The Phonology-Morphology Interface

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Overview: This book presents a phenomenon-oriented survey of the ways in which phonology and morphology interact, including ways in which morphology, i.e. word formation, demonstrates sensitivity to phonological information and in which phonological patterns can be sensitive to morphology. Although the purpose of the book is not to promote one theory over another, it does have a secondary purpose of highlighting properties any theory of morphology must have in order to account for the phenomena covered. Certain of the phenomena discussed have famously inspired or been cited as support for particular morphological or phonological theories; in conjunction with the presentation of the relevant phenomena, these theories (including Lexical Morphology and Phonology (LMP), Prosodic Morphology, A-morphous Morphology, Sign-Based Morphology (SBM), certain proposals within Optimality Theory, and word & paradigm morphology) are reviewed and, in cases of competition, compared.

Chapter 1. Morphologically conditioned phonology

This chapter surveys various facets of the morphological conditioning of phonology, focusing on the types of morphological information that can condition phonological patterns and the types of phonological patterns that can be conditioned by morphology. Also covered will be several of the most influential theories of morphologically conditioned phonology, which aim to capture language-specific as well as cross-linguistic generalizations about the phenomenon.
The chapter will focus specifically on phonological alternations or constraints that affect the surface form of morphemes. A number of closely related topics are taken up in other chapters: process morphology, in Chapter 2; prosodic templates, in Chapter 3; reduplication, in Chapter 4; phonology-morphology interleaving, in Chapter 6; phonology which applies only in morphologically derived environments, in Chapter 7; the interference of phonology with morphology, including suppletive allomorphy, in Chapter 8; the relationship between morphological structure and prosodic structure, in Chapter 9; and the effect of paradigmatic relationships on phonology, in Chapter 10.

Chapter 2. Process morphology

The counterpart to morphologically conditioned phonology is morphology which is manifested as a phonological process (other than concatenation of morphemes). These processes can either themselves be the sole mark of a morphological category or may form the stems that are involved in the marking of that category. Among the most common processes are truncation, vowel ablaut, consonant mutation, and alternations involving vowel or consonant length.

- Truncation (bare, accompanied by affixation, or accompanied by compounding)
- Subtractive morphology (e.g. Tohono O'odham perfective)
- Ablaut and mutation
- Gemination or vowel lengthening
- Toggle effects

Process morphology has been cited as evidence for processual or realizational theories of morphology (e.g. A-Morphous Morphology; Anderson 1992) over item-based theories (e.g. Lieber 1980; Kiparsky 1982b, which must treat process morphology as a very different phenomenon from ordinary affixation or compounding. Item-based theories face a significant challengewhen the same morphological construction is realized both by affixation and by a process, e.g. truncation, as in Japanese hypocoristics: *Midori* → *Mido-tsan*.

Another potential problem for item-based theories, and some realizational theories, of morphology lies in distinguishing process morphology from morphologically conditioned phonology. For example, final consonant deletion alone, as in Tohono O'odham perfective formation, would be described as subtractive morphology, while final consonant deletion in the context of a particular suffix (e.g. Turkish *bebek-cik* → *bebecik* 'baby-DIM = little baby') is normally described as a suffix-triggered consonant deletion rule. This 'too-many-descriptions' problem disappears in a realizational Sign-Based approach to affixation (and in many other realizational approaches as well); the analyst is not forced to formally distinguish between morphologically conditioned phonology and phonologically manifested morphology.

Chapter 3. Prosodic templates

Templates are morphological constructions, sometimes stem-forming and in other cases associated with derivational or inflectional morphological categories, which directly constrain the phonological shape of the derived stem. This chapter surveys some well-known and lesser known examples, evaluating the claim of McCarthy & Prince 1986 that templates correspond to universally available prosodic units (foot, syllable, mora) and the claim of McCarthy & Prince 1994b; c that templates are artifacts of constraint interaction.

Chapter 4. Reduplication

Reduplication is the duplication of some part, possibly all, of a stem for some morphological purpose. This chapter discusses reduplication shape and the morphological nature of reduplication.

Reduplicant shape. Partial reduplication typically involves a phonologically static template for the reduplicant: mora, syllable, or foot. Interestingly, reduplication rarely if ever unambiguously copies an existing mora, syllable or foot from the 'base'; rather, the templatic requirements seem to be output requirements on the reduplicant, which may, however, be obscured by resyllabification with adjacent morphemes. An important observation by McCarthy & Prince (1986; 1999) is that the shapes of reduplicants are comparable to the shapes resulting from truncation, and draw from the universal prosodic hierarchy.

Partial reduplication usually duplicates that edge of the stem to which the reduplicant is closest, but opposite-edge reduplication occurs as well.

