

Li8: Morphology/Lent 2018

Wortschatz, Lautlehre, Formenlehre

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Morphological Interfaces

- ❖ Let us reconsider the basic contrast between *Formenlehre* ([inflectional] morphology), *Wortschatz* ('lexicon') and *Lautlehre* ('phonetics'), inherited from traditional (German) grammars.
- ❖ Consider first how to distinguish morphology from phonetics/phonology, if they are cued by the same discriminable contrasts.
- ❖ From a general perspective, if morphology and phonology operate with broadly the same (phonetic/gestural) substance, differences between these domains must concern distribution or function.
- ❖ (Implicit in the attempt to distinguish morphology from phonology is the assumption that a principled split is in fact possible.)

Morphological modularity?

- ❖ The attempt to demarcate the domain of morphology and define its interfaces to other domains implies a modular conception.
- ❖ The morphological domain is anchored in a hierarchy of levels.
- ❖ Each level is defined by simple units that are combined to form complex units that function as the simple units of the next level.
- ❖ The same operations apply to combine units at different levels.
- ❖ The contrastive features at each level are encapsulated in the units at that level, so that higher levels can refer to those units.
- ❖ The postulation of units — e.g., phonemes and morphemes — is justified by structural correspondences to other types of units.

Distinguishing morphological alternations and units

- ❖ Morphological alternations and units can perhaps be associated with a range of characteristic distributional and substantive traits:
- ❖ **Context:** morphological alternations arise in conditioning environments that do not refer only to phonetic properties.
 - ❖ But what about morphologically conditioned phonology?
- ❖ **Part-whole relations:** morphological units occupy a characteristic place in the progression from 'phone to utterance'.
 - ❖ But **are** morphological units composed of phonemes?
- ❖ **Dual articulation:** Morphological units arrange sub-meaningful units into larger units with a communicative function.
 - ❖ Do the smaller units encapsulate variation at that level?

Diagnostic conditioning environments?

- ❖ Variation in environments that 'condition' alternations provides one basis for distinguishing morphology from sound patterns:
- ❖ An alternation is not morphological if it can be characterized wholly in terms of phonetic or phonological properties:
 - ❖ If all vowels truncate at the end of a syllable or (prosodic) word, then the alternation is phonological;
 - ❖ But if vowels truncate only at the end of nouns (or at the end of a particular case form), then the alternation is morphological.

Final consonant loss in Maori (Oceanic)

Maori	Proto-Oceanic	Modern Austronesian	Gloss
rangi	*langit	langit (Tagalog)	'sky'
ika	*ikan	ikan (Ilocano)	'fish'
manu	*manuk	manok (Tagalog 'chicken')	'bird'
onu	*enem	enem (Malay)	'six'

Morphological truncation in Lardil (Hale 1967)

Stem	Nom Sg	Acc Sg	Gloss
yalulu	yalul	yalulun	'flame'
mayara	mayar	mayaran	'rainbow'
ɲaluk	ɲalu	ɲalukin	'story'
waɲalk	waɲal	waɲalkin	'boomerang'
wulunka	wulun	wulunkan	'fruit'
pulumunitami	pulumunita	pulumunitamin	'young female dugong'

Prosodically conditioned allomorphy in Ciyao (Ngunga 1987)

Allomorph 'selection' can be conditioned by phonological factors:

Stem	Singular	Plