

# On the Form of Default Rules in Phonology\*

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## 1 Introduction

The theory of Lexical Phonology proposed by Kiparsky (1982 ; 1985 ; 1993 ; 1995) has totally abandoned the distinction between types of phonological rules and those of redundancy rules. By the theory of Underspecification, the feature specifications are underspecified at the level of underlying representation if they are predictable by rules, including phonological and redundancy rules. The *Trisyllabic Shortening Rule* (TSS), which has been regarded as a kind of phonological rule, fills in [-long] in non-derived phonological environments, and it may change the feature specification [+long] into [-long] in derived phonological environments: in the former case of rule application TSS functions as a redundancy rule, while in the latter case it behaves as a phonological rule. Thus TSS performs the double duty of (i) feature-filling and (ii) feature-changing functions. Within the framework of Lexical Phonology, the modes of rule application are governed by the interaction of principles of Underspecification and Structure Preservation: TSS applies lexically to fill in [-long] in such words as *Italy* ([ølong]təli) and to change [+long] into [-long] in such words as *sanity* ([sænitɪ]).<sup>1</sup>

One of the basic dichotomy of phonological rules in Lexical Phonology is defined as the distinction between language-universal and language-specific rules. The former type is called Default Rules, which Archangeli (1984: 45) defines as follows:

#### Default Rules

Rules which are part of Universal Grammar. These are cost-free.<sup>2</sup>

Language-specific phonological rules, e. g. , Velar Softening and Spirantization, are in some significant sense of the word language-specific, phonological “residue” of universal properties of language.<sup>3</sup> These two rules of phonology may be categorized as processes of lenition, or weakening, of phonological segments: “/k / > [s]” and “/t / > [s]”, which at the same time are in essential respects subject to lexicalization.

Phonological researches in the main strands of generative grammar have hitherto focused their attention on the content and function of default rules, and relatively little attention has been paid on the form of default rules. The present paper tries to capture some formal uniformities of default rules and relates some consequences in the description of the phonology of German / *R* /.

The line of argumentation will be the following. In § 2, I will reanalyze some formal and substantive aspects of default rules that are postulated in articles on phonology. I will point to the (bi-) directionality in the structural descriptions of rules. In § 3, I will reanalyze Hall’s (1992) description of German / *R* /.

## 2 Formal and Substantive Aspects of Default Rules

Default rules have been formulated as rewrite rules that specify struc-

tural changes and descriptions of phonological processes. Durand (1990: 162) ingeniously distinguishes two types of default rules: (i) those rules that define logical relations among feature specifications and those that state preferred configurations among feature specifications. Four examples from Archangeli (1984) will be cited:

(1) a. Logical relations

[ ] → [-high] / [\_\_\_\_\_, +low]

[ ] → [+low] / [\_\_\_\_\_, -high]

b. Preferred configurations

[ ] → [around] / [\_\_\_\_\_, αback, -low]

[ ] → [αback] / [\_\_\_\_\_, around, -low]

Rules of the type (1a), if there are any, provide redundant information on phonological alternations: the information can be logically derivable from definitions of phonological features. Thus, by definition the feature specification [+low] and [+high] cannot coincide with each other in a phonological segment. Therefore, rules of the type (1a) are simply superfluous in phonology. The output configurations of rules of the type (1a), e. g., [+high, -low] and [-high, +low], are determined by non-linguistic properties of human vocal organs.

The output configurations of rules of the type (1b), e. g., [-low, around, αback], are physiologically motivated by human vocal organs. While it is logically impossible to pronounce [+high, +low] segments by our organs of speech, the effects of rules of the type (1b) are not derivable from any independent systems of phonology. The set of feature specification [-low, around, αback] defines a universally preferred and physiologically motivated configuration.

