

1982

On Limiting the Form of Morphological Rules: German Umlaut, Diacritic Features, and the "Cluster-Constraint"

Richard D. Janda
University of Arizona

Follow this and additional works at: <https://scholarworks.umass.edu/nels>



Part of the [Linguistics Commons](#)

Recommended Citation

Janda, Richard D. (1982) "On Limiting the Form of Morphological Rules: German Umlaut, Diacritic Features, and the "Cluster-Constraint"," *North East Linguistics Society*. Vol. 12 : Iss. 1 , Article 12.
Available at: <https://scholarworks.umass.edu/nels/vol12/iss1/12>

This Article is brought to you for free and open access by the Graduate Linguistics Students Association (GLSA) at ScholarWorks@UMass Amherst. It has been accepted for inclusion in North East Linguistics Society by an authorized editor of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

On Limiting the Form of Morphological Rules:
German Umlaut, Diacritic Features, and the "Cluster-Constraint"

Richard D. Janda

University of Arizona

This paper presents a critical examination of three currently-proposed formal constraints on morphological rules, in the light of varied evidence from several languages--but primarily from German Umlaut-data. I first discuss a limitation suggested by McCarthy, and provide additional support for Lieber's claim that this constraint is overly restrictive, and thus cannot be maintained. Second, however, I demonstrate that another, weaker constraint proposed by Lieber, herself, is likewise too restrictive, in that it rules-out well-motivated morphological rules in various languages. Third and finally, though, I suggest a (novel) condition of my own, which seems to be tenable limitation on the form of rules of morphology--a constraint on the use of diacritic features.

The background of this discussion is the major focus of research, within the current boom of generative morphology, which centers on the question: "How severely can the formal operations performed by morphological rules be constrained?". Some such restrictions are obviously a priori desirable, and they are also empirically justified, given that numerous logically-possible types of morphological processes do not seem to occur, in the world's languages. For example, there are absolutely no reports of word-formation rules that spell-out one category by reversing the order of all segments in some other category, or by affixing (-)op- before every vowel in the original--although such operations are easily imaginable, and,

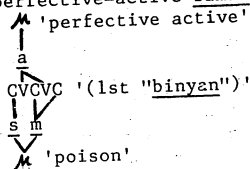
JANDA

indeed, occur in children's language-games. Thus, as a bold start toward this goal of restricting the formal nature of morphological processes, McCarthy 1979:357-358, 1981:405 has proposed the extremely-strong limitation given below, in (1):

(1) Morphological Rule Constraint (MRC)

All morphological rules are of the form $A \rightarrow B/X$, where A is a single element or zero and B and X are (possibly null) strings of elements.

The effect of this MRC is, of course, to exclude, from the set of possible word-formation processes, all those operations which can only be described transformationally. In line with this, McCarthy 1981 is, in fact, largely devoted to presenting an elegant and insightful account of Arabic verb-morphology which obeys the MRC. This treatment involves modifying, and extending to morphology, many of the principles of "Autosegmental Phonology"--principles by-now so familiar that I will forgo discussing them, here. (For details, see--for example--Goldsmith 1976/1979, and Clements and Ford 1979.) The essence of McCarthy's system lies in the equating of morphemes (or the segments composing them) with individual autosegmental tiers. Thus, segments of morphemes are "melodic" elements, just as tones can be, while the "melody"-bearing units are the C's and V's of a "prosodic template", or "skeleton"--parallel to tone-bearing segments. If one supplements these assumptions with the association-conventions of Autosegmental Phonology--modified, slightly, to accommodate certain peculiarities of morphology--then various transformational effects can be achieved, in word-formation, without any need to invoke the full power of morphological transformations. Thus, McCarthy's "Autosegmental Morphological" (or "Prosodic") framework does not allow expression of a process which, say, reverses the order of all segments in a form, but does allow the straightforward statement of an operation like "discontinuous gemination" in Arabic, as in (2), below (cf. McCarthy 1981:397 [(34)a]):

(2) 1st-"binyan" perfective-active samam 'poisoned':

