

Squibs and replies

*The place of Structure Preservation in German diminutive formation**

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Recent issues of this journal have carried articles which argue that Lexical Phonology's principle of Structure Preservation must be relaxed in order to accommodate a defect in the otherwise complementary distribution of voiceless palatal and velar fricatives in German. In all but one case, the velar in this set appears after back vowels within the word, elsewhere the palatal occurs. The single exception is the diminutive suffix *-chen* [çən] (or [çan]), which does not vary according to context, i.e. its fricative is palatal even after back vowels. Ordinarily, the general lack of contrast between [x] and [ç] would imply that any rule which relates these segments is postlexical rather than lexical, as Structure Preservation prohibits the lexical introduction of segments not found in underlying representation. But the exceptions involving *-chen* imply that the rule is lexical instead, since a basic property of postlexical rules is that they are exception-free, whereas lexical rules often admit of exceptions; assignment to the (cyclic) lexical component, however, places the rule of Fricative Assimilation, which introduces the novel segment [x], in violation of Structure Preservation.

In the present squib, we show that Structure Preservation need neither be nullified in the lexicon for this one particular rule (Hall 1989) nor reduced more broadly in its scope of applicability (Macfarland & Pierrehumbert 1991) in order to subsume the German fricative distributions under a single phoneme; rather, we argue, the appropriate mechanism is to identify the phonologically idiosyncratic or 'non-cohering' (Booij & Rubach 1984) character of the diminutive morpheme *-chen*. We suggest that, parallel to similar cases in English morphology, the suffix *-chen* is actually two formatives, one of which induces umlaut of the preceding stem vowel and applies relatively deep within the morphology, the other of which – the one that is exceptional with respect to fricative distributions – is non-umlauting and typically carries with it a nickname or affective connotation (rather than simple diminution). We place the phonological rule accounting for fricative variation at Lexical Phonology's word level (Kiparsky 1985), i.e. at the end of the lexical component after all cyclic

lexical rules have applied, and we fix the point at which Structure Preservation no longer holds at this juncture (as do Booij & Rubach 1987), rather than later, in the postlexical phonology. A similar proposal, but with Structure Preservation turning off at the beginning of Level 2 phonology, is advanced by Borowsky (to appear), and in current work Hall (to appear) also arrives at the conclusion that German Fricative Assimilation must be a postcyclic, lexical rule; in a related vein, Wiese (ms) suggests that *-chen*, like all consonant-initial suffixes in German, constitutes a 'phonological word' in its own right and hence is not influenced in phonetic form by the rest of the morphological word of which it is a part. Each of these proposals has the effect of removing special limitations on the principle of Structure Preservation or the rule of Fricative Assimilation in German, too, but the following account, developed independently of these considerations, places the behaviour of *-chen* within a model of word-formation which distinguishes between remote, phonologically interactive and more superficial, phonologically inert manifestations of what appears to be the same affix.

As recapitulated by Hall (1989), to summarise here, the occurrence of occasional minimal pairs as in (1) has often been cited in support of phonemic status for both [ç] and [x] (morpheme boundaries added in the orthography):

- (1) a. Kuh + chen [k^hu:çən] 'little cow'
 Kuchen [k^hu:xən] 'cake'
 b. Tau + chen [t^hawçən] 'little rope'
 tauch + en [t^hawxən] 'to dive'

However, it is only at a morpheme boundary (involving *-chen*) where the phonetically predictable distribution of these sounds breaks down, and so only one of these two segments needs to be represented underlyingly if the rule relating them is appropriately restricted.¹ In answer to the long-standing question of whether [ç] or [x] is basic in German, Hall proposes to derive both of them from a voiceless posterior fricative which is neutral with respect to palatal *vs.* velar articulation, i.e. one underspecified for the feature [back] and represented here as /X/. An assimilation rule then spreads the specified [+back] value of an immediately preceding, tautomorphemic vowel onto the fricative, and elsewhere, i.e. where the preceding vowel is front or where no vowel at all precedes (word-initially, post-consonantly), the default specification [-back] is provided:²

- (2) *Fricative Assimilation*
 Spread [+back] from a vowel onto an immediately following /X/
Condition: both segments are in the same morpheme
- (3) *Fricative default specification*
 Assign [-back] to /X/

These rules correctly supply velar articulation in the back-vowel words of (4a), and palatal articulation in the other environments exemplified in (4b), *viz.* after front vowel, after consonant, and word-initially. At the

same time, it is rule (3) rather than (2) which is cited in (1), because Fricative Assimilation applies to morphemes.