Infixing reduplication. Reduplication is commonly infixing. Interestingly, infixing reduplication seems always to duplicate adjacent material, whereas prefixing or suffixing reduplication can duplicate material on the opposite side of the stem.

Fixed segmentism in reduplication. It is often the case that one of the two copies in reduplication contains some fixed material which either co-occurs with (X-Y X, where Y represents fixed material) or supplants material that would otherwise be expected to copy (*fancy-shmancy*, Amele etc.). The latter phenomenon has been termed 'Melodic Overwriting' (McCarthy & Prince 1986; Yip 1992). In some cases there is a diachronic relationship between the two construction types. Melodic Overwriting appears to be more common in total reduplication than

in partial reduplication, though this may simply be an artifact of the difficulty in diagnosing Melodic Overwriting effects in partial reduplication.

One functional motivation that has been offered for Melodic Overwriting is that it makes the two copies different; support for this is (a) its apparent predominance in total reduplication and (b) allomorphy which guarantees that the copy with the fixed material is different from the intact copy (Abkhaz, Hindi, Javanese) or cases in which the construction is blocked when the copies would be the same (Turkish, as described in Lewis 1967). (The dissimilation seen here is reminiscent of the 'toggle' morphological effects described in Chapter 2, although different features seem to be involved.) Alderete et al. (1999) have suggested that some cases of Melodic Overwriting may be emergent unmarkedness ('TETU'); undermining this interpretation, however, is the fact that Melodic Overwriting is typically a very local effect, rather than an exhibition of overall unmarkedness in the reduplicant. TETU seems to be a more accurate characterization of effects in partial reduplication, which is consistent with the hypothesis that many cases of partial reduplication derive historically from erosion of total reduplication (Niepokuj 1997). It is more likely that Melodic Overwriting is the historical result of fusion between an accompanying affix and one of the copies in reduplication.

Morphological character of reduplicant. Partial reduplication is often described as affixation and total reduplication as compounding; however, there is little morphological evidence for this distinction, which seems purely to be based on the phonological differences. Indeed, some phonologists have recruited the affixation/compounding distinction to account for phonological size differences even within partial reduplication, terming reduplicants which are syllable-sized or smaller 'affixes' and those which are foot-sized 'roots' (Generalized Template Theory; McCarthy & Prince 1994b; c; Urbanczyk 1996). There is no morphological evidence for this distinction either; it is theoretically motivated by the desire to avoid templates in morphology. According to Morphological Doubling Theory (Inkelas & Zoll in progress), all reduplication involves double insertion of a semantically defined morphological constituent (which could be either an affix or stem).

Chapter 5. Infixation

Infixation is generally described as being just like affixation except that the affix is positioned within the stem instead of peripheral to it. The interest of infixation lies in the phonological generalizations about where in a word an infix can appear and why infixation occurs at all. Recurring sites for infixes are: next to the initial or final consonant or vowel, or next to a stress foot. There is apparently no evidence of infixation to tonally prominent syllables (in the absence of metrical stress) or to syllables containing phonetically salient segments (e.g. fricatives or ejectives) or phonologically salient syllables (e.g. those with long vowels or consonant clusters). Only morphemes classified as affixes have ever been shown to infix; infixation is apparently not a possible property of compounding, modulo several suggestive examples, including expletive-infixation in English.

Some (e.g. McCarthy & Prince 1994a, working in Optimality Theory) have offered synchronic theories of the positions in which infixation is possible; however, such proposals typically predict more possible types of infixes than have been found. A full explanation of infix distribution cross-linguistically may need to appeal to diachrony; Yu (2003), for one, argues that infixation arises either through affix entrapment (fossilization of an outer affix, trapping an inner one) or from stress shift (leading to reanalysis of a stress-adjacent affix as a stress-adjacent infix).

Chapter 6. The phonological interpretation of morphologically complex words: layering and locality

This chapter discusses the phonological properties of morphologically complex words, i.e. those formed by more than one word-formation process. What we find in many such cases is clear evidence that phonology is sensitive to constituent structure (not just to morpheme boundaries). Phonology is interleaved with morphology in the sense that SBM predicts: the output of the phonological input-output mapping within a subconstituent is the input to the phonology of the larger constituent. Well-known and lesser known examples of cyclicity are surveyed; the survey pus to rest the widespread but inaccurate belief that examples of cyclicity almost exclusivcely involve stress assignment.

This chapter distinguishes two usages of 'cyclicity' in the literature. Some phonologists use the term whenever there is evidence that the output of applying phonology to a daughter is the input to the application of phonology to its mother, i.e. what we are here calling 'interleaving'; other phonologists use the term 'cyclicity' only for the subcase of interleaving in which both daughter and mother are subject to the same phonological pattern.