No linguistic motivations have hitherto been pointed out that determine

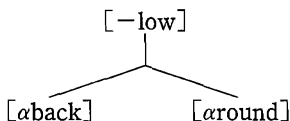
the foci of default rules. The preferred configuration [ $\alpha$ round,  $\alpha$ back,  $-$ low] could easily be translated into nine candidate rewrite rules, if we restrict the number of the feature specifications encoded in the foci of rules to be one :

(2) Nine candidate rewrite rules

- [ ]  $\rightarrow$  [ $\alpha$ round] / [\_\_\_\_\_,  $\alpha$ back,  $-$ low]
- [ ]  $\rightarrow$  [ $\alpha$ back] / [\_\_\_\_\_,  $\alpha$ round,  $-$ low]
- [ ]  $\rightarrow$  [ $-$ low] / [\_\_\_\_\_,  $\alpha$ round,  $\alpha$ back]
- [ $\alpha$ round]  $\rightarrow$  [ $\alpha$ back] / [\_\_\_\_\_,  $-$ low]
- [ $\alpha$ back]  $\rightarrow$  [ $\alpha$ round] / [\_\_\_\_\_,  $-$ low]
- [ $-$ low]  $\rightarrow$  [ $\alpha$ round] / [\_\_\_\_\_,  $\alpha$ back]
- [ $\alpha$ round]  $\rightarrow$  [ $-$ low] / [\_\_\_\_\_,  $\alpha$ back]
- [ $-$ low]  $\rightarrow$  [ $\alpha$ back] / [\_\_\_\_\_,  $\alpha$ round]
- [ $\alpha$ back]  $\rightarrow$  [ $-$ low] / [\_\_\_\_\_,  $\alpha$ round]

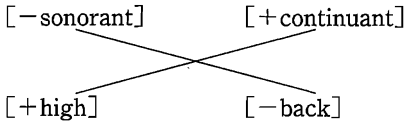
Any arbitrary choice among these candidates has to be avoided in order to restrict and guarantee the explanatory plausibility of the theory of phonology. In the present paper, I would like to propose that default rules are not rewrite rules but some kind of configurations of featural specifications. Hence there is no “direction” or no “focus” in the statement of default rules. The idea of “configurations of featural specifications” may diagrammatically be represented as follows :

(3) configurations of featural specifications



Thus Hall's (1989) default rule "[−sonorant, +continuant, +high] → [−back]" may be reformulated as (4) :

(4) Hall's (1989) default rule (revised)

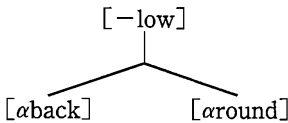


The default rule "[αsonorant] → [αvoice]" may be translated into (5) :

(5) [αsonorant] ————— [αvoice]

I assume (i) that the association lines among feature specifications are interpreted to be bi-directional and (ii) that the lines that connect features with coefficients indicate the foci of rules. Thus (3) will be rewritten into (6) :<sup>4</sup>

(7) Hall's default rule (revised)



The focus of the input configuration of feature specification (the trigger of the phonological operation) is determined by the underlying and derived representations in the phonology of the language. Thus if the feature specification of a given feature is [αback, ∅round, −low], the default rule "[αback] → [αaround] / [\_\_\_\_\_, −low]" will be evoked to fill in [αaround] in the phonological representation. Given a language in which lexical entries include [∅back, around, −low], the default rule "[αaround] → [αback]

/ [\_\_\_\_\_, -low]" will take effect to insert [ $\alpha$ back] there.

### 3 A Reanalysis of Hall's Description of German / R /

#### 3.1 The Overall Architecture of the Theory

In this section I would like to present an overall architecture of the phonological theory to provide a reanalysis of phonological phenomena involving German / R /. Three universal hypothesis and an hypothesis on German phonology are in order:

#### (8) Universal Hypotheses

##### a. Strong Domain Hypothesis (Kiparsky (1984))

- i. All rules are available at the earliest level of the phonology.
- ii. Rules may cease to apply, but may not begin to apply at a later level by stipulation.

##### b. Lexical Constraint on Feeding (LCF, see Takahashi (1996))

In the lexicon, default rules cannot feed unmarked rules.

##### c. Spread $\alpha$

Spread any terminal feature specification rightward within a phonological word. Otherwise, spread it leftward.

##### d. Parametric specification on individual grammars, e. g., on English Phonology

In the sequence "[+stop][+cons]" the two consonants must share a single place node. (Mohanan (1993))

As for German phonology, the following specification may be parameterized with respect to (8c):

- (9) The two neighboring consonants “[+stop] [+cons]” must share a single place node within a phonological word; in cases where the second segment is an alveolar, labiodental, or palatal segment the restriction does not hold.

