

REVIEWS

Lexical strata in English: Morphological causes, phonological effects. By Heinz J. Giegerich. Cambridge: Cambridge University Press, 1999. Pp. ix, 329. Hardcover. \$69.95.

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In this creative and ambitious book, Giegerich undertakes perhaps the most comprehensive study ever of phonology-morphology interaction in English in the framework of lexical phonology and proposes major modifications of certain aspects of the theory. The book is full of interesting and thought-provoking claims, supported by thorough empirical demonstrations. At the same time, however, it is curiously out of touch with recent developments in the field. For example, Optimality Theory, which has become the *de facto* lingua franca of phonologists, is not even mentioned. Perhaps even more disturbing is the fact that many developments in the 1990s in the framework of lexical phonology are also ignored. For example, although Giegerich devotes a whole chapter to Strict Cycle effects, he fails to acknowledge Kiparsky's (1993) approach to such effects (now properly called Non-Derived Environment Blocking, though Giegerich continues to use the outdated term) based on Radical Underspecification and structure-filling default rules.

Chapter 1 summarizes a number of past challenges to the framework of lexical phonology, suggesting that, in spite of those challenges, changing certain fundamental assumptions can in fact salvage the framework. Chapter 2 presents in detail these assumptions and the empirical evidence against them. In particular, Giegerich argues in this chapter that the traditional notion that properties of affixes drive lexical stratification gives rise to major difficulties. He proposes that the base of affixation is instead the driving force of lexical stratification, affixes in principle being free to attach on any stratum. Chapter 3 presents the theoretical details of the base-driven stratification model, including mechanisms for transitions between strata, affixation on different strata, listing of unproductive formations, and so on. Chapter 4 is devoted entirely to Strict Cycle effects, showing how the base-driven model derives these. Giegerich shows that the model gives rise to different empirical predictions than the traditional affix-driven model and argues that these new predictions are more accurate. Chapter 5, perhaps the

most interesting in the book, is devoted to certain patterns of neutralization, focusing mostly on unstressed vowel reduction. Giegerich argues in this chapter that, contrary to traditional (and uncontroversial) wisdom, underlying forms of items such as *atom* (cf. *atomic* with a full vowel) contain reduced vowels. It follows then that the full-vowel variant is not predictable from the phonological information in the underlying representation. Giegerich argues that the full vowel in such forms is derived from the orthographic representation. Chapters 6 and 7 analyze *r*-insertion and *r*-deletion in Received Pronunciation, a nonrhotic variety of English. Giegerich argues, building on chapter 5, that *r*-insertion also makes crucial reference to orthography. Chapter 8 further develops the analysis of lexical syllabification sketched in chapters 6 and 7. The main claim here is that there is no lexical resyllabification; syllabification is entirely structure building.

We turn now to a more detailed look at the contents of each chapter. Chapters 1 through 3 argue against the traditional affix-driven stratification model and introduce and defend Geigerich's base-driven stratification model. The main argument in chapter 2 is based on affixes that exhibit multiple-stratum membership. Giegerich starts with the well-known case of *-able*, which may function as a typical stratum 1 affix (as in *divisible*) or as a stratum 2 affix (*dividable*). He argues that, far from being exceptional, *-able* is in fact typical: there are a large number of affixes that show stratum 1 or stratum 2 behavior within different words. He presents arguments for multiple-stratum membership of fourteen specific affixes and suggests that the existence of such a large number of affixes that can be attached on either stratum shows that affix-driven stratification is a fundamentally flawed idea. It should be noted here that some of the empirical evidence Giegerich uses to motivate multiple-stratum membership is somewhat suspect. For example, he asserts that only stratum 1 affixes may attach to bound roots; stratum 2 affixes can attach only to free forms. It follows from this assertion and the existence of forms such as *reckless* and *ruthless* that *-less* may function as a stratum 1 affix. Note, however, that the existence of such forms could as well have been seen as evidence that stratum 2 formations may be based on bound roots. Similarly, Giegerich suggests that stratum 2 affixes are necessarily fully productive and semantically compositional. The form *highness* (used as an honorific; note also the failure of *height* to block this form) then implies that *-ness* can function as a stratum 1 affix. Again, note that the existence of this form could as well have been taken

to imply that stratum 2 formations might be semantically noncompositional.