LMP uses the term 'cyclicity' in the second, more restricted way. According to LMP, each level is uniformly cyclic or uniformly noncyclic. SBM does not impose such a restriction. Whether or not there is interleaving is determined by whether the morphological constituent structure of the relevant word is flat (no interleaving) or branching (interleaving).

LMP also predicts clustering in the word of constructions exhibiting the same phonology and rigid ordering between constructions exhibiting different phonology; this is not consistent with data from languages with complex morphology. SBM provides a more accurate picture of what actually goes on.

Chapter 7. Nonderived Environment Blocking (NDEB)

Cyclic rules have often been observed to be restricted to derived environments. 'Strict Cycle' principles proposed in the 1970's and 1980's correlated the cyclic application of structure-changing rules with nonderived environment blocking; however, subsequent work (e.g. Hualde 1989; Kiparsky 1993) has shown that the correlation with cyclicity and structure changing status is imperfect. Some structure changing rules do apply (albeit optionally) in nonderived environments; some patterns which are blocked in nonderived environments are non-structure-changing, and so on. A number of recent proposals (Burzio 1997; Lubowicz 1999; Inkelas 2000; Yu 2000) have successfully analyzed individual subphenomena falling under the umbrella of nonderived environment blocking. It may turn out to be the case that NDEB effects are neither universal nor monolithic, in which case the patchwork approach is motivated; however, this is still an area of ongoing research.

Bracket erasure. An important question for any model of the morphology-phonology interface is whether phonological rules applying to one subconstituent can make reference to properties of embedded structure. The existence of NDEB effects might suggest that phonology needs to distinguish complex from simplex structures. However, there is little evidence to suggest that information about granddaughters or nieces is ever accessed. According to the Relativized Opacity Theorem (Orgun & Inkelas 2002), phonology and morphology have different degrees of access to internal morphological structure. Phonology and morphology both can access the daughter nodes and their boundary. Morphology can in addition access the identities of the morphemes (but not their boundaries) *within* the daughter nodes.

☞ *Look for discussion of this issue. Reviathidou (diss), Shaw 2009 for starters*

Chapter 8. When phonology interferes with morphology [class lectures]

This chapter discusses cases in which word-formation possibilities are constrained by phonology, either because of phonological requirements on inputs to word-formation; or because of phonological requirements on the outputs of word formation. Constraints on word-formation can result in the choice of one suppletive allomorph over another, or they can result in morphological gaps, where no output (or only a periphrastic output) is possible. This chapter surveys these two phenomena in turn, and then considers two areas in which phonology has been claimed to interfere with morphology, but where the facts are more questionable: the Repeated Morph Constraint and phonologically conditioned affix ordering.

Phonological selectional requirements on affixation. Individual affixes often impose phonological requirements on bases of affixation; bases not meeting these requirements cannot combine with the affix. A common subcase of this would be suppletive allomorphy where the allomorphs in question occur in complementary phonological environments. For example, Turkish has two suppletive causative suffix allomorphs: causative *-t* goes on polysyllabic V-final bases, e.g. *anla-t* 'understand-CAUS', while causative *-DIr* occurs in the complement set of environments, e.g. *ye-dir* 'eat-CAUS', *al-dır* 'take-CAUS', *bırak-tır* 'leave-CAUS'.

Phonologically conditioned suppletive allomorph isn't interference so much as influence. Paster claims that suppletive allomorphy is not broadly optimizing; Wolf claims that it is.

☞ *Read Wolf's dissertation*

Phonological output restrictions. In some cases a word-formation construction (affixation, truncation, reduplication, etc.) can apply only if its phonological output is well-formed. For example, for many speakers of Turkish, suffixation is grammatical only if the resulting word is at least disyllabic. A number of cases of phonologically conditioned suppletive allomorphy have been analyzed in this manner; for example, Turkish has two allomorphs of the 3rd possessive, *-I* and *-sI*. The former occurs after consonants and the latter after vowels. While these restrictions could be stipulated as input requirements on the two suffix allomorphs, it is also possible to make them output conditions, under the assumption that the grammar of Turkish favors alternating CVCV… structure where possible; on such cases see e.g. Kager 1996; Sprouse in preparation.

Phonological conditions accompanying morphological constructions, e.g. affixation, can result in morphological gaps in the event they are not satisfiable by a given input to the construction. A number of such cases are discussed by Orgun & Sprouse 1996; Carstairs-McCarthy 1998. In case of suppletive allomorphy, it is common for one allomorph to be the elsewhere case, available in case conditions making possible the use of the other are not met. But when there is no alternative, the word simply cannot be formed, resulting in a gap.

In addition to phonological well-formedness, phonological distinctness has been claimed to be a factor in the applicability of a morphological construction. In cases of this kind, a particular morphological construction is blocked if the phonological output would be nondistinct from the input. A number of such cases are surveyed in Kurisu 2001 and will be discussed here.