- (4) a. mach + en [mɔxən]
 Buch [bʊç]
 Sprache [ʃpɔçə]
 b. ich [ɪç]
 Bäch + e [bɛçə]
 Milch [mɪç]
 Chemie [çɛmiə]

The restriction of Fricative Assimilation to morphemes is a very odd stipulation, however, since the theoretical motivation for the category information transmitted by the formation along with the assimilation must apply to morphologically sensitive words. For example, *schwäch + er* 'weaker' which provides, [+back], is not of the standard language. In the condition in (2), it is environments involving velars rather than palatals which are considered to be postlexical. This might suggest, the tautology of the force somehow since the instance, *Chemie* 'chemistry', what precedes it, even a morpheme boundary.

The fact that Fricative Assimilation applies to morphemes necessarily makes it presumably cannot be limited to morphemes, there is no evidence for only within morphemes, suffix *-chen*. It therefore, irregularity to this one in the assimilation rule, where the lexical phonology a simulation on this account theoretically more coherent condition is no longer required (*-chen*), and the assignment of the rule application of the rule rather than characterise Fricative Assimilation, v morphological category

same time, it is rule (3) rather than rule (2) that applies in the diminutives cited in (1), because Fricative Assimilation is limited to application within morphemes.

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|--------|-------------------------|-----------|-------------|
| (4) a. | <i>mach</i> + <i>en</i> | [maxən] | 'to make' |
| | <i>Buch</i> | [bu:x] | 'book' |
| | <i>Sprache</i> | [ʃpra:xə] | 'language' |
| b. | <i>ich</i> | [ɪç] | 'I' |
| | <i>Bäch</i> + <i>e</i> | [bɛçə] | 'streams' |
| | <i>Milch</i> | [mɪlç] | 'milk' |
| | <i>Chemie</i> | [çɛmi] | 'chemistry' |

The restriction of Fricative Assimilation to morpheme-internal environments is a very odd stipulation under the model of Lexical Phonology, however, since the theory itself otherwise provides for morphological category information through level-ordering of the rules of word-formation along with those of phonology. In this case, Fricative Assimilation must apply relatively late since it is dependent on earlier, morphologically sensitive rules like umlaut (*schwach* 'weak' with velar [x]; *schwäch* + *er* 'weaker' with palatal [ç], etc.), and the feature the rule provides, [+back], is not employed contrastively in the consonant system of the standard language. But if the rule were not restricted lexically by the condition in (2), it would improperly apply in intermorphemic environments involving the diminutive morpheme *-chen*, producing velars rather than palatals in *Kuh* + *chen*, etc. Alternatively, if the rule were considered to be postlexical, which its non-structure-preserving character might suggest, the tautomorphemic restriction would still have to be in force somehow since the rule does not apply between words, either. For instance, *Chemie* 'chemistry' has an initial palatal fricative irrespective of what precedes it, even a back vowel in compounds like *Foto#chemie*.³

The fact that Fricative Assimilation is restricted to application within words necessarily makes the rule lexical, however, since postlexical rules presumably cannot be limited to the domain of a single word. Actually, there is no evidence for the peculiar restriction that the rule may apply only within morphemes, either, save for the invariability of the particular suffix *-chen*. It therefore seems reasonable to ascribe the distributional irregularity to this one morpheme rather than to any special limitation on the assimilation rule, which we place at the 'word level', i.e. at the end of the lexical phonology after all cyclic rules have applied. Fricative Assimilation on this account becomes a considerably simpler and theoretically more coherent rule since its unusual tautomorphemic condition is no longer required (it serves only to block application before *-chen*), and the assignment to word-level phonology naturally blocks any application of the rule between words. The reason *-chen* escapes application of Fricative Assimilation is then attributable to *-chen* itself; but rather than characterise this morpheme simply as a lexical exception to Fricative Assimilation, we can account for it in more general terms via the morphological category distinction which Booij & Rubach (1984) have

drawn between 'cohering' and 'non-cohering' affixes (cf. also Selkirk 1982; Borowsky to appear).

