Word-level affixes trigger stem-level cycles: evidence from German dorsal fricatives

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The question

In stratal-cyclic approaches to the morphology-phonology interface, there are two competing approaches to the behaviour of word-level (‘class-two’) suffixes: e.g. English memory-less

Option 1. Word-level affixes do not define cyclic domains by themselves.

Option 2. Word-level affixes define stem-level domains by themselves.

Predictions about the phonological shape of stems and of word-level suffixes:

Option 1. Relative different shapes: stems abide by stem-level phonotactics, but word-level affixes do not.

Option 2. Relatively similar shapes: stems abide by stem-level phonotactics, and word-level affixes do too.

We argue that opacity effects involving German dorsal obstruents support Option 2:

German word-level suffixes like diminutive -chen and adjectival -ig behave like ‘mini-stems’.

Test case: German dorsal obstruents

Puzzle 1: -chen and the exceptions to the ich-Laut-/ach-Laut rule

The ich-Laut [ç] and ach-Laut [x] are in near complementary distribution:

\[\begin{array}{ll}
[x] & \text{following a back vowel} \\
[ç] & \text{elsewhere, i.e. following a front vowel}
\end{array}\]

Kuchen ‘cake’ Kuh-chen ‘cow-DIM’
[kuːxn] [kuː-çən] underapplication of dorsal fricative assimilation!

Küche ‘kitchen’ Milch ‘milk’ China ‘China’
[kyːçə] [m/FL026Ahlç] [çi-na] N.B. Nonetheless, the constraint banning [x] after front vowels, *V[-back]*x, remains unviolated in word-level constructions: e.g. bra[x] ‘break(N)’ – braç[x]-ig ‘breakable’ (Goldrick 2000: 11-12).

Puzzle 2: -ig and the interaction of spirantization and devoicing

German voiced obstruents devoice in the coda at the word level:

\[\begin{array}{c}
/\text{hund-}/ \text{‘dog’} \\
\text{Hund} & \text{SG} & \text{Hund-chen} \text{DIM}
\end{array}\]

But, following the vowel //FL026Ah/, voiced [ç] in the onset alternates with voiceless [k] rather than with [k]:

\[\begin{array}{ll}
[kœ:ni] & \text{König-in} \text{‘queen’} \\
[kœ:niç] & \text{König} \text{‘king’}
\end{array}\]

rauch-ig-es ‘smoky.GEN’ rauch-ig ‘smoky’
[kau.xi.gas] [kau.xiç] N.B. The explanation must lie in the representation of the alternating consonant in the input to the word level, since the rhyme [kœ] is perfectly well-formed: e.g. [bl/FL026Ahk] Blick ‘glimpse’.

rauch-ig-es ‘smoky.GEN’ rauch-ig ‘smoky’
[kau.xi.gas] [kau.xiç] N.B. The alternation works in exactly the same way whether the relevant string belongs to a stem (e.g. König) or to a word-level suffix (e.g. rauch-ig).
Our solution

(1) The [ç] and [x] allophones are in perfect complementary distribution in stem-level domains.

The word-level suffix -chen is always realized with [ç] because -chen goes through a cycle of the stem-level phonology by itself and, in this cycle, the dorsal fricative is domain-initial.

(2) In German, the continuancy of voiced dorsal obstruents is determined by a stem-level process:

At the word level, onset [ç] hardens to [g]


Stratal OT implementation (I): -chen

The stem level

- [ç] and [x] are in perfect complementary distribution within stem-level domains.

- We assume a context-free markedness constraint against [ç]: *ç

- positional markedness constraints against [x]: *V[-back]X (after front V)
  *Cx (after C)
  *x (domain-initially)

Recall that *V[-back]X is needed to capture the [ç] – [ç] alternation at the word level.

- Richness of the Base:
  input specifications for [back] don’t matter because IDENT[back] is ranked low.

The word level

At the word level, the input is no longer rich: it obeys the generalizations enforced by the stem-level phonology. Accordingly,

- IDENT[back] can be promoted above ç to protect the stem-level ich-Laut in -chen; but

<table>
<thead>
<tr>
<th>Stem Level</th>
<th>Kuchen 'cake'</th>
<th>*V[-back]X</th>
<th>*Cx</th>
<th>*x</th>
<th>IDENT[back]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kuːçn</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Word Level</th>
<th>Kuh-chen 'cow'</th>
<th>*V[-back]X</th>
<th>IDENT[back]</th>
<th>ç</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kuːçn</td>
<td>kuːçn</td>
<td></td>
<td>ç</td>
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<tr>
<td></td>
<td>kuːçn</td>
<td></td>
<td></td>
<td>ç</td>
</tr>
</tbody>
</table>
Stratal OT implementation (II): -ig

The stem level

• As we saw above, the stem-level hierarchy enforces the following generalization:

\[
/g/ \rightarrow \begin{cases} 
[y] & \text{if [y]} \\
[g] & \text{elsewhere}
\end{cases}
\]

• In line with Richness of the Base, the underlying [continuant] specification of the voiced dorsal obstruent is not crucial, as IDENT[cont] is ranked low.

The word level

• The devoiced realization of input [ŋ] becomes [ç] because \(^*V_[\text{back}]X\gg \text{IDENT[back]}\): see above. Hardening to [k] is blocked because IDENT[cont] \(\gg\) *ç.

• However, the voiced realization does harden because *ŋ is now demoted and *ç becomes top-ranked:

Summary and implications

The evidence of German

Understanding the phonological behaviour of German dorsal obstruents requires that we treat the word-level suffixes of this language as ‘mini-stems’, which go through a cycle of the stem-level phonology on their own:

• The initial dorsal fricative of the diminutive suffix -chen is realized as [ç] because it is domain-initial at the stem level, just like the initial fricative of the stem China.

• The adjectival suffix -ig participates in the \([\text{ç} \sim \text{ç}]\) alternation because its voiced dorsal obstruent is contextually spirantized as the stem level, just like the one in the noun stem König.

Further implications

• The proposal that word-level suffixes go through separate stem-level cycles naturally accounts for languages where every suffix constitutes a separate footing domain:


• The proposal that word-level suffixes pass through the stem level automatically correctly predicts that the phonemic inventory of word-level suffixes will not be a superset of the phonemic inventory of stems, pace McCarthy (2007: 133-34).

See Bermúdez-Otero (2007) for the role of the stem level in defining phonemic inventories.
References


