical. Thus, the autosegmental framework, whose main representative is currently Government phonology, appeared to many scholars as a project where, thanks to representational devices, the rules of earlier models could be motivated or even eliminated, in other words, where derivation could be justified if not ruled out from phonological theory.

1.2 FROM RULES TO CONSTRAINTS

It is also instructive to compare the contribution of autosegmental phonology with the second great break in our field, which dates back to Prince & Smolensky (1993), and is now mainstream: Optimality theory (OT). As is well-known, three main points characterize this approach in relation to the *SPE* original framework:

- (1)
 - a. Universal violable constraints, whose ranking (or weight) is language-specific.
 - b. Dialectic tension between markedness and faithfulness (MAX, DEP, etc.) constraints, the former applying to the surface representations (SR), and the latter to the relation between surface representations and underlying representations (UR).
 - c. Parallel derivation, which replaces *SPE* serialism (at least in the classic version of OT).

With respect to previous autosegmental approaches, however, one point has been less often noted:

- (2) With some exceptions (like tonology or metrical phonology), the UR's used in OT-based research are identical to those of *SPE*, that is mere sequences of letters.

The comparison between autosegmental and OT accounts is thus extremely interesting as it provides us with two different ways of answering the following question: what should a rule-free phonology be like? So as to get rid of rules, the autosegmental approach

focuses on the structure of *representations*, OT on the computation of (parallel) *derivation*.² The question then arises: should we try to overcome this opposition by unifying the two theories? This is, in my opinion, one of the most challenging epistemological problems that emerge from the phonology of these last forty years.

1.3 IS UNIFICATION POSSIBLE?

To begin with, is this unification desirable? I think it is, because the two approaches show major and specific drawbacks. Interestingly, both involve the same flaw as earlier rules, although in different domains: arbitrariness.

On the representational side, Government phonology is unable to provide a straightforward account of variation. Variability is assumed to follow from parameters associated to the principles mentioned above. Yet, parameter setting through licensing relations are too often based on arbitrary and ultimately circular stipulations. Consider, for example, the variable behaviour of word-final empty nuclei from language to language according to whether they can or cannot dispense licensing (Charette 1991:132-142). In contrast to this "legalist" approach (Boltanski 1999:153), recent developments of OT (see Coetzee & Pater 2011) have led to the most interesting formal accounts of phonological variation since Labov's times.

As to the OT framework, the same holds for markedness constraints, which can be argued to be formally arbitrary as they lack motivation by any representational theory.³ For example, why are CV syllables unmarked *vis-à-vis* CVC (with one additional element) and V (with one element less)? ONSET and NOCODA simply record typological

² In other words, the word "derivation" applies here to both serial and parallel frameworks, and refers in general terms to a process involving an input and an output, that is whereby an object is changed into another one.

³ For most phonologists working in the OT framework, formal motivation might be unnecessary, as markedness constraints are supposed to be "phonetically grounded" (see Archangeli & Pulleyblank 1994, Hayes & Steriade 2004, Bermúdez-Otero & Börjars 2006, de Lacy 2006, Kingston 2007). However, not only is this groundedness problematic in many cases, but phonologists are far away from a consensus on the relationship between phonology and phonetic substance (see Iosad 2017, Reiss 2017).

evidence; they do not explain anything. By contrast, Strict CV provides a unified account of CVCv and cV markedness if it is assumed that empty positions (v, c) are marked.

There are several cases of theoretical competition and eventual unification in the history of science. Physics offers at least three different examples. The first and the simplest one is when a new and more global approach annexes an earlier and “narrower” theory, the latter becoming a particular case of the former. This is the case of general relativity and classical mechanics. I do not think that this applies to the phonological frameworks at stake: neither of them can be shown to be more global than the other.

The second example is when two competing theories account for different empirical domains. This is the case of the theory of relativity *versus* quantum theory. Here a real unification should occur (and is still expected), both theories becoming particular cases of a third more global one. This case does not seem more relevant than the former, since the domains of configurational and constraint-based approaches largely overlap.

