Constraints on URs and blocking in nonderived environments

Ezer Rasin (rasin@mit.edu), MIT

Summary: I argue that nonderived environment blocking (NDEB) is the result of an opaque interaction between a component that constrains possible URs in the lexicon and the usual phonological component that maps URs into surface forms. I present several arguments for this approach over previous proposals. This amounts to an argument for a dual-component architecture of phonology and against the elimination of constraints on URs (the principle of Richness of the Base in OT).

The problem: In standard NDEB cases, which I exemplify using Finnish assibilation (Kiparsky, 1973), a phonological process (t $\rightarrow$ s / _ i) applies across morphemes boundaries ([halut-a]-[halus-i]) or morpheme-internally when fed by a prior phonological process (final-vowel raising, [vete-nä]-[vesi]) but is otherwise blocked from applying ([tila], [äiti]).

Architecture: My claim is that NDEB supports a component that restricts possible URs in the lexicon. I will have nothing to say about the phonological formalism (e.g., rule-based or constraint-based) or the nature of lexical representations (e.g., underspecified or fully specified). To make the proposal explicit, I will adopt a ruled-based formalism and underspecification, but these choices are arbitrary. The architecture, which I now describe, is schematized in the box below. **The alphabet:** a phonological grammar includes an inventory of feature bundles Σ, the elements of which can be concatenated: if k,a,t $\in \Sigma$, then $\{$kat$\}$ and $\{$takta$\}$ are possible concatenations, among others. **Constraints on URs (CURs)** come in two forms: a) constraints on the alphabet: language-specific restrictions of Σ to a subset $\Sigma' \subset \Sigma$; if x $\notin \Sigma'$, then $\{$bax$\}$ is not a possible concatenation of the elements of Σ'; b) morpheme structure rules, which are formally identical to regular rules. **Generating URs:** URs are generated in two steps. Step I: concatenate elements from Σ'. Step II: apply morpheme structure rules. **Underspecification:** the elements of Σ may be underspecified for some of their features (e.g., T stands for a voiceless alveolar underspecified for CONT). Underspecified features are later filled by morpheme structure rules or by phonological rules. Both types of rules may be feature-filling. For example, if assibilation is feature-filling (T $\rightarrow$ s / _ i), it applies to underspecified /T/ but not to fully-specified /t/.

			Morpheme structure rules			Phonological rules		
Σ'	$\rightarrow$	$\{$CONCATENATION$\}$	$\rightarrow$	/UR/	$\rightarrow$	[SR]		

Analysis: Consider first a hypothetical grammar with two feature-filling rules: (1) assibilation: T $\rightarrow$ s / _ i and (2) "anti-assibilation": T $\rightarrow$ t / _ i, where (2) is ordered before (1). A UR like /Ti/ surfaces as [ti]: (2) applies first and removes the environment for (1) by specifying T as [-cont]. This interaction is at the core of my proposal: assibilation is blocked in environments present at the stage of the derivation when anti-assibilation applies. Assibilation only applies to environments created in later stages of the derivation. **The grammar: CURs:** (1) t $\notin \Sigma'$, (2) T $\rightarrow$ t / _ i. **Phonological rules:** (3) T $\rightarrow$ s / _ i, (4) T $\rightarrow$ t. The two CURs require that /t/ occur only before /i/ in URs; /T/ occurs elsewhere. When possible, assibilation (3) applies to /T/, which is otherwise specified as [t] by the elsewhere rule (4). **Derivations: Morphological NDEB:** Consider the derivation of [tilas-i] (alternating with [tilat-a]). Here assibilation applies between two morphemes but not within the stem. First, morpheme struc-

ture rules apply to {TilaT} and {i}, yielding the URs /tilaT/ and /i/. Phonological rules apply to /tilaT-i/: /Ti/ (but not /ti/) satisfies the environment for assibilation, yielding [tilas-i]. The derivation of [tilat-a] is similar: here assibilation does not apply in /tilaT-a/, but the elsewhere rule (4) does, yielding [tilat-a]. **Phonological NDEB:** nothing further has to be said. The derivation of [vesi] starts with {veTe}, anti-assibilation does not apply, leaving T underspecified, and the environment for assibilation is met after vowel raising.

Previous proposals: For **Kiparsky (1993)**, the input-output mapping is identical to mine: assibilation is a feature-filling rule and the distinction between application and misapplication corresponds to underspecification (/T/) vs. full specification (/t/). The absence of CURs leads to over-generation: the underlying distribution of /T/ and /t/ remains an accident of the Finnish lexicon; nothing prevents /t/ from occurring root-finally and incorrectly blocking assibilation before a suffix-initial /i/. The grammar incorrectly generates ungrammatical SRs such as *[hirat-i]. In approaches such as the **Strict Cycle Condition** (Mascaró, 1976) and **Colored Containment** (van Oostendorp, 2006), a sufficient condition for application in cases of morphological NDEB is that the triggering environment spans two morphemes. Romanian palatalization (Steriade, 2008a) suggests that this characterization is incorrect. The process ($k \rightarrow tʃ \ / \ \_ \ \{e, i, j\}$) applies across a morpheme boundary ([mak]-[matʃ-j)] and is blocked morpheme-internally ([rokie], [unkj]), but when a stem-final vowel is deleted before the suffix ([berɛ]-[ber-j]), palatalization of a stem-penultimate /k/ is blocked exactly when the deleted vowel had been a palatalization trigger ([pəduke]-[pədu**k**-j] vs. [mɨnekə]-[mɨnetʃ-j]). This behavior is predicted by the current approach, as the presence of a palatalization trigger in the UR provides the environment for anti-palatalization before suffixation. **Wolf's (2008) Optimal Interleaving with Candidate Chains** accounts for morphological NDEB through a condition on crucial precedence between suffixation and the application of a process: if the environment is present both before and after suffixation, the process is blocked. Vowel raising in Romanian (Steriade, 2008b) and reduction in Armenian (Khanijan, 2008) provide counter-evidence. In Romanian, where stress is predictable, newly-unstressed [a] raises to [ə] ([bárbə]-[bərb-ós] vs. [mazíl]-[mazil-í]). For URs such as /bárbə/, Wolf's approach makes the right prediction: raising applies in [bərb-ós] since [a] is not unstressed before suffixation. But given Richness of the Base, /barbə/ and /barbá/ are possible URs in which [a] is not stressed before suffixation and surface stress is fixed by the grammar. This leads to over-generation of SRs like *[barb-ós] where raising does not apply. In the current approach, a judicious choice of CURs could filter out the relevant URs. **Burzio's (2000) Sequence Protection** faces the same challenge. Faithfulness constraints protect underlying environments from undergoing a change. In Romanian, underlying unstressed [a] would be protected from raising. For URs such as /bárbə/, raising is correctly licensed in the suffixed form since stressed [a] evades faithfulness. But unstressed [a] in the hypothetical /barbə/ and /barbá/ is subject to faithfulness, incorrectly yielding *[barb-ós].

Implications: OT dispensed with CURs primarily for reasons of theoretical simplicity: a single-component architecture seemed more appealing than a dual-component one; output constraints unified CURs and the input-output mapping. The present work identifies NDEB as a domain in which the predictions of the two architectures diverge and presents new empirical evidence in favor of a dual-component architecture of phonology.