The specific condition described in “unless the second segment is an alveolar, labiodental, or palatal segment” is necessary to account for a non-assimilating string of segments found in *Amt* [amt], *fünf* [fʏnf] and *Mönch* [mœnç].

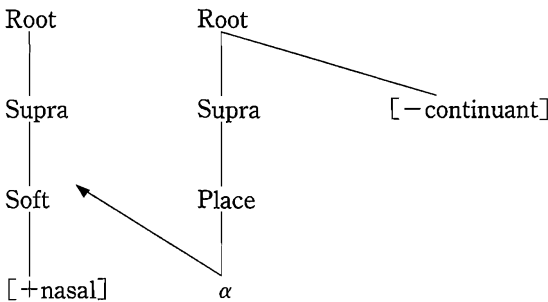
### 3.2 Nasal Place Assimilation in German

In this subsection, I would like to take up Hall’s (1992) analysis of Nasal Place Assimilation in German and to make it explicit that the approach I propose here unifies two rules of German phonology into one.

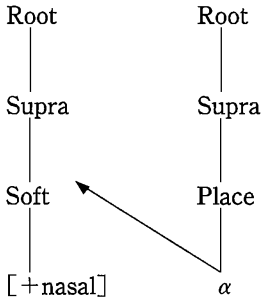
Hall (1992) formulates two rules of Nasal Place Assimilation :

- (9’) Rules of Nasal Place Assimilation<sup>5</sup>

- a. Lexical Nasal Place Assimilation (Hall (1992: 191)) Obligatory



b. Postlexical Nasal Place Assimilation (Hall (1992: 197)) Optional



In our framework, instances of spreading can be deduced from a premise: Avoid  $\emptyset$  if possible. To cite an example, in *krank*, the nasal /n/ has no specification of place of articulation by universal default and underspecification; the word has a vacant slot under the Place node of the fourth segment. The word-final segment /k/ is specified as [DORSAL]. By the principle “Avoid  $\emptyset$  if possible,” the specification [DORSAL] is spread leftward onto the nasal. If it is not spread there, the filter (8d/9) will be evoked to bar [krank]. The surface obligatory nature of the Nasal Place Assimilation with respect to *krank* is translated here into the interaction of “Avoid  $\emptyset$ ” principle and the filter (8d/9). The German word *Mönch* has two types of pronunciation: [mœnc̥] / [mœnc̥]. The former type is derived by (i) non-application of Spread  $\alpha$  and (ii) avoidance of  $\emptyset$  by default introduction of [CORONAL] onto the nasal in the coda. The latter is derived by the spreading of [-back] from /ç/ onto /n/: the instance of the lexical application of Spread  $\alpha$  is barred by LCF (8b), because the specification of [-back] (/ç/) is introduced by a default rule “[-sonorant, +high, +continuant]  $\rightarrow$  [-back].”



#### 4 An Analysis of German / R /

The realization of German / R / involves complicated interacting phonological processes. The present section focuses its attention on the functioning of a default rule and tries to simplify the whole derivational process.

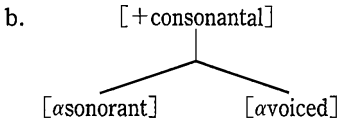
It has been assumed in traditional literature of Generative Phonology that there is a unidirectional relationship between the features [sonorant] and [voiced]:

$$(10) \quad [\alpha\text{sonorant}] \rightarrow [\alpha\text{voiced}]$$

Cf. Kiparsky (1985: 108)

Restricting its structural description to consonants (and excluding vowels), we may reformulate (10) into (11a) or its partially non-directional notational variant (11b) :

$$(11) \quad \text{a. } [\alpha\text{sonorant}] \leftrightarrow [\alpha\text{voiced}] / [\text{_____}, +\text{consonantal}]$$



(11) performs the effects of the following two rules:

$$(12) \quad \text{a. } [\alpha\text{sonorant}] \rightarrow [\langle\text{voiced}\rangle] / [\text{_____}, +\text{consonantal}]$$

$$\text{b. } [\alpha\text{voiced}] \rightarrow [\alpha\text{sonorant}] / [\text{_____}, +\text{consonantal}]$$

The postlexical derivation of the partially breathed sonorants found in the onsets of *smile* and *slow* is a consequence of two premises: (i) the default “[−sonorant] → [−voiced] / [\_\_\_\_\_, +consonantal]” feeds an instance of rightward spreading of [−voiced] (an unmarked process), and

(ii) the default cannot feed the unmarked spreading operation. The results are postlexically derived contour segments in the onsets.