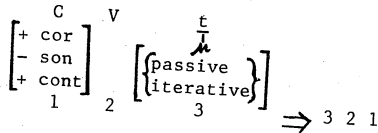
Now, McCarthy 1979, 1981 intends his MRC to hold, not only for Arabic, or even Pan-Semitic, but for all languages. As an extremely-restrictive potential universal, it certainly deserves testing against a wide cross-linguistic range of phenomena--and, indeed, Lieber 1980:234, 236-246 has already matched it up against Tagalog reduplication. Her conclusion, however, is that, although the formalism of Autosegmental Morphology can be made to work "mechanically", in such cases, it still, in actuality, implicitly requires extra machinery involving transformational power, in order to do so. And,

ON LIMITING THE FORM OF MORPHOLOGICAL RULES

if this is true, then similar conclusions would extend to some of McCarthy's Semitic-reduplication examples. Thus, Lieber claims, the MRC cannot be correct, even as a Semitic-specific constraint, much less as a universal one: it simply appears to be the case that morphological rules require transformational power in excess of that provided by Autosegmental Morphology. Given the far-reaching significance of this negative finding regarding the MRC, it would obviously be desirable to present and scrutinize the Tagalog (and Semitic) forms, and the argumentation, which lead Lieber to it (and, in the longer and fuller version of this paper presented orally at the NELS-XII Meeting, I in fact did so). Unfortunately, the space-limitations here-in-effect dictate otherwise. But, summarizing, I can say that, actually, a closer look at Lieber's evidence reveals that McCarthy's Autosegmental Morphology can handle them without violating the MRC, even in spirit. In any case, though: while it is thus not such examples which impugn the MRC, Lieber 1980 is correct in maintaining that the MRC is overly restrictive, and so must be rejected.

That is, although Autosegmental Morphology does seem able to handle many complex morphological processes in Semitic and Tagalog, as well as some in English, Warlpiri, Hausa, Spanish, and Cupeño (cf. McCarthy 1981, and references there), it is not adequate to cover numerous other word-formational operations, in these and other languages. The processes in question simply cannot be stated without (traditional) transformational power, and so invalidate the MRC. They further raise doubts concerning Autosegmental Morphology, as well-- since, when its prosodic operations are supplemented with the more familiar transformational ones, that theory must recognize two sorts of morphological rules, while other theories need posit only one. In proceeding to demonstrate the excessive restrictiveness of the MRC, one can begin with a counterexample to it from McCarthy's own (1981:381) treatment of a morphologically-conditioned metathesis in the Semitic language Akkadian (said to correspond to a parallel process in Hebrew). McCarthy, himself, handles this operation (illustrated in (3), below) by expressing it as a morphological transformation, given in (4) [= his (8)]:

- (3) Passive ("Gt") and iterative ("Gtn"):
 /mħs/ 'strike' → mīħās 'to be struck', mīħāħās 'to strike repeatedly' (no metathesis)
 /šbt/ 'seize' → šitbutum 'to seize one another' → tišbutum (metathesis)
 /zqr/ 'elevate' → zitqurum 'to be elevated' → tizqurum (metathesis)
 /šbt/ 'seize' [repeated, from above] → ištabbat 'he will seize' [→ *ištabbat] (no metathesis)
- (4) [Metathesis]



