

## Optimal underlying representations

This paper tests the predictions of Optimality Theory (OT, Prince & Smolensky 1993 [PS], McCarthy & Prince 1995 [MP]) for underlying representations (URs) of predictable non-alternating phonological structures. The analysis of English low vowel tensing and German glottal stop insertion provides evidence against the OT claim of underlying full specification of such structure (PS 1993, Inkelas 1994, Kager 1999, Burzio 2000). OT does not make any clear prediction for allophones in complementary distribution, and it clearly opts for underspecification in cases of epenthesis.

With the introduction of Lexicon Optimization (LO), PS and Inkelas (1994) turned generally held views on lexical economy within generative phonology upside down (Yip 1996). According to these authors, LO predicts that URs are fully specified for all features and feature values unless they are predictably alternating. A closer examination, however, reveals that the nature of the optimal UR compatible with a given output entirely depends on faithfulness constraints and their violations. Since the output is always the same and only the inputs compete in a LO evaluation, violations of surface markedness constraints have to be the same for all input-output pairs. In correspondence theory (MP), segmental features are checked in the input-output mapping only by identity constraints, though some later studies argue for MAX(F) and DEP(F) constraints. In the theory of feature identity there are no faithfulness violations recorded in the grammar if an underspecified input is mapped onto a fully specified output. Hence, in LO the underspecified form does not fare worse than the fully specified form.

In this paper, I examine English æ-tensing and German glottal stop epenthesis. Benua's (1995) analysis of æ-tensing provides a grammar that determines the tenseness of the low vowels in all environments rather than only in the tensing environment. First, I will show that this analysis, which adheres to the Richness of the Base Hypothesis (ROTB, PS 1993) does not unambiguously predict a UR (see tableau 1). Second, I will show that this analysis, and, as a consequence ROTB, is borne out. To test for the URs of English low lax and tense vowels I taught German words to a group of Northern Irish students who exhibit this tensing pattern and tested English native speakers with a certain command of German as L2 for German words which violate English phonotactic restrictions on low vowels. The subjects adjust German words in both directions: They realise the lax vowels in the tensing environment as tense and they change tense vowels to lax in the remaining environments. From this one can conclude that an analysis conform to the ROTB is more appropriate than an analysis which takes one allophone as basic and only derives the other.

PS predict that epenthesised consonants which never alternate are stored in UR. Wiese (1996/ 2000) and Alber (2001) argue that the sites of glottal stop epenthesis in German are the left edge of the stem and the left edge of the foot. In an OT analysis adhering to ROTB we have to exclude all other contexts where a lexical glottal stop might occur, i.e., complex onsets, onsets of unstressed non-initial syllables and any kind of coda.

In the full analysis proposed here to account for the positional restrictions on the occurrence of glottal stops all potential underlying glottal stops are realised as oral stops (see tableau 2). As a by-product of the analysis, actually occurring glottal stops cannot be stored in URs by LO, since these URs would result in the wrong outputs. Hence, the glottal stop is absent from the German lexicon, contrary to original claims by PS and Inkelas for such patterns.

In conclusion, in analyses within correspondence theory which take ROTB seriously LO does not make the counter-intuitive predictions it was originally thought to make. Time permitting I discuss the repercussions of these findings for UR-less approaches as advocated for by e.g. Burzio (2000).

## Example tableaux

(1) æ-tensing in (Belfast) English and LO ('A' = low vowel underspecified for tenseness)

i.	æ-TENSING	*TENSE-low	IO-IDENT
☞ a. /pAs/ ~ pa:s		*	
b. /pæs/ ~ pa:s		*	*!
☞ c. /pa:s/ ~ pa:s		*	

ii.	æ-TENSING	*TENSE-low	IO-IDENT
☞ a. /Asɪd/ ~ æsɪd			
b. /a:sɪd/ ~ æsɪd			*!
☞ c. /æsɪd/ ~ æsɪd			

(2) German epenthesis

i.	DEP& *PLACE	MAX	ONSET foot	CONTI GUILTY	ONSET	SPECIFY [place]
☞ a. /e:kəl/ ~ [ʔe:kəl]				*		*
b. /e:kəl/ ~ [te:kəl]	*!					
c. /e:kəl/ ~ [e:kəl]			*!		*	
d. /ʔe:kəl/ ~ [ʔe:kəl]						*!
☞ e. /ʔe:kəl/ ~ [te:kəl]						
f. /ʔe:kəl/ ~ [e:kəl]			*!		*	

ii.	DEP& *PLACE	MAX	ONSET foot	CONTI GUILTY	ONSET	SPECIFY [place]
/kaʊs/ /kaʊs-ɪʃ/						
a. [(ká.ʔʊs)]				*!		
b. [(ká.tʊs)]	*!					
☞ c. [(ká.ʊs)]					*	
d. [(kás)]		*!				
☞ e. [ka.(ʔó:tɪʃ)]						*
f. [ka.(tó:tɪʃ)]	*!			*	*	
g. [ka.(ó:tɪʃ)]			*!			