The third example may be the most appropriate for our purpose. Until the twenties of the last century, certain natural phenomena – light for example – seemed to exhibit a mysterious dualism: some data supported the view that they had a corpuscular nature, and that a particle should therefore be sought; other data pointed towards a wave theory. This continued until Louis de Broglie succeeded in explaining that light was *simultaneously* a particle and a wave, according to the “perspective”: one is the other’s limit. I have long forgotten what de Broglie’s perspectives are, but I think there might be a similar way to answer the question that arises from the dual nature of phonology: if representation and derivation are both part of our field, *where should we draw the line between them?* Interestingly, the response I will argue for squares with repeated claims for the autonomy of phonology in relation to upper modules (see in particular Scheer 2011).

2 BACK TO BASICS

2.1 THE DUAL NATURE OF RULES

Let us remember the scope of *SPE* rules. They are a legacy of structural phonology, and, as such, they are dependent on its two main historical trends: Prague School and American structuralism. Due to the former source, rules should affect phonemes that are strictly defined through distributional analysis. For example, as shown in (3a), Spanish has three nasal phonemes – a labial /m/, a coronal /n/ and a palatal /ɲ/ – that contrast in onset position, while, as shown in (3b), only an underspecified nasal can occur in coda position – an "archiphoneme", whose place feature is imposed by the following onset, if there is any.

(3) Trubetzkoy's "(archi)phonemes"

a. Spanish /m/ ~ /n/ ~ /ɲ/

['kama] “bed”	['kana] “rattan, stick”	['kaɲa] “reed”
[so'maɾ] “to sum”	[so'naɾ] “to sound”	[so'ɲaɾ] “to dream”

b. Spanish /N/ = {nasal}

['kampo] “countryside”	['kanto] “I sing”	['baŋko] “bank”
['aɲtʃo] “large”	['pan/ɲ] “bread”	['bjen/ɲ] “well, asset”

It follows that Spanish will be said to have the "allophonic rule" in (4).

(4) Sp. /N/ → [m, n, ɲ, ŋ] / _P, T, C, K
 → [n/ɲ] (according to the variety) / _#

However, in line with the Bloomfieldian tradition, the input of *SPE* rules is not always based on distribution; it can also follow from (phonologically-conditioned) allomorphy. Consider the data from Somali in (5). Distributional evidence would have led to posit

/la:N, siN, da:N, sa:N/ in the singular and definite forms for the same reasons as in Spanish: no place contrast is allowed in coda. Yet, as this would make the plural form unpredictable, the /m/ ~ /n/ contrast is assumed to exist in all positions at the underlying level.

(5) Bloomfield's "morpho-phonemes"

	<i>singular</i>	<i>definite</i>	<i>plural</i>	
a. Somali /m/	[la:n] [sin]	[la:nta] [sinta]	[la:mo] [simo]	“branch” “hip”
b. Somali /n/	[da:n] [sa:n]	[da:nta] [sa:nta]	[da:no] [sa:no]	“shore” “hiding place”

Thus, the rule at stake here no longer affects an archiphoneme, but specified nasal phonemes, in particular /m/ which, as shown in (6), loses its labial feature.⁴

(6) Som. /m/ → [n] / _T, #

The rules in (4) and (6) differ considerably due to the motivation of their inputs; they do not play the same role. As said above, (4) is dictated by distributional analysis, while (6) is supposed to account for the *morphological* knowledge of speakers: the plural of [la:n] is [la:mo], not *[la:no]; therefore, its [n] is not a "real" /n/ but an /m/ that changes into [n]. Despite that difference, due to Chomsky & Halle's denial of an intermediate phonemic level, (4) and (6) have long been assumed to be formally identical instances of phonological derivation, whereby an object is converted into another one. Does this hypothesis hold? It might be the case that the difference between (4) and (6) dispenses with

⁴ In fact, Spanish also shows a few alternations like [islámiko]-[islán] or [álbumes]-[álbun], which are parallel to Somali [la:mo]-[la:n] (Torres Tamarit, p. obs.). It might be just an accident that there are not so many pairs like this, the same way there might be cases of intramorphemic NC sequences in Somali from which no alternation can be subsumed. In any case, as the reader may have guessed, my point is not the difference between the two languages, but the one between absence and existence of alternations.

the need for derivation in at least one of the two examples. We should thus ask if derivation is necessary in both cases.