JANDA

For these data, there isn't any obvious non-ad hoc way to treat the metathesis-rule involved, autosegmental-morphologically--but only transformationally, as shown--and so it appears that the MRC does not even hold for Semitic. On the other hand, this conclusion has been disputed, by McCarthy (personal communication), who argues that the metathesis in (4), above, is not a morphological process, but only a morphologically-conditioned phonological one--perhaps more cogently-put: a rule of allomorphy (cf. Aronoff 1974/1976:98-99 et passim), which does not spell-out (or realize) a morphological category, but merely alters (here: rearranges) the realization of such a category, after it has already been spelled-out. In response to this objection, there are a number of refutatory responses to be made. First: while is undeniable that the Akkadian(/Hebrew) passive/iterative-metathesis lies near the border between phonology and morphology, it seems fairly clear that it is on the morphological side. Anderson's 1975 and Sommerstein's 1977 typology of sound-structural rules, for example, classifies as "morpholexical" any such rule that refers to morphological (or lexical-class) features; in this classification--which is necessary, to account for a wide range of phenomena, and imposes strong constraints on both phonology and morphology--there simply can be no such thing as a morphologically-conditioned phonological rule. That rules of allomorphy pattern with morphological rules (rather than with phonological ones) is shown by, e.g., the fact that neither of them is subject to Howard's 1972:94 "(Weaker) Crossover Condition" (whereby the focus of a rule cannot be separated from its determinant by another potential focus)--which does, however, hold for phonological rules, proper. Anderson 1979:12-13 discusses the differential applicability of this condition, and provides an example of a rule of allomorphy which is not subject to it: in Abkhaz/Abaza (Northwest-Caucasian family), personal-pronominal r-prefixes to verb-stems are dissimilated, to d, before r-initial stems--but not before (only) other r-prefixes--and this process can apply to more than one r-prefix, thus leap-frogging other such prefixes, as it were. Hence, if McCarthy's MRC does not hold for rules of allomorphy, then it does not hold for all morphological rules, but can at most be a constraint on only a subclass of them (= non-allomorphy-rules). Second, however: even this weakened putative domain of validity for the MRC can be shown to be in error, for there exist morphological metathesis-rules which are not rules of allomorphy. Thompson and Thompson 1969 discuss two of these in some detail, especially one from Clallam. In this Straits-language of Coast Salish, one of the major aspectual distinctions--"actual"/"non-actual" (= similar to Slavic imperfective/perfective, respectively)--is marked by metathesis, for a large class of verbs: e.g., $\check{c}k^w u-t \sim \check{c}uk^w-t$ 'throw (subject-control) non-actual ~ actual'. When roots occur in the "reduced grade" (i.e., vowelless), preceding stressed suffixes, the metathesis permutes the stressed suffix-vowel with a following (solely-)consonantal suffix, if there is one: e.g., $t^k k^w-i-t \dots \sim t^k k^w-t-i \dots$ 'grasp - persistently (subject-control) non-actual ~ actual'. In Rotuman (an Oceanic language of the Austronesian family), on the other hand, metathesis marks the aspectual category "incomplete phase" (vs. "complete"), among other things: e.g., pure ~ puer 'rule (com-

ON LIMITING THE FORM OF MORPHOLOGICAL RULES

plete ~ incomplete phase)'. (For both these languages, consult Thompson and Thompson 1969, and references there, for further details.)

In the face of such evidence, it can only be concluded that morphological rules of metathesis exist (both of allomorphy, and otherwise), and, thus, that word-formation processes require the transformational power needed to perform such operations--contrary to the MRC. But metathesis is not the only type of counterexample, to that proposed constraint: certain reduplication-processes are also problematic (--ones in language(-familie)s other than Tagalog and Semitic), and discontinuous processes of affixation and/or internal change that require morphological-transformational analysis are perhaps the clearest violations of it. To present extensive exemplification of either or both of these two kinds of phenomena would--given the great amount of space that autosegmental-morphological representations take-up (cf. (1), above)--clearly preclude any discussion of other topics, in this paper (e.g., Lieber's proposed constraint, and my own), and so I must limit myself to schematically outlining the issues involved (and thus suppress the much fuller discussion of these topics which I presented orally at the NELS-XII Meeting). As regards reduplication: problems for the MRC arise whenever the association of C's and V's (in a template) with the segments of a morpheme does not proceed blindly, from left to right (or vice versa), but, instead, skips-over certain certain consonants, say, of that morpheme. Thus, in Sanskrit perfect-stems (cf. Halle and Vergnaud 1980:92-93, and references there), stV- does not reduplicate as the expected stV-, but as tV-, for example. In Autosegmental Morphology, this can be handled only by either allowing exceptions to the otherwise-valid association-conventions, or else positing a special ad hoc deletion-process, to remove the (association with the) non-reduplicated segment(s)--after normal association has been completed. While it is true that these two evasive maneuvers allow one to avoid outright violation of the MRC (as would be entailed by positing a morphological transformation), it is also the case that such analyses rob the MRC of much of its content--by circumventing it, and allowing exactly the type of surface-patterns of word-formation that it was originally formulated to rule-out. With many discontinuous morphological processes, however, it is not even obvious that such evasive analytical moves are available. In the Amerindian language Chickasaw (Muskogean family), for instance, negation of non-future verb-forms is achieved by simultaneously performing the following changes, on the (positive) verb-stem: (1) prefixation of ik-; (2) insertion of glottal stop, after the penultimate vowel of the stem (as long as only a single consonant follows), and (3) replacement of the last vowel, by -o. Thus, the negation of losa 'it's black' is ikloʔso, e.g., and that of iʔanu 'he knows it/how' is ikiʔaʔno. I must leave it to the reader to verify that this discontinuous negation-marker cannot be treated, autosegmental-morphologically, as an unassociated continuous morpheme, to be linked appropriately by the usual association-conventions--for the reason that, depending on the order of association, the result involves segments either associated in the wrong order, or else left unassociated. Furthermore, one cannot preassociate ik-...-ʔ-...-o with