This distinction will be elaborated presently; first, however, we note that, in their seminal paper motivating a distinct word level for Lexical Phonology, Booij & Rubach (1987) observe that the principle of Structure Preservation appears not to hold for this class of postcyclic, lexically restricted rules. They cite (1987: 6-7), for example, the closed-syllable laxing of high vowels in Canadian French (*petit* m. [pəti], *petite* f. [pətit] 'little') as restricted to word-internal contexts since it is not affected by postlexical resyllabification ([pti.ta.mi] m., [pti.ta.mi] f. 'little friend'), nonetheless the rule does produce segments (here [i]) which are not found in the underlying inventory. As Structure Preservation must turn off in the postlexical phonology anyway, the idea that it should expire at the very end of the lexical phonology instead is of no empirical consequence except among the postcyclic rules of the word level. Indeed, there appear to be no lexical rules whose proper application requires Structure Preservation to remain in force at the word level, but there are some, including German Fricative Assimilation, for which the principle clearly makes the wrong prediction. We conclude with Booij & Rubach (1987), then, that the point at which Structure Preservation ceases to be in effect in Lexical Phonology is upon entrance to the word level.

This means that, as a postcyclic lexical rule, German Fricative Assimilation is correctly constrained to apply within the phonological word. The fact that the rule produces segments not found in the underlying inventory constitutes no violation of Structure Preservation, since that principle now holds only of cyclic lexical rules, not word-level rules. As a consequence, there is no need to invalidate this principle just for the German case at hand (Hall 1989), or to revise it more generally in the manner proposed by Macfarland & Pierrehumbert (1991). The latter's extension into this domain of the autosegmental linking condition (Hayes 1986) sanctions lexical violations of Structure Preservation just in case they arise as a result of feature spread, i.e. from rules of assimilation. As the source of many if not most novel segments actually is assimilation, however, this proposal removes many more cases from the domain of the principle than is warranted (as Macfarland & Pierrehumbert also recognise in discussion of its consequences for cases like Finnish vowel harmony, an assimilatory lexical rule which fails to apply whenever it would result in the creation of a novel segment). It appears to be an entirely sufficient relaxation, though, to exempt just word-level lexical rules from Structure Preservation rather than all rules in the lexicon which produce shared feature configurations.

It would also suffice, observationally, to excuse *-chen* from Fricative Assimilation simply by marking it as a lexical exception, but there are other peculiarities about this morpheme which suggest that its phonological invariance is due instead to particular properties of word-formation in German. For example, it is almost always the case that affixation of the diminutive suffixes (either *-chen* or *-lein*) induces fronting, or umlaut, of

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a basically back-stem vowel (cf. *Mrs'*), *Häuschen* 'little house' (cf. *Brot* 'bread'), etc., but as discussed above, *Tauchen* 'dive' in the Germanic literature such as *Pfauchen* 'dive' have interviewed *do* umlaut (*Pfäuchen*), the reported standard constitutes an exception to the standard in which *-chen* has no umlaut, of course, exception marking the absence of umlaut in these three cases. So straightforward in a Germanic context, the diminutive plural form of the morpheme *Kuh* could not be expected to exhibit umlaut.

At the same time, the affixation of *-chen* outside the word level is *-er*:

- (5) *Kinderchen* 'kid' (cf. *Kindchen*)
Eierchen 'eggs' (cf. *Eichen*)
Häuserchen 'little houses' (cf. *Häuschen*)
Dingerchen 'trivial things' (cf. *Dingchen*)

There appears to be considerable variation in the use of *-er + chen* plural diminutives of presumably derivational morphemes. Semantics suggest that the use of *-er + chen* is more common in diminutive formation of proper names and terms (cf. *Gertrude*, *Tantchen* 'aunt') than in the formation of diminutives of common nouns. The umlauting/non-umlauting distinction is also observed in a pair *Mütterchen* 'little mother' (cf. *Mütter*) and *Frauchen* 'mistress' (dog address based on a cropped stem *Frau*). From the presumed point of view,

Differences in the semantics of the diminutive suffix *-ese* is adjectival (cf. *Japanese*, *Chinese*, etc.) or nominal (cf. *German*, *French*, etc.) constructions which refer to a person or thing (cf. Dressler & Barbaresi 1990). The philosophy or religion is also a factor (cf. Goldsmith (1990) points