2.2 SAME PHONOLOGY BUT DIFFERENT LEXICON

Is the derivation in (4) necessary? I contend that it is not. The concept /N/ follows from the classic view of phonemic representations where features do not overlap (hence /N+p/). However, strict linearity at the underlying level – causing PA spreading at the phonetic level (hence [mp]) – results from unidimensionality. Within an autosegmental approach, there is no need for such things as feature spreading or delinking in such cases: homorganic NC clusters are simply geminates, in which linearity (i.e. the Nasal+PA sequence) is satisfied *in the melodic tier*, as shown in (7b). No one has ever claimed that lexical geminates or long vowels result from spreading.



In fact, only the representations in (7) are well-formed in both Spanish and Somali, the nasal coda lacking a place feature of its own. However, unlike Spanish, Somali is supposed to have the rule in (6). This is because Somali, but not Spanish, has roots ending with either /m/ or /n/, hence the allomorphy in (5a) given the phonological representations in (7). In sum, *the two languages have the same (nasal) phonology but different lexicons*. Crucially, unlike (4), (6) does appear as a derivational rule since something happens to features, as shown in (8a) for [(la:)n] and (8b) for [(la:)mo].⁵



⁵ According to whether [Labial] is defined as an anchored or a floating feature in the lexicon respectively.

Note that non-derivational alternatives to allomorphy-based rules have long been proposed: e.g. the "via-rules" of Natural Generative Phonology (Hooper 1976), whereby (6) could be replaced with an alternation / correspondence between /m/ and the archiphoneme /N/. For my part, I think that both representations are potential options: /la:m/ (and the resulting derivation) should entail word-final [m] before vowel *even in sandhi contexts*, while /la:N/, with a lexicalized archiphoneme (= (7a,b)), precludes [m] in sandhi.⁶

In any event, the facts discussed above suggest the following answer to the question asked in §1.3 about the border between representation and derivation:

- (9) a. There is no derivation in (core) phonology.
 b. Only when it comes to allomorphy – be it due to affix concatenation or to sandhi – may derivation emerge.

To give another example, all harmonic phenomena simply require many-to-one association, as in (7a); only affixation allows us to speak about derivation, as in Turkish /ip-unn/ → [ipin] ‘rope-genitive’, /ip-lar/ → [ipler] ‘rope-pl.’.

Before concluding, two points are worth noting. First, the claim "same phonology but different lexicon" departs from OT, where there are no lexical differences, and everything is put into the grammar to a point that the examples above would be explained in a quite paradoxical manner. It is the simplest case, Spanish, the one with place neutralization in coda position and no morphophonological alternations, that would require the most complex treatment, where the principles of Richness of the Base and Lexicon Optimization must be taken into account for banning specified /m, n/ inputs in coda position.

⁶ Also, Korean *lenis* /p, t.../, aspirated /p^h, t^h.../ and *fortis* /p*, t*.../ consonants merge word-finally into voiceless plosives ([p̚, t̚...]) that undergo the same voicing process in sandhi contexts as the word-internal unmarked *lenis* between vowels. Clearly, despite regular allomorphic alternations with marked phonemes, these word-final plosives can be argued to be underlyingly archiphonemes that have lost all connection with their historical sources.

Secondly, and most importantly, as the attentive reader may have understood, the divide I propose between core phonology and its interfaces does not parallel the one between the so-called "lexical" and "post-lexical" levels posited by Lexical phonology and its heirs: both rules in (4, 6) are indeed post-lexical. Nor can one argue that the same work is done twice, once by phonology, a second time by phonology's upper interfaces. What is at stake here is not a matter of levels but of perspectives (cf. §1.3): (4) and (6) can be considered as the same phenomenon seen from different angles.

CONCLUSION

The idea expressed in this article may seem obvious to anyone familiar with the history of phonology. My point is that it may shed light on the ongoing discussions about the work sharing between representational and computational approaches to our field. If I am right, the dual legacy of *SPE* should not be seen as contradictory: representations and derivation do complementary jobs. Hence, representational approaches account for the internal workings of the phonological module, and might help to motivate the markedness constraints required by phonological computation. Constraint-based approaches deal with the latter, that is derivation which emerges when phonology interacts with other modules such as morphology, syntax, and the lexicon. Thereby, the respective roles of representation and derivation strongly support modularist theories of grammar, and the autonomy of the phonological module.

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