JANDA

a single general template, for the non-future negative, since different verbs will require different templates: e.g., *losa* goes with VCCVCCV, but *i9anu*, with VCVCCVCCV--and *pomanompo-li* 'he's talking - to us' (negative *ikpomanompo?-lo*), with VCCVCCVCCVCCV. And the only way to determine which template is appropriate for which verb, in the non-future negative, is--of course--to analyze the individual segments of the (positive) verb-stem: an operation which obviously requires transformational power. The Chickasaw-case shows, then, that even Autosegmental Morphology cannot avoid (the equivalent of) transformational morphological rules something like: [+ VERB, + NEGATIVE, - FUTURE] /XCVCV(C)/ → /ik1?2o4/ (cf. Kempler and Thomas-Flinders 1981).

And, since it is precisely rules that violate conditions on rules which falsify such conditions, it is clear that word-formational processes like the Chickasaw, Sanskrit, Rotuman, Clallam, and Akkadian ones, above, falsify the MRC. That constraint is simply at odds--in its over-restrictiveness--with the richness and variety of morphological rules found in human languages. Rather than disregard a large number of seemingly well-motivated rules of morphology, then, we must reject the MRC--though for somewhat different reasons than those forwarded by Lieber 1980.

Now, Lieber, herself--after dismissing the MRC (as we have just done)--makes a proposal of her own, for limiting the power of morphological rules. She argues that, while transformational operations must be allowed, in such rules, they form part of a larger class of word-formation processes on which heavy constraints can be placed: the class of "string-dependent" rules. As opposed to rules of prefixation, suffixation, circumfixation, and stem-allomorphy, these rules must analyze the internal composition of stems to which they apply. Lieber argues that all string-dependent rules are subject to a conjunction of six conditions which severely limit their operation--and conversely, that these six conditions determine which morphological operations can have string-dependent form. I will refer to this requirement (that all string-dependent rules should exhibit the same cluster of six properties) as the "Property-Cluster Constraint", or just "Cluster-Constraint"--my term, not Lieber's.

The Cluster-Constraint is motivated as follows: After concluding that reduplication in Tagalog can be insightfully described only as a "lexical transformation" not in any way conforming to (the spirit of) Autosegmental Morphology and the MRC, Lieber 1980:246-270 investigates the rule's further properties, in some detail. She discusses six significant characteristics of Tagalog reduplication, which she then summarizes (pp. 270-271)--that rule is: (1) "strictly local"; (2) "triggered" (by certain affixes, after their affixation); (3) non-category-changing (by itself--associated category-changes must be attributed to the affixes just mentioned); (4) "pervasive" (i.e., it recurs, as the same formal operation, in a variety of morphological constructions); (5) "structure-preserving" (since it need not be analyzed as affecting labeled bracketing), and (6) semantically-neutral, or empty (i.e., it is not associable with any unique semantic representation, across the

ON LIMITING THE FORM OF MORPHOLOGICAL RULES

constructions in which it appears). Since this is a rather unusual group of properties to find-together, in a single operation, their conjunction seems more than coincidental, and Lieber concludes that it is not, in fact, an accident. Rather, this clustering of characteristics--or at least most of it--follows, Lieber 1980:311-317 argues, from her model of the lexicon, and its word-formation rules. This model envisions a "permanent lexicon" containing all and only morphemes, listed in lexical entries with information about their: morphological insertion-frames; syntactic category, subcategorization, argument-structures, and also semantic representation. But string-dependent rules like Tagalog reduplication are not allowed, in Lieber's theory, to contain or introduce such information, because they are not treated as morphemes. Consequently, they cannot have any associated semantics of their own (which yields property 6, above), nor can they have any effect on syntactic category-status (property 5). Not being purely phonologically-conditioned, they can be triggered only by affixes (property 2). And, since Lieber's model orders all string-dependent rules, in a block, after all affixational rules--which have exclusive power to create bracketing--it follows that Tagalog reduplication must be "structure-preserving" (property 3).