a basically back-stem vowel, as in *Fräulein* 'girl, Miss' (cf. *Frau* 'woman, Mrs'), *Häuschen* 'little house' (cf. *Haus* 'house'), *Brötchen* 'dinner roll' (cf. *Brot* 'bread'), etc., but umlaut has not taken place in the diminutives discussed above, *Tauchen* and *Kuhchen*, nor in a few others cited in the literature such as *Pfäuchen* 'little peacock'. Although most speakers we have interviewed do umlaut even in these cases (*Kühchen*, *Täuchen*, *Pfäuchen*), the reported lack of umlaut at least in the style of the literary standard constitutes an additional morphophonological oddity for the few words in which *-chen* has unexpected palatal articulation. In principle, of course, exception marking could be available to accommodate the failure of umlaut in these three diminutives, too, although the matter is not quite so straightforward in as much as umlaut does take place in the non-diminutive plural form of one of the nouns, *viz.* *Kühe* 'cows', hence the morpheme *Kuh* could not be umlaut-exempt across the board.

At the same time, there are numerous plural diminutives formed by affixation of *-chen* outside of the inflectional marking when the plural suffix is *-er*:

- (5) *Kinderchen* 'kids'
 cf. *Kindchen* 'little child/children', *Kinder* 'children'
Eierchen 'eggs' (ironic)
 cf. *Eichen* 'little egg/eggs', *Eier* 'eggs'
Häuserchen 'little houses' (pejorative)
 cf. *Häuschen* 'little house/houses', *Häuser* 'houses'
Dingerchen 'trivialities, girls' (contemptuous)
 cf. *Dingchen* 'little thing/things', *Dinge/Dinger* 'things'

There appears to be consistently an affective connotation connected with *-er + chen* plural diminutives. Along with the uncharacteristic placement of presumably derivational *-chen* relative to inflectional *-er*, the additional semantics suggest that here it is a different *-chen* than is usually employed in diminutive formation. In fact, when non-umlauting, *-chen* is described in handbooks on German word-formation as associated primarily with proper names and terms of endearment (*Kurtchen* < *Kurt*, *Trudchen* < *Gertrude*, *Tantchen* 'auntie' < *Tante* 'aunt', etc.; cf. Fleischer 1975: 180). The umlauting/non-umlauting distinction is especially apparent in the pair *Mütterchen* 'little old lady' *vs.* *Muttchen*, an affectionate term of address based on a cropped form of *Mutter* 'mother', and in *Fräulein vs. Frauchen* 'mistress' (dog-owner), a term of endearment from the animal's presumed point of view. Here as elsewhere, the fricative in *-chen* is palatal.

Differences in the sense and use of identical affixes are familiar in English morphology as well. In its 'less productive' manifestations, the suffix *-ese* is adjectival (or nominal when identifying a language) in words like *Japanese*, *Chinese*, *Congolese*, but it is largely pejorative in constructions which refer to jargon, e.g. *bureaucratese*, *journalese*, *officialese* (Dressler & Barbaresi 1987). The nominaliser *-ism*, similarly, identifies a philosophy or religion in *Communism*, *Chomskyism*, *Catholicism*, but, as Goldsmith (1990) points out, can convey instead the meaning of 'manner

ig' affixes (cf. also Selkirk

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of speech' in words like *Chicagoism*, *Californiaism* or even *Chomskyism* ('a manner of speech characteristic of Noam Chomsky') and *Catholic[k]ism* ('something Catholics say'). Cases such as these suggest that there are two suffixes *-ese* in English, and two of the form *-ism*: one in each pair is less productive than the other, triggers morphologically restricted phonological rules (vowel truncation in *Chinese*, velar softening in *Catholicism*, etc.), and conveys no special or affective connotation.⁴ The situation with respect to German *-chen* would appear to be entirely parallel: one *-chen* is relatively deep in the lexicon, induces morphologically triggered umlaut of a preceding back vowel, and is (at least historically) simply diminutive; the other, closer to the surface, conveys a connotation of endearment or other affectation beyond mere diminution, and does not cause umlaut in the preceding stem vowel.

