

## Laryngeal Underspecification and Richness of the Base

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In this paper I argue that, *contra* Prince and Smolensky's ([1993] 2004) principle of Richness of the Base (RotB), phonological input forms are constrained by language-specific patterns of featural underspecification. The empirical basis for this claim comes from a comparison of voicing neutralization processes in Turkish and Czech. I show that extending Inkelas's (1995) treatment of Turkish to Czech leads to a paradoxical state of affairs in which RotB predicts that underspecification will occur if and only if it is unnecessary.

In Turkish, there are three types of root-final stops: ones that are always voiceless (1a,b), ones that are voiced in onsets but voiceless in codas (1c,d), and ones that are always voiced (1e,f). Inkelas proposes that the non-alternating stops /t, d/ are specified for [±voice] in the input, while the alternating ones /D/ are "archiphonemically" unspecified for [±voice]. The alternations arise through the filling in of positionally optimal values on the underspecified stops.

The Czech facts at first appear to be amenable to a similar set of representations. Czech obstruents in general are subject to final devoicing, and also to a process of regressive voicing assimilation, which produces both voicing (2e–h) and devoicing (2i–l). However, the fricatives /r/ and (in some dialects) /v/ undergo but do not trigger assimilation, being instead devoiced after voiceless obstruents (3). If /V/ and /R/ are archiphonemically unspecified for [±voice], then the constraints in (4), ranked in the order shown, will produce the attested voicing patterns (assuming that all segments in the output must be fully specified).

In contexts such as *řeka* or *vrána*, where the anomalous segments alternate between voiced and progressively devoiced surface forms, the underspecified underlying representations will be the only ones that yield the correct outputs in all environments. However, in non-alternating contexts, such as *dva* [dva] 'two' or *tři* [tri] 'three', Lexicon Optimization (LO) will prefer underlying representations containing the output values of [±voice] (5). This is not problematic in itself, but becomes so when taken in combination with RotB. If fully specified /v/, /f/, /r/, and /r̥/ are all possible input segments, then we expect to find forms in which the anomalous segments behave identically to the other obstruents, triggering assimilation regressively rather than undergoing it progressively. In other words, the archiphonemes /V/ and /R/ are expected to have both [+voice] and [-voice] counterparts, just as Turkish /D/ has. The prediction is partially correct: Czech has /f/, albeit only in loanwords and onomatopoeia, but there are no forms such as \*[r̥eka] (cf. 3c) or \*[zvra:nou] (cf. 3h) in which [v], [r], or [r̥] act as if underlyingly specified for [±voice] in contexts where alternations can occur.

The problem is that, given RotB, the only way to express the correlation between the voicing behaviour of /V/ and /R/ and their other features is in the constraint hierarchy. There is no obvious principled way of doing this. Historically, /V/ and /R/ owe their status to the fact that they used to be sonorants, but synchronically they are not phonetically more sonorous than other Czech obstruents, and so they are not amenable to a cue-based account along the lines of Padgett's (2002) treatment of Russian /v/ (Hall 2004). They can be prevented from spreading [±voice] only arbitrarily, e.g. by replacing the constraints in (4c) and (4f) with ones that apply only to segments other than /V/ and /R/, and demoting the general MAX[VOI] constraint to below \*[-VOI]. This will produce the attested surface patterns, and, if MAX[VOI] outranks DEP[VOI] (as per Inkelas 1995 and Kiparsky 1993), then the underspecified inputs will be preferred by Alternant Optimization, Inkelas's version of LO that takes alternations into account (6). But the constraint hierarchy that guarantees underspecification also makes it irrelevant, by stipulating the exceptionality of /V/ and /R/ independently of their voicing features. Furthermore, this hierarchy fails to predict the absence of other archiphonemes (such as /D/) in Czech. However, if languages differ in their underlying inventories of feature combinations, underspecification is both possible and, together with the grammar in (4), successful.