The model in question does not actually require "pervasiveness" (property 4), for string-dependent rules; it only predicts that, lacking characterization for idiosyncratic syntactic and semantic information, such rules "might be available for a wide range of functions...[: for] repeated appearance in [both] derivation and inflection...[: for] noun, verb and adjective morphology" (cf. Lieber 1980:314-315--emphasis added). And strict locality (property 1) is admitted, by Lieber, not to follow from the core of her theory of lexical morphology. But, in any case, Lieber 1980:311-317 (especially 316-317) believes it a significant consequence of her theory that at least five of the six clustering properties of string-dependent rules can be predicted by placing only three constraints on such processes: (1) they cannot be assigned lexical-entry information; (2) they are ordered, in a block, after "lexical-structure" (or affixational) rules, and cannot affect bracketing, and (3) they must be local. (Since requirement (2), here, actually has two parts, it would be more accurate to say that Lieber's model predicts five clustering properties, for string-dependent rules, at the cost of four stipulated constraints on them.) Now, since Lieber's 1980 theory of lexical morphology motivates the application of the Cluster-Constraint to Tagalog reduplication by virtue of the latter's being a string-dependent rule, it follows that all string-dependent rules should obey the Cluster-Constraint. And, pursuantly, Lieber 1980:272-311 presents a lengthy treatment of one other morphological process, in support of her clustering-requirement for string-dependent rules: namely, German Umlaut. She argues that this operation--a string-dependent rule of radically-different (i.e., non-transformational) type--exhibits the requisite cluster of six properties identical to those of Tagalog reduplication. Since the only two string-dependent processes investigated by her in any detail both obey the Cluster-Constraint, Lieber then generalizes the restriction to universal application, and claims that its otherwise-unexpected properties constitute

JANDA

strong support for her model of word-formation processes.

I will now attempt to show, however, that a close(r) consideration of both known and new facts about Modern High German Umlaut forces one to quite different conclusions, about it, from Lieber's: this process exhibits at most two of the properties which Lieber 1980 attributes to it, and this not-at-all-isolated fact requires the rejection of both the Cluster-Constraint and the theory of (lexical) morphology which entails that restriction. The case against identifying the properties of Umlaut with four of those demanded by the Cluster-Constraint begins with the fact that the process is not strictly-local. It is simply factually-untrue that, as claimed by Lieber 1980:290-291, 311, an affix "never triggers umlaut on [a] stem vowel... in cases where another vowel intervenes between that vowel and the umlaut trigger". There exist numerous nouns, verbs, and adjectives--some of which Lieber, herself, cites (e.g., on p. 278)--where Umlauter and Umlautee are separated by schwa: e.g., Bäuer-lein 'little farmer', (hämmer-n 'to hammer?'), mütter-lich 'maternal', jämmer-lich 'lamentable'. Neither of the two most plausible alternatives to this conclusion is particularly appealing: On the one hand, an analysis with epenthetic schwa has been suggested (e.g., by Wurzel 1970--and, following him, Lieber 1980), but certain schwa-containing syllables never alternate, with schwa-less ones (except in unnaturally-rapid speech)--e.g., the -er in Bauer(-) 'farmer'--and the existence of minimal pairs like Weihel 'veil' ~ weil 'because' frustrates any general epenthesis-rule for alternating schwas, in forms like Trömmel-chen 'little drum' (cf. tromm-le 'I drum'). On the other hand, it is admittedly possible--in the framework of current "Metrical Phonology" (cf., e.g., Hayes 1980, Halle 1980-MS, and references there)--to stipulate that intervening schwas in these cases are not "projected", and so ensure that Umlauter and Umlautee are, indeed, adjacent, in the relevant representation. However, in the absence of any general constraints on what can or can't be left unprojected, such an analytical move would be completely ad hoc. Not only might it create more problems than it solves; it definitely would reduce the strict-locality condition on string-dependent rules to vacuity.

But, also, second, Umlaut is not always triggered by affixes. In the standard language, there exists a sizeable number of nouns whose only overt sign of pluralization is Umlaut: e.g., Väter 'fathers', Böden 'floors', Äpfel 'apples', Mütter 'mothers'. There is little enough possibility of arguing for a plural schwa-suffix, here, but there is absolutely none at all, in the many dialects that have only Umlaut-marking of monosyllabic plurals: cf. šwǝn 'swans' (Swiss German: Kesswil), šæft 'shafts' (Swiss German: Entlebuch), hent 'hands' (Yiddish), etc. It should be mentioned, in this regard, that Lieber 1980:296-297, 310 (e.g.)--in discussing the triggering of Umlaut--allows it to be triggered by a feature [+U] (for Umlaut) on stems, as well as by affixes bearing that feature(-value). This step allows one to continue to maintain that Umlaut is (always) triggered, but it also evacuates the content of the notion "triggered", and so is unacceptable. A true conditioner of Umlaut must be more than a mere indicator on a stem to the effect that the rule applies to it.