Non-umlauting *-chen*, we conclude, is the kind of affix Booij & Rubach (1984) characterise as 'non-cohering', or phonologically non-interactive, and as such constitutes a separate phonological word within the larger morphological word of which it is a part.⁵ This instantiation of *-chen* forms a kind of 'phonological compound' with the stem to which it attaches morphologically, and so fails to undergo word-level Fricative Assimilation in constructions like *Kuh + chen* for the same reason that it has no effect in true morphological compounds like *Foto#chemie*. That is, Fricative Assimilation applies only within the phonological word. The cohering/non-cohering distinction seems relevant to numerous examples of affix homophony in English as well, where the affective or more productive variant is also phonologically non-interactive, even with respect to the surface syllabification (e.g. in *Ca.tho.lic[k].ism* the stem-final [k] is not aspirated because it is not syllable-initial). The pattern emerging from these and the German diminutive cases suggests that the 'same' affix may either fuse phonologically with the morphological word (umlauting *-chen*) or constitute a phonological word apart from the morphological word with which it is in construction (non-umlauting *-chen*). But whether *-chen* is accommodated under this general scheme of morphology or treated simply as a lexical exception, the identification of German Fricative Assimilation as a postcyclic lexical rule brings it into full conformity with the principle of Structure Preservation, provided, as others have suggested before, that the point at which Structure Preservation turns off is upon entrance to rather than exit from the word level of Lexical Phonology.

NOTES

* We wish to thank especially Garry Davis, Monica Macaulay and Edith Moravcsik for productive discussions on this topic, as well as Tracy Hall, Ellen Kaisse and Richard Wiese for helpful electronic correspondence.

[1] A few non-integrated loans for many speakers have [x] rather than [ç] word-initially, e.g. *Chuzpe*, *Cheb*, but these are clearly marginal, similar to the fringe-status of [x] for those English speakers whose pronunciation of the composer's name *Bach* is [bax].

[2] Hall (1989) spreads [zback], but we will implement this feature as 'radically

underspecified', so that on-lation applies.

- [3] Hall (1989) considers the lexical as in (2), the other than the same morpheme. count for palatal fricative 'king'; cf. *König + in* [k^h] or the spirantisation of /g/ itself not structure-preserving here, however, there is on end of the lexical compon
- [4] Even in the absence of set morphological differences of words like *tolerable*, in not. Certain counterexamples support two *-ment* and tw
- [5] Kaisse & Shaw (1985: 13) between the phonological ar going considerable elabor Wiese (ms).

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ism or even Chomskyism ('a Chomsky') and Catholic[k]ism. These suggest that there are two classes: one in each pair is less phonologically restricted phonologically. The situation with respect to the -chen is entirely parallel: one -chen is phonologically triggered umlaut (phonologically) simply diminutive; the other is a morpheme denoting endearment or affection and does not cause umlaut in

the case of affix Booij & Rubach (1984) are phonologically non-interactive. The affix is a morpheme within the larger morphological word to which it attaches. The affix is subject to the same level Fricative Assimilation as the stem. The reason that it has no effect in the case of the morpheme is that it has no effect in the morpheme. That is, Fricative Assimilation is a morphological word. The cohering/interacting of numerous examples of affixes which are more productive or more productive, even with respect to the morpheme, the stem-final [k] is not the pattern emerging from the morpheme that the 'same' affix may be used in the morpheme (umlauting -chen) in the morphological word with respect to the morpheme. But whether -chen is subject to morphology or treated as a morpheme in German Fricative Assimilation into full conformity with the morpheme, as others have suggested, the morpheme turns off is upon the morpheme of Lexical Phonology.

Monica Macaulay and Edith Hargus, as well as Tracy Hall, Ellen Kaisse and Sharon Hargus correspondence.

have [x] rather than [ç] word-marginal, similar to the fricative pronunciation of the composer's

segment this feature as 'radically

underspecified', so that only [+back] is available at the point Fricative Assimilation applies.

- [3] Hall (1989) considers that there are two rules of Fricative Assimilation, one lexical as in (2), the other postlexical but restricted to the same syllable rather than the same morpheme. The postlexical variant is proposed in order to account for palatal fricatives derived from voiced velar stops (*König* [k^hɔnɪç] 'king'; cf. *Königin* [k^hɔnɪçɪn] 'queen'), and presumably is postlexical because the spirantisation of /g/ to intermediate /ɣ/ (which devoices word-finally) is itself not structure-preserving in German. On the account under development here, however, there is only one rule of Fricative Assimilation, applying at the end of the lexical component.
- [4] Even in the absence of semantic distinctions, Aronoff (1974) has suggested that morphological differences support positing two -able suffixes in English because of words like *tolerable*, in which -ate truncates, and *inflatable*, in which it does not. Certain counterexamples to the affix-ordering generalisation (Selkirk 1982) support two -ment and two -ise suffixes as well.
- [5] Kaisse & Shaw (1985: 13) also suggest that a division of function obtains between the phonological and morphological word, a distinction which is undergoing considerable elaboration in the current work of Borowsky (to appear) and Wiese (ms).

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