The existence of numerous multi-stratal affixes is only one part of Giegerich's argument in favor of his base-driven model. The other part is based on a demonstration that base-driven mechanisms are independently needed in any case. For example, it is often noted that *-ive* may follow Latinate suffixes but not Germanic ones, a fact traditionally handled by assigning Latinate suffixes (including *-ive*) to stratum 1 and Germanic ones to stratum 2. However, Giegerich notes, *-ive* fails to attach to Germanic roots as well: **lovive* (cf. *abusive*). This restriction must follow from the properties of the base of affixation, *love* (vs. *abuse*). Giegerich suggests that this kind of sensitivity to the properties of the base of affixation is in fact also the mechanism behind lexical stratification. All affixes are, then, in principle able to attach on either stratum (unless diacritically marked otherwise). The base of affixation, not the affix, determines the stratum membership of a complex form. According to Giegerich, there are several distinctions between stratum 1 and 2 bases in English. Stratum 1 bases, called roots (an unfortunate choice of terminology as complex forms derived on stratum 1 are also called roots in Giegerich's exposition), are bound forms that lack syntactic category specifications. Stratum 2 bases are free words with lexical category specifications. (Giegerich suggests, based on a brief discussion of German, that some languages may also allow bound forms with lexical category specifications, which he calls stems.) The claim that stratum 1 forms lack lexical category specifications is an interesting one, which gives rise to a somewhat arcane architecture for the base-driven stratification model. This claim is rather weakly motivated: Giegerich notes that some bound roots are able to combine with suffixes with incompatible attachment requirements: *maternity*, where *-ity* normally attaches to adjectives and *maternal*, where *-al* attaches to nouns. He concludes, reasonably, that such bound roots therefore must lack lexical category specifications. He then proposes to generalize this observation to claim that all stratum 1 bases, including those, such as *go*, which will always surface with the same lexical category, lack categorial features on level 1. He proposes that lexical categories are assigned by a special rule (his rule 10, p. 76), which also effects the transition between stratum 1 and stratum 2. Stratum 1 bases that happen to be free forms are diacritically marked for undergoing a specific subrule of rule 10. For example, *go* is diacritically marked as undergoing a version of rule 10 that will convert it into a verb in its transition to stratum 2. Forms that are

created on stratum 1 also lack lexical categories but are diacritically marked for the lexical category that will be assigned to them on their transition to stratum 2. Thus, for example, *-ity* creates roots that lack lexical categories but are diacritically marked to undergo a version of rule 10 that will convert them to nouns on their transition to stratum 2. Note that this apparently excessively complicated model is based on the relatively small number of bound forms such as *matern-*, which seem able to combine with affixes that normally attach to differing lexical categories. A much simpler alternative would be to posit that it is only roots such as *matern-* that lack lexical categories; roots that do not exhibit this type of schizophrenic behavior are marked with appropriate lexical categories. Since roots of the *matern-* type are bound, they are unable to become stratum 2 (free) forms in any case; therefore rule 10 need not introduce any lexical categories at all. We are then able to say that *-ity*, for example, creates nouns rather than category-lacking bound forms that are diacritically marked to undergo rule 10, which will turn them into free forms that happen to be nouns. In this alternative model, affixes would be said to be able to combine with bases that do not disagree with their attachment requirements. For example, *-ity*, required to attach to an adjective, could combine with *matern-* (with no category information) as well as with *grammatical* (an adjective), but not with *abuse* (a verb). In Giegerich's model, by contrast, *-ity* can attach to *matern-* and *grammatical* with no problems since both bases lack lexical category information. However, *-ity*'s failure to attach to *abuse* is either an accidental gap, or requires rather suspect reference to diacritic features (*-ity* will not attach to roots that are diacritically marked to undergo the subrule of rule 10 that will convert bound roots into verbs). On the other hand, in Giegerich's defense, we may cite sporadic forms such as *relentless* and *uncola* (advertising neologism), in which affixes apparently attach to the wrong syntactic category. In Giegerich's framework, these would be stratum 1 formations where the base lacks a lexical category.

Chapter 4 derives Strict Cycle effects from the Stratum Transition Rule (rule 10). In the spirit of Kiparsky's use of lexical identity rules in conjunction with the Elsewhere Condition, Giegerich argues that the specific subclass of rule 10 that a given form is diacritically marked to undergo will be more specific than any phonological rule, and will therefore prevent the phonological rule from applying. This, he argues, automatically gives rise to Strict Cycle effects. Giegerich notes, however, that, in this conception, Strict Cycle effects have nothing to do with