ON LIMITING THE FORM OF MORPHOLOGICAL RULES

Next, it is, thirdly, untrue that "Umlaut never by itself changes category in word formation", as argued by Lieber 1980:309. Specifically, Umlaut performs a change from noun (or adjective) to verb, in derivative-pairs like the following: Hammer 'hammer' (N[oun]) ~ hämmer- 'hammer' (V[erb]), nass 'wet' (ADJ[ective]) ~ näss- 'wet' (V), Rache 'revenge' (N) ~ räch- 'avenge' (V). Lieber 1980:305-308 treats such apparent "morphological conversion" as actually involving lexically-listed pairs of stems, differentiated solely by the presence of the feature [+ U], on the verb. The members of each pair are then related by the "conversion relation" (or redundancy-rule) N[ADJ] ↔ V, which "requires phonological identity of nouns[adjectives] and verbs" (cf. p. 305). Although the feature [+ U] triggers Umlaut, that is, it is not supposed to thwart this requirement of phonological identity--e.g., for forms like Schmuck 'decoration' (N) ~ schmück- 'decorate' (V) (= Schmuck_N ~ schmuck-_V[+ U]), Futter 'feed' (N) ~ fütter- 'feed' (V) (= Futter_N ~ fütter-_V[+ U]). But such an evasive maneuver not only violates the spirit of the category-change prohibition, for string-dependent rules; it also represents a classic case of the phonological (ab)use of diacritic features (cf. Kiparsky 1968/1973:16). Such an anachronistic alternative is, likewise, not an acceptable option.

Fourth, finally, and perhaps most importantly, German Umlaut is (contra Lieber 1980:309) not really "a pervasive rule ... that appears over and over again in [exactly] the same form in word-formation processes". That is, Lieber does, it is true, formulate a single rule of (roughly) V → [-back]/[+ U], which is triggered by the feature(-value) [+ U], found on any of the many German suffixes that occur with Umlaut. But Umlaut cannot, in fact, be analyzed as a single unified rule, or even rule-schema, because at least some of the various Umlaut-processes associated with the suffixes in question have different structural descriptions, and such rules obviously cannot be collapsed, with one another. Thus, for example, neither comparatives nor superlatives of adjectives can Umlaut their stem-vowels over intervening schwa--in fact, they can Umlaut only if monosyllabic-stemmed. Nor can they Umlaut if their stem-vowel is the diphthong /au/. These conditions, though, are obviously not shared by other deadjectival or by denominal and deverbal formations, even for identical or nearly-identical stems: cf., e.g., braun-er/*bräun-er 'brownier' vs. bräunlich 'brownish'; laut(er)-er/*läut(er)-er 'purer' vs. läuter-n 'to purify', and mag(e)r-er/*mäg(e)r-er 'leaner' vs. Mägen 'stomachs'. Furthermore, as first emphasized by Wurzel 1970:115 et passim, the same stem can undergo the Umlaut-process associated with one suffix while being an exception to the Umlaut that usually accompanies another suffix: e.g., contrast Bärte 'beards', bärtig 'bearded' with, not only Arme 'arms' and -armig '--armed', but also Büsche 'bushes', buschig 'bushy', and Tage 'days', -tägig '- days long'. This is all further evidence against analyzing Umlaut as a single process: there are incontrovertible reasons to posit at least two Umlaut-rules, then, and no real grounds for not positing far more than that (= ca. 30)!