- (1) a. [sʁnʏt] ‘art’                      b. [sʁnʏt+ʏm] ‘my art’  
 c. [kʁnʏt] ‘wing’                      d. [kʁnʏd+ʏm] ‘my wing’  
 e. [etyd] ‘étude’                      f. [etyd+ym] ‘my étude’
- (2) a. *s mužem* [smuʒem] ‘with man’                      b. *z muže* [zmuʒe] ‘from man’  
 c. *s lesem* [slese] ‘with forest’                      d. *z lese* [zlese] ‘from forest’  
 e. *s domem* [zdomem] ‘with house’                      f. *z domu* [zdomu] ‘from house’  
 g. *s hradem* [zɦradem] ‘with castle’                      h. *z hradu* [zɦradu] ‘from castle’  
 i. *s polem* [spolem] ‘with field’                      j. *z pole* [spole] ‘from field’  
 k. *s chybou* [sxibou] ‘with mistake’                      l. *z chyby* [sxibi] ‘from mistake’
- (3) a. *nářek* [na:ɾek] ‘lamentation’                      b. *nářky* [na:ɾki] ‘lamentations’  
 c. *řeka* [ɾeka] ‘river’                      d. *k rece* [kɾetse] ‘to river’  
 e. *v lesu* [vlesu] ‘in forest’                      f. *v chybě* [fxibje] ‘in mistake’  
 g. *vrána* [vra:na] ‘crow’                      h. *s vránou* [sfra:nou] ‘with crow’

- (4) a. MAX[SON]                      Underlying values of [±sonorant] are preserved.  
 b. \*[+SON, -VOI]                      All sonorants are voiced.  
 c. MAX[VOI]/\_ [+SON]                      Underlying values of [±voice] are preserved before sonorants.  
 d. \*[+VOI]/\_ #                      Word-final segments are voiceless.  
 e. AGREE[VOI]                      Adjacent obstruents have identical values for [±voice].  
 f. MAX[VOI]                      Underlying values of [±voice] are preserved.  
 g. \*[-VOI]                      Segments are [+voice].  
 h. DEP[VOI]                      Output values of [±voice] are present in the input.

(5)	L.O.	MAX[SON]	MAX[VOI]/_ [+SON]	MAX[VOI]	DEP[VOI]
↗	/dva/	[dva]			
	/dVa/	[dva]			*!

(6)	L.O.	(A.O.)	MAX [SON]	MAX[VOI]/_ [+SON] (NOT V OR ɾ)	MAX[VOI] (NOT V OR ɾ)	MAX [VOI]	DEP [VOI]
	/vra:n-/	[vra:n+a] [s+fra:n+ou]				*!	*
↗	/Vra:n-/	[vra:n+a] [s+fra:n+ou]					* *

## References

- Hall, D.C. 2004. A formal approach to [v]: Evidence from Czech and Slovak. In O. Arnaudova, W. Browne, M.L. Rivero, and D. Stojanovic, eds. *Formal approaches to Slavic linguistics #12: The Ottawa meeting 2003*. Ann Arbor, Mich.: Michigan Slavic Publications.
- Inkelas, S. 1995. The consequences of optimization for underspecification. In J.N. Beckman, ed. *Proceedings of the 25th meeting of the North-Eastern Linguistics Society*. Amherst, Mass.: GLSA. (≈ROA #40.)
- Kiparsky, P. 1993. Blocking in non-derived environments. In S. Hargus and E. Kaisse, eds. *Phonetics and phonology 4: Studies in Lexical Phonology*. San Diego, Cal.: Academic Press.
- Padgett, J. 2002. Russian voicing assimilation, final devoicing, and the problem of [v] (*or*, The mouse that squeaked). Ms., University of California, Santa Cruz. ROA #528.
- Prince, A., and P. Smolensky. [1993] 2004. *Optimality Theory: Constraint interaction in Generative Grammar*. Oxford: Blackwell. (≈ROA #537.)