The problematic cases with German /*ʀ*/ are intricately related with certain instances of the application of a default rule (12b). The derivational problems arise in the description of dialects of the Lower Rhine (henceforth, LRG). Readers are referred to Hall (1993) as for their behavior with respect to /*ʀ*/. Hall (1993) assumes that the underlying segments of allophonic variants in German are one and the same: /*ʀ*/. But it is clear we do not have to stick to this hypothesis. As McMahon (1992: 83) reasonably notes:

- (13) ... if the constraints of the lexical model [Lexical Phonology as proposed by Kiparsky (1982) and others—YT] are strictly applied, and if dialects are analysed on their own terms, different sets of underlying representations will be proposed.

In fact, there is no evidence for the assumption that /*ʀ*/ is included in the underlying inventory of segments in LRG: (i) the segments [ʀ] never surfaces at the level of phonetic representation in LRG, (ii) as Hall (1993: 92) notes, the non-vocalized /*ʀ*/ always surfaces as a fricative—either [ʁ] or [χ]. Kiparsky's (1976) Alternation Condition and Postal's (1968) Naturalness Condition would suggest that the underlying segment be /*ʁ*/. Therefore the phonological patterning of related segments in LRG would be:

- (14) /*ʁ*/ [ʁ]  
[χ]  
[ɹ]

In the onset, [ɣ] surfaces: e. g., *zurück* [tsuɣyk]. The other two segments are realized in coda positions. The related derivations follow:

- (15) Wort [vɔΔt] / [vɔχt]
- |        |        |  |
|--------|--------|--|
| vɔɣt   | vɔɣt   |  |
| vɔΔt   | vɔɣt   | ɣ-Vocalization <sup>6</sup>                  |
| [vɔΔt] | [vɔχt] | Regressive Voicing Assimilation <sup>7</sup> |

It is crucial in the derivations in (15) that the default (12b) does not feed ɣ-Vocalization. The upshot of the analysis is that Hall's (1993) Desonorization can be discarded. Hall's observation "... the non-distinctive segments [ɣ] and [χ] are created postlexically" is a natural consequence of the analysis.

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<sup>1</sup> We are assuming here that the lexical introduction of [-long] is not barred by any marking conditions: in English, the specifications [+long] and [-long] are mutually contrastive with respect to vowels. TSS cannot apply to words whose antepenultimate syllables are [+long], for example, *nightingale*. It does not

apply to this word because the identity rule (n [+long] tingæɫ > n [+long] tingæɫ) excludes the application of TSS by virtue of the Elsewhere Condition.

<sup>2</sup> Default rules are distinguished from Complement and Learned rules:

i) Complement Rules : Rules created by a process Alphabet Formation, which is part of Universal Grammar. Alphabet Formation requires language particular information to create the Complement Rules. These are cost-free.

ii) Learned Rule: Language particular rules which must be learned. These are not cost-free.

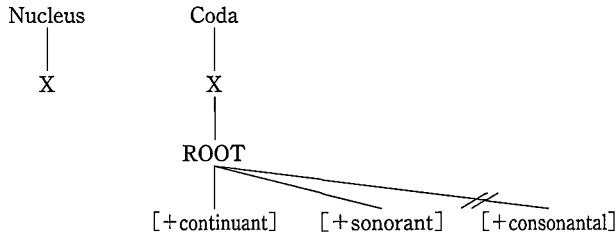
<sup>3</sup> See Stampe (1969: 443) for the notion “phonological residue”.

<sup>4</sup> The rule (5) also has a bold line:

[αsonorant] ————— [αvoice]

<sup>5</sup> The theory of Feature Geometry here I assume comes from Sagey (1990).

<sup>6</sup> α -Vocalization (optional)



<sup>7</sup> Regressive Voice Assimilation