The conclusion to be drawn from these various points is a far-reaching one: Modern High German Umlaut--far from being one unitary rule,

or rule-schema, factored out-of over twenty word-formation processes (as [+ U])--is actually a fragmented set of similar changes, each built-into one of these twenty-plus rules. In a sense, then, there is no isolable Umlaut, as a string-dependent rule--except where it isn't associated with any suffix, as seen earlier: in the N/ADJ ~ V conversion-pairs, above. Otherwise, Umlaut is just the string-dependent internal-change part of morphological rules that simultaneously add suffixes to stems--like, e.g., [+ ADJECTIVE, + COMPARATIVE]/C VC / \rightarrow /C [V, -back]C +er/, and [+ NOUN, + DIMINUTIVE]/X(V)VC (eC) / \rightarrow /X(V) [V, -back]C (eC) +chen/ (where [COMPARATIVE] and [DIMINUTIVE] should be considered syntactic and semantic features, respectively). But this then means that each of these suffixation-cum-Umlaut operations is a string-dependent rule. And, since many of these individual rules only spell-out one category of German, with a unique suffix--Umlaut plus -chen, for example, only indicates 'diminutive'--it thus follows that the language has many string-dependent morphological rules that are not pervasive, not semantically-empty, not triggered, and not strictly-local. At least one such rule is category-changing, and most of the rest--since they include addition of bracketing, with their suffixes--are non-structure-preserving. These many string-dependent processes of German, in short, act exactly like Lieber's lexically-listed morphemes--in near-total contradiction to the predictions of her model of (lexical) morphology. And, as discontinuous operations of internal change plus suffixation, potentially separated by a vowel, these rules are not susceptible to treatment by the association-conventions of Autosegmental Morphology, and so must be stated in transformational format--in stampeding violation of the MRC. All at once, then, disintegrated and incorporated German Umlaut shows that both the Cluster-Constraint and the MRC are overly restrictive--and, hence, to be rejected, in the face of their inability to account for the varied wealth of formal morphological operations in natural languages. I say languages, because the German case is by no means isolated: we have, in fact, already seen a parallel example, in the process of Chickasaw non-future verb-negation, above.

Now, this is, on the one hand, a very negative conclusion, since losing the MRC and the Cluster-Constraint means that some other mechanism(s) will now have to be found, to rule-out exploitation of the definitely-needed morphological transformations in ways that are not found (and do not seem likely to be found), in human language--to block, e.g., total order-reversal, or op-op-op insertion, as we mentioned earlier. However, on the other hand, the above discussion of Umlaut does point to one way to constrain morphological rules. The use of diacritic features like [+ U] is not motivated by any other considerations, in grammar, than a desire to trigger certain morphological operations, after one has factored such processes out-of other rules. In Janda 1982, though, I discuss the striking evidence which exists suggesting that there is, in fact, a cross-linguistic preference for identical formatives/processes to recur, in a language's morphological rules--especially when these rules cannot be unified, or collapsed into schemata. Furthermore, it is clear that--as opposed to features like [+ PAST], [+ DATIVE], and [+ PLURAL] (which are relevant for, e.g., government, case-marking, and

ON LIMITING THE FORM OF MORPHOLOGICAL RULES

agreement)--diacritics like [+ U] certainly play no role in syntax. It can, thus, only be a large step forward--at least as regards limiting the strong generative capacity of grammars--to adopt a constraint on the form of morphological operations which will have the effect of excluding from such processes any and all features that lack syntactic, semantic, or phonological motivation, and so I will conclude this paper* by proposing (5), below:

(5) Diacritic-Prohibition

No word-formation rule may refer to any feature which is not independently required by some principle, rule, or representation in syntax, semantics, or phonology (pröper).

FOOTNOTE

* For comments--both positive and negative--regarding this paper made at the NELS-XII Meeting, I am grateful especially to Rochelle Lieber, John McCarthy, and Tracy Thomas-Flinders, but also to Steve Frank, Paul Kiparsky, and Alec Marantz. For helpful remarks made before and after the Meeting, I am also indebted to Steve Anderson, Stuart Davis, Dick Demers, and Dick Oehrle. And my apologies to anyone I've forgotten.

Further support for my analysis of German Umlaut is presented in Janda 1981, and more extensive discussion of all the issues raised here will be given in Janda (in preparation). For an articulated theory of morphology alternative to Lieber's "Lexical Morphology" and McCarthy's Autosegmental Morphology, see Anderson 1977, 1981 and other papers in Thomas-Flinders (ed.) 1981, as well as Thomas-Flinders (in this volume)--all of which depart from the start made by Matthews 1972, 1974.

