

Allophony, neutralization, and structure preservation in Stratal OT

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1. Introduction

This talk investigates the role of structure preservation within the framework of Stratal Optimality Theory (e.g. Kiparsky 2000) through an analysis of attested cases of structure preservation violations. The principle of structure preservation (e.g. Kiparsky 1985) prohibits the creation of allophones during the course of operations in the lexical phonology. Although structure preservation has been largely rejected within Optimality Theory, not all structure preservation violations are alike with respect to their analysis in OT grammars. Previous work has shown that processes which are both neutralizing and non-structure-preserving result in a ranking paradox in a single, parallel OT evaluation (e.g. Krämer 2006). This has been presented as an argument in support of Stratal OT (Bermúdez-Otero 2007, Mackenzie 2016). Although purely allophonic processes have not been considered in these works, this talk shows that similar ranking paradoxes arise if allophonic processes are motivated by markedness constraints which restrict the location or distribution of features. Instead, this talk argues that purely allophonic processes occurring at the stem level are motivated by constraints which require rich output specifications. This approach is integrated with a model of contrastive specifications in which a hierarchy of featural faithfulness constraints maps the rich base to contrastively specified outputs (e.g. Drescher 2009).

The following analyses show that stratal OT allows purely allophonic and purely neutralizing processes to apply at the stem, word, or phrase level. Processes that are both neutralizing and non-structure-preserving, however, cannot apply at the stem level but can apply at later levels when constraint rankings are no longer required to filter the rich base to the phonemic inventory. German dorsal fricative assimilation is presented as an example of an allophonic process that applies at the stem level. The effect of a preceding /l/ on vowel quality in London English (Wells 1982; Harris 1990) is presented as a case in which neutralizing and allophonic applications of a process appear similar but must occur at different levels and be motivated by different constraints.

2. German dorsal fricative allophony

In German, [x] and [ç] are in complementary distribution with [x] occurring after back vowels and [ç] occurring elsewhere (1). The back variant of the fricative does not occur when a morpheme boundary intervenes between the fricative and a preceding back vowel, resulting in the surface contrasts in (2). These data have been argued to provide a counterexample to structure preservation as they require the allophonic process to occur early in the lexical phonology (e.g. Hall 1989).

(1)	Lichte	[lɪçt]	‘light’	Nacht	[naxt]	‘night’
	Chemie	[çɛmi]	‘chemistry’	durch	[durç]	‘through’
(2a)	Tau-chen	[tauçən]	‘little rope’	b. tauch-en	[tauxən]	‘dive-inf’
	Kuh-chen	[kuçən]	‘little cow’	Kuchen	[kuxən]	‘cake’

In the analysis proposed here, the feature [back] is not contrastive for the dorsal fricative but surfaces in the [x] allophone. If the constraint motivating the allophony is formalized as a ban on feature co-occurrence, such as *[+back][–back], a ranking paradox arises at the stem level. The markedness constraint must outrank faithfulness to [back] to ensure allophonic distribution. The constraint against [+back] specification for dorsal fricatives must also outrank faithfulness to [back] in order to prevent [x] from surfacing when not preceded by a back vowel. In a model allowing output underspecification, the attested output with a [+back]

dorsal fricative will lose to candidates which satisfy the markedness constraint against [+back][−back] sequences through mapping to a member of the inventory, such as a dorsal fricative unspecified for [back]. This problem is avoided if the markedness constraint motivating the allophonic variation is formalized as a constraint requiring [+back] in this context, as in (3), rather than as a constraint against a particular feature sequence.

(3) ALIGN[+back]_{VC}: if a vowel is [+back], a following dorsal consonant is also [+back]

(4) Stem level evaluation of /kuçən/ ‘cake’

kuçən [−back]	ALIGN[+back] _{VC}	*C [+ back, +continuant]	MAX[back]
a) [☞] kuçən [+back]		*	*
b) kuçən [−back]	*!		
c) kuxən	*!		*

High ranking of ALIGN[+back] requires non-contrastive specification of [back] in the output of the earliest level of evaluation. The constraint is ranked lower at later levels, failing to trigger backing in derived forms such as [kuçən], ‘little cow’. This analysis follows the multi-stratal account of Ito and Mester (2001) and builds on their proposal by incorporating a theory of contrastive specifications and providing explicit definitions of relevant markedness and faithfulness constraints with respect to feature specification.

3. Roland-rolling in London English

Tautosyllabic /l/ affects the quality of preceding vowels in London English. The effect neutralizes the tense/lax contrast among high vowels (5a) while it is non-structure-preserving for the GOAT vowel (5b).

(5a) [pʊu] ‘pull’ = ‘pool’ (b) [gʌʊt] ‘goat’ (Harris 1990: 97)
 [fɪʊ] ‘fill’ = ‘feel’ [gʊʊl] ‘goal’

Application to the GOAT vowel is sensitive to morphological structure, resulting in the surface contrasts in (6a). In ‘rolling’, the GOAT vowel shows the effect of the following /l/, although the /l/ is syllabified as an onset. The vowel in ‘rolling’ is thus equivalent to the vowel in ‘roll’ where the /l/ must be syllabified as a coda, and distinct from the vowel in monomorphemic ‘Roland’. The neutralizing effect on high vowels, however, does not exhibit parallel sensitivity to morphological structure. It fails to apply in forms like ‘feeling’, (6b), resulting in a difference in vowel quality between ‘feel’ and ‘feeling’.

(6a) [rʌʊlənd] ‘Roland’ (b) [fɪʊ] ‘feel’
 [rʊʊlɪŋ] ‘rolling’ [fiilɪŋ] ‘feeling’

Harris (1990) provides a derivational analysis in the framework of lexical phonology, showing that the vowel quality changes to the GOAT vowel must apply early in the lexical phonology whereas the effects on the high vowels must be postlexical. Thus, although these processes appear similar, they must apply at distinct morphological levels and do not constitute a counterexample to the claim that processes which are both neutralizing and allophonic cannot occur at the stem level. This talk provides a Stratal OT analysis showing that, not only are the neutralizing and allophonic aspects of the process triggered by different constraint rankings, but also that the allophonic effects must be motivated by a constraint requiring output specification of non-contrastive features, as in the analysis of German dorsal allophony.