☞ *Check Albright's work on this topic; search on 'ineffability'*

Haplology effects. Menn & McWhinney (1984) have claimed it to be generally, if not universally true that sequences of homophonous affixes are prohibited. If this is true it is a clear case of phonology interfering with morphology. The Repeated Morph Constraint (RMC) may, according to Menn & McWhinney, result in lexical gaps, in haplology – where a single morpheme does

double duty – or in suppletion involving one or both morphs in question. Some doubt is cast on the RMC by the existence of many sequences of homophonous morphs and by the fact that suppletion and lexical gaps occur even when morph repetition is not an issue.

☞ *Get more examples of morph repetition avoidance. Haig?*

Affix order. Some cases have been described in which phonology constrains the linear order in which affixes appear. (This does not include infixation, described separately in Chapter 5.) The RMC, for example, blocks sequences of homophonous affixes; mobile affixes, as discussed by Fulmer and Noyer, vary freely between two possible positions in the word, with phonological considerations being the deciding factors. Such cases could be handled in Optimality Theory by the general schema proposed by McCarthy & Prince (1994a) in which phonological considerations ('P') outrank morphological considerations, e.g. affix ordering ('M'). In this regard, however, the absence of certain phenomena is just as significant as the presence of others. Phenomena predicted by P » M but seemingly unattested in natural language include:

- Rhyming, alliteration as factors in allomorph selection (though intriguing near-counterexamples in Arapeshan are discussed in Aronoff 1992; Dobrin 1998)
- Affix metathesis (reordering) to optimize some phonological parameter (though intriguing near-counterexamples in Huave and Afar are discussed in Noyer 1994, Kim 2008)
- Unbounded infixation to improve phonological well-formedness (McCarthy 2002; Yu 2003)

The apparent absence of such cases calls into question the hypothesis that any phonological constraint ('P') is capable of outranking any given morphological constraint ('M'). There seem to be certain areas in which the phonology cannot interfere. Further research is needed to determine whether the reasons for this are historical – certain reanalysis possibilities being statistically unlikely – or synchronic – certain patterns falling outside of the scope of what universal grammar can describe.

Track down more refs from Paster paper. Tuttle & Hargus

Chapter 9. Nonparallelism between phonological and morphological structure

The domains of phonological patterns are coextensive with the morphological subconstituents of a word; for this reason, phonology provides strong evidence about the morphological structure of a word. However, there can be mismatches, i.e. situations in which phonological domains are not matched with morphological subconstituents. In some cases the phonological domain – prosodic root, or stem, or word – is a subportion of a word (see e.g. Booij 1984; Sproat 1986; Inkelas 1990; Booij & Lieber 1993, among many others), as in the following situations:

- Compounding: one prosodic domain vs. two
- Noncohering vs. cohering affixes
- Infixation to proots or pstems

The mismatch between morphological structure and word-internal prosodic structure is implicated in some bracketing paradoxes (e.g. Aronoff 1988; Cohn 1989), where phonology diagnoses a structure different from morphology.

There is also strong evidence that word-sized prosodic domains can include material outside of the morphological or lexical word, clitics being the most obvious example. It has been

widely argued that clitics are phonologically defective syntactic terminal elements, having to join with another (nonclictic) syntactic terminal element to form a single prosodic word (e.g. Inkelas 1990; Halpern 1992; Booij 1996).

Chapter 10. Paradigmatic effects

It has often been suggested that word formation and the phonological interpretation of words can be influenced not only by properties of the word in question, but also by other words. The main claim of this type that has been made is that morphology and phonology can conspire to avoid producing new word forms that are homophonous with some other word in the language (or paradigm). Recent claims of this sort are made by Crosswhite, among others. The issue for anti-homophony principles is that homophony is quite rampant in languages, perhaps even more rampant than sequences of identical morphs.

Conversely, it has also been suggested that the phonology conspires to keep the shared portions of morphologically related words phonologically identical (paradigm uniformity); the Base-Identity constraints of e.g. Kenstowicz 1996; Benua 1997 fall into this category. It is unclear whether Base-Identity is needed independently of cyclicity; most formulations of Base-Identity assume that it takes the place of cyclicity. The deciding cases are those in which two words crucially subject to Base-Identity intersect morphologically, so that neither is a subconstituent of the other (see e.g. Steriade 1999). Clear cases of this sort are not numerous, but research has only recently began to focus on them.

Chapter 11. Summary

Phonology-morphology interaction is very different from syntax-phonology interaction. It sheds light on word-internal structure and on the ability for relatively unnatural phonological alternations to be productive, at least within a given morphological niche. Morphophonological patterns are crucial for universalist theories of phonology, and must be taken seriously by morphologists and phonologists, especially those seeking to reduce all synchronic morphological patterns to syntax, or all synchronic phonological patterns to universal phonetic motivations.