cyclicity. Any rule will be subject to these effects, whether or not it is cyclic, since all stratum 1 forms must undergo rule 10 (it is rather disappointing that Giegerich fails to cite Hualde's [1989] demonstration of the independence of Strict Cycle effects from cyclic versus noncyclic rule application). Another interesting prediction is that rules of the final lexical stratum (in English, stratum 2) must be immune from Strict Cycle effects, since there is no stratum transition rule that would give rise to the desired elsewhere blocking. While interesting, this chapter suffers from its lack of acknowledgment of recent approaches to Strict Cycle effects. In particular, Giegerich should have considered Kiparsky's (1993) approach to Non-Derived Environment Blocking, based on Radical Underspecification, and his arguments in favor of that approach over the elsewhere approach. (The modern terminology specifically divorces Non-Derived Environment Blocking from cyclicity; Giegerich, while also denying the relevance of cyclicity, continues to use the archaic term.)

Chapter 5 is without doubt the most interesting and thought-provoking in the book. In this chapter, Giegerich analyzes a number of neutralizing alternations, focusing mostly on unstressed vowel reduction. In pairs of related forms such as *atom/atomic*, it follows from Giegerich's approach to Strict Cycle effects (developed in chapter 4) that the morphologically simple form (here *atom*) cannot undergo vowel reduction, since this would be preempted by rule 10. Therefore, the underlying form of such morphemes must contain a reduced vowel, contradicting the traditional analysis with an underlying full vowel and a reduction rule. Instead, Giegerich must posit a family of rules converting underlying reduced vowels into surface full vowels in stressed syllables. As Giegerich notes, the quality of this surface vowel is not phonologically predictable (compare, for example, *atom/atomic* with *totem/totemic*). Giegerich suggests that the phonological rule that is responsible for creating a full vowel from an underlying schwa must crucially refer to orthography. Thus, for example, the speaker must use orthographic information in order to know that the stressed vowel in *atomic* is [ɒ], while that in *totemic* is [ɛ]. Giegerich suggests that this analysis is superior to the traditional alternative in light of learnability considerations. He argues that it is unreasonable to assume that a speaker who has already learned the form *atom* would, upon encountering the morphologically complex derivative *atomic*, go back and revise the underlying form to include a specific full vowel. Such revision is not needed in Giegerich's analysis.

Though controversial, there is little doubt that there is something right about Giegerich's claim that phonology may be sensitive to orthography. However, we must note that the pattern of neutralization is not what is right about his argument. If his exposition in this chapter were taken literally, one would have to conclude that the morphologically simple form must always be more faithful to the underlying representation than any form morphologically derived from it. It is clear that this is not generally true in all languages. Consider, for example, the simple case of final voicing alternations in Turkish (Lewis 1967):

- | | | | |
|-----|------------|---------|--------|
| (1) | Nominative | Dative | |
| | kanat | kanad-a | 'wing' |
| | sanat | sanat-a | 'art' |

The traditional analysis of such forms is that there is an underlying voicing distinction, neutralized in syllable-final position. The fact that the underlying voicing distinction is evident only in morphologically complex forms is not relevant. Note that Giegerich's mechanism of reference to orthography will not work here (even ignoring the large numbers of illiterate speakers of Turkish), since such voicing alternations are found even in forms where the orthographic convention does not encode the underlying voicing distinctions, for example, in proper names:

- | | | | |
|-----|---------------|--------|----------|
| (2) | phonetic: | mehmet | mehmed-e |
| | orthographic: | Mehmet | Mehmet'e |

Giegerich's learnability argument (that it is unreasonable for a speaker to revise the underlying form of a morpheme upon encountering a new surface realization of the said morpheme within a complex form) also cannot be taken literally. The speaker must of course continually revise underlying representations upon encountering different surface realizations of a given morpheme.

On the other hand, it cannot be denied that English speakers do on occasion refer to orthographic representations in determining pronunciation. For example, in my own work with native speaker consultants, I observed that many speakers, when forced to produce the ungrammatical form **corruptize*, pronounced a full vowel, [o]. Since *corrupt* does not occur in any surface form with a full vowel, the only possible source for the surface quality of this full vowel is the orthography. Since we have already demonstrated that the particular

pattern of neutralization is not responsible for this need to refer to orthography, we must ask what is. It seems clear that what is crucial about these English examples (and what distinguishes them from the Turkish examples) is that they are all cases of unproductive morphology. In light of this, one can arrive at quite a different conclusion from Giegerich's concerning the relevance of orthography: instead of assuming that orthography plays a role in the structural description of a phonological rule, one may conclude that (at least some) speakers use orthography in positing an underlying representation for a phonologically reduced vowel. For example, a speaker might posit an underlying [ɒ] in *atom* based on orthography. This approach seems advantageous to Giegerich's in two respects. First, it requires no major departure in the phonological apparatus over traditional approaches: phonological rules need not refer to orthographic representation; they simply apply to underlying representations as expected. Second, this approach accounts for many speakers' insistence that *atom* and *Adam* are different, although they are in fact phonetically identical (in my consultants' variety of California English): those speakers have posited different underlying vowels and consonants in these forms based on their orthography.