REFERENCES

- Anderson, Stephen R. (1975) "On the Interaction of Phonological Rules of Various Types". Journal of Linguistics 11.1:39-62.
- _____. (1977) "On the Formal Description of Inflection". In Woodford A. Beach, Samuel E. Fox, and Shulamith Philosoph (eds.), Papers from the Thirteenth Regional Meeting, Chicago Linguistic Society; April 14-16, 1977. Chicago: Chicago Linguistic Society, pp. 15-44.
- _____. (1979) "On the Subsequent Development of the 'Standard Theory' in Phonology". In Daniel A. Dinnsen (ed.), Current Approaches to Phonological Theory. Bloomington: Indiana University Press, pp. 2-30 (Chapter One).
- _____. (1981) "Where's Morphology?" In Thomas-Flinders (ed.):1-40.
- Aronoff, Mark. (1974/1976) Word-Structure. MIT Ph.D.-dissertation, 1974. Somewhat revised and expanded version published as Word Formation in Generative Grammar. Cambridge, Mass.: MIT Press, 1976. (Linguistic Inquiry Monograph One.)
- Clements, George N. and Kevin C. Ford. (1979) "Kikuyu Tone Shift and Its Synchronic Consequences". Linguistic Inquiry 10.2:179-210.
- Goldsmith, John. (1976/1979) Autosegmental Phonology. MIT Ph.D.-dissertation, 1976. Published New York: Garland Publishing, Inc, 1979. (Outstanding Dissertations in Linguistics.)
- Halle, Morris. (1980-MS) "A Metrical Theory of Vowel Harmony and Related Matters". Unpublished paper, MIT.
- _____. and Jean-Roger Vergnaud. (1980) "Three Dimensional Phonology".

- Journal of Linguistic Research 1.1:83-105.
- Hayes, Bruce P. (1980) A Metrical Theory of Stress Rules. MIT Ph.D.-dissertation.
- Janda, Richard D. (1981) "Two Umlaut-Heresies and Their Claim to Orthodoxy". Paper presented at the LSA Annual (Winter) Meeting; New York City, New York; December 27-30, 1981.
- _____. (1982) "Of Formal Identity and Rule-(Un)Collapsibility: On Lost and Found Generalizations in Morphology". Paper presented at the 1st Annual West Coast Conference on Formal Linguistics; Stanford University; January 22-24, 1982. (To appear in the Proceedings.)
- _____. (in preparation) "What's Morphology?"
- Kempler, Daniel and Tracy Thomas-Flinders. (1981) "Problems for the Morpheme as a Unit: Evidence from Chickasaw". Paper presented at the LSA Annual (Winter) Meeting; New York City, New York; December 27-30, 1981.
- Kiparsky, Paul. (1968/1973) "How Abstract Is Phonology?" Unpublished paper, MIT, 1968; reproduced by the Indiana University Linguistics Club, 1968. Slightly revised version published in Osamu Fujimura (ed.), Three Dimensions of Linguistic Theory. Tokyo: TEC Company, Ltd., 1973, pp. 5-56.
- Lieber, Rochelle. (1980) On the Organization of the Lexicon. MIT Ph.D.-dissertation.
- Matthews, Peter H. (1972) Inflectional Morphology. A Theoretical Study Based on Aspects of Latin Verb Conjugation. Cambridge[, England]: Cambridge University Press. (Cambridge Studies in Linguistics, 6.)
- _____. (1974) Morphology. An Introduction to the Theory of Word Structure. Cambridge[, England]: Cambridge University Press. (Cambridge Textbooks in Linguistics.)
- McCarthy, John J. III. (1979) Formal Problems in Semitic Phonology and Morphology. MIT Ph.D.-dissertation.
- _____. (1981) "A Prosodic Theory of Nonconcatenative Morphology". Linguistic Inquiry 12.3:373-418.
- Sommerstein, Alan H. (1977) Modern Phonology. Baltimore, Maryland: University Park Press. (Theoretical Linguistics, 2.) [First published London: Edward Arnold (Publishers) Ltd.]
- Thomas-Flinders, Tracy G. (in this volume) "Initial Lenition in Celtic: Evidence for Inflection as a Phonological Process". (Also in Thomas-Flinders (ed.):72-83.)
- _____. (ed.) (1981) Inflectional Morphology: Introduction to the Extended Word-and-Paradigm Theory. UCLA Occasional Papers 4. Working Papers in Morphology.
- Thompson, Laurence C. and M. Terry Thompson. (1969) "Metathesis as a Grammatical Device". International Journal of American Linguistics 35.3:213-219
- Wurzel, Wolfgang U. (1970) Studia Grammatica 8. Studien zur deutschen Lautstruktur. [East]Berlin: Akademie-Verlag GmbH.