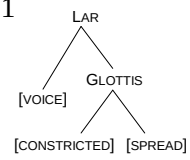
FEATURAL ALTERNATION AND FORMAL REPRESENTATION :THE PHONOLOGY OF GERMAN LARYNGEALS

Systematic alternation patterns ideally determine the design of representational linguistic frameworks. Thus for instance, the theory of feature geometry reflects the class behaviour of phonological features by proposing class nodes – i.e. abstract entities without featural content – to represent single features or even certain sets of features as a unit. If for instance the laryngeal features consistently behave in a similar way in language-specific alternation, a tree structure like the following is an appropiate representation:

table 1

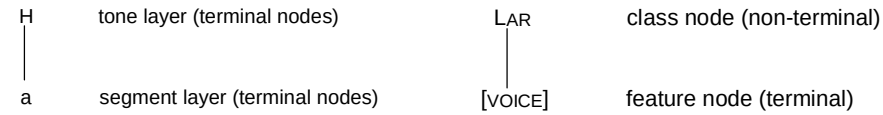


In the constraint-based as well as in the rule-based research paradigm such phonological feature trees are in widespread use; this leads to the assumption that sufficient evidence has motivated each feature class refered to in the analysis. A closer look at various approaches in feature geometry, however, does not support this conclusion: two major shortcomings – one of empirical, one of conceptual origin – characterize the current analyses.

The first problem is that no effort has yet been made to prove the internal class hierarchy of the laryngeal features although the structure in table 1 is permanently used, e.g. to formalize delinking rules for all phenomena involving laryngeal features such as final devoicing (voice contrasts in general), the distribution of /h/ and the distribution of the glottal stop (cf. German data on p. 2). On the contrary, current optimality-theoretic work leads to the conclusion that alternation phenomena in German concerning laryngeal features do not suit a unified analysis (cf. Alber 2001, Féry 1999, 2002). This becomes obvious within a short view of papers that permanently treat glottal features in separate analyses from those dealing with [VOICE]-alternations (final devoicing). In this paper all three laryngeal features are shown to be prosodically determined by uniform means which motivate a representation like in table 1.

The second problem is that graphical conventions of phonological feature structures are used inconsistently. The associations between a class node and a feature (Bird 1991:137 dubs 2 b. CATEGORY MEMBERSHIP) are interpreted in the same way as those between a segment and its feature (Bird 1991:137 dubs 2 a. DOMINANCE):

table 2: ambiguous associations in tree structures



a. $\{a\} \notin \{H\}$ b. [VOICE] $\in$ LAR

The crucial difference between these two interpretations shows up if the terminal element is delinked. In the first case called DOMINANCE the tone feature passes a delinking process of the associated segment since its feature content is not affected at all. In the second case the class node LAR would not be part of the resulting structure if the feature [VOICE] was delinked; since class nodes are defined as non-terminal elements, they lack any featural content. In the current approach this conception of class nodes is put to use: class nodes are absent or present in phonological structures depending on their subsequent complexity.

Based on these preliminaries the present paper will reveal the uniform systematic behaviour of the three phonological features involved. The current mismatch between generalizations and representations is resolved in a constraint-based framework following fundamental hypotheses of Declarative Phonology (cf. Scobbie/ Coleman/ Bird 1996). By modifying the constraint-based syllabification tool of Walther (1993), an interface between feature structures and prosodic structure building is developed. The appropriate prosodic licensing of phonological features is achieved by the following theoretical assumptions:

- the nature of class nodes allows non-maximally specified segments to show up in surface forms in declarative frameworks
- prosodic structure building is based on parsing fully structured feature sets rather than segments
- three inviolable constraints are posited that lead to a structured feature set *identical* to the hierarchy under discussion.

Data

1. [VOICE]-alternation in German (shaded column)

a.	Rat	‚counsel'	[ʀɑ:	t		]	
b.	Rad	‚bike'	[ʀɑ:	t		]	
c.	Räte	‚counsels'	[ʀɛ:	t	ə	]	
d.	Räder	‚bikes'	[ʀɛ:	d	ɐ	]	
e.	robbe	‚crawl'	[ʀɔ	b̥	ə	]	[b] in ambisyllabic position
f.	robbt	‚crawls'	[ʀɔ	p	t	]	

2. glottal/Ø-alternation in German (shaded column)

a.	Hemd	‚shirt'		[h]	emd					
b.	Bahnhof	‚station'	Bahn	[h]	of	vs.	Bahn	Ø	of	
c.	Sahara	‚sahara'	Sa	[h]	ara	vs.	Sa	Ø	ara	
d.	Atem	‚breath'		[ʔ]	Atem	no alternation				
e.	einatmen	‚to breathe in'	ein	[ʔ]	atmen	vs.	ein	Ø	atmen	
f.	chaotisch	‚chaotic'	cha	[ʔ]	otisch	vs	cha	Ø	otisch	

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