Another implication of Giegerich's approach to neutralization is that many free-ride derivations are ruled out. For example, *high* cannot be derived from underlying /hi:/, with a free ride on the Great Vowel Shift. This greatly reduces abstractness and is surely a welcome result. However, it should be noted that there are other recent approaches to lexical representation that also successfully rule out such free-ride derivations, for example, the influential lexicon optimization approach within Optimality Theory (Prince and Smolensky 1993). According to these proposals, nonalternating forms are always listed underlyingly as true to their surface form, and free-ride derivations are automatically ruled out.

Chapters 6 and 7 analyze *r*-insertion and *r*-deletion in an *r*-less variety of English. One of the main conclusions is that the *r* that appears in *searing* but not in *seeing* is not underlying, but, along the lines of chapter 5, is derived by reference to orthography. This assumption is again necessitated by Giegerich's approach to Strict Cycle effects developed in chapter 4. The conclusion is once again questionable; even if one wanted to make orthography relevant, one would preferably do so by assuming that the orthography may lead the speaker to posit an underlying *r* in *sear* but not *see*. Another disappointment in this chapter

is Giegerich's failure to address the lack of epenthetic *r* in stratum 1 formations (e.g., *algebraic*).

Chapter 8 follows up on the remarks made on syllabification in chapters 6 and 7 and develops a comprehensive account of lexical syllabification in English. The main point, according to Giegerich, is that there is no lexical resyllabification in English. Syllabification is entirely structure building in the English lexicon. While this conclusion might be valid in English, it is quite clear that it is not universal. See, for example, works by Hargus (1988) and Inkelas and Orgun (1995), where a surface onset might show onset effects due to its lexical syllabification as a coda on a deeper stratum.

Wrapping this all up, we may offer the following final remarks. Note that Giegerich conflates a number of issues in several chapters of the book: bound versus free roots, stratum 1 versus stratum 2 derivation, semantic compositionality, productivity, listing, and the relevance of orthography. His criteria for assigning stratum 1 membership to forms are more flexible than previous researchers'. For example, any form that contains a bound root is automatically assumed to be created on stratum 1. Likewise, any form that is unproductively created, or is noncompositional in any way, is assumed to belong to stratum 1. All stratum 1 forms are accordingly claimed to be listed. As such, lexical strata in Giegerich's framework lack the definitional property of older approaches. In past approaches to lexical phonology, all stratum 1 formations are united by their common phonological system. Likewise, all stratum 2 forms share a common phonological system. By putting everything that is not fully productive and compositional, as well as everything that is formed on a bound root (in English, necessarily unproductive, but in many languages, such as Bantu, possibly fully regular, compositional, and productive) on stratum 1, Giegerich loses the phonological uniformity of strata. Stratum 1 contains some forms that evince alternations such as the Great Vowel Shift, velar softening, and stress shift, as well as forms that do not. Clearly, then, what Giegerich means by lexical strata is not what others have meant by the same term. What does he mean then? It appears that his model is not really one of lexical stratification. Rather, Giegerich has simply argued that all unproductive, noncompositional forms must be listed (surely an uncontroversial position), while regular, fully productive forms can be created by affixation constructions with traditional subcategorization frames.

This book is based on an ingenious proposal, base-driven stratification, with many interesting empirical and theoretical arguments in favor of it. It would be sad if people ignored this book because it seems outdated; there are many interesting ideas in it that, whether right or wrong, can give rise to many new insights.

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From regularity to anomaly: Inflectional *i*-umlaut in Middle English. By Marcin Krygier. (*Bamberger Beiträge zur englischen Sprachwissenschaft*, 40.) Frankfurt am Main: Peter Lang, 1997. Pp. xiv, 313. Paper. \$57.95.

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In this volume, Marcin Krygier seeks to chronicle the loss of morphological alternations resulting from Old English *i*-umlaut in the inflectional systems of the various dialects of Middle English. The author argues that while the extent of *i*-umlaut in Old English is well researched, no detailed analysis of the subsequent process of leveling of *i*-umlaut alternations in Middle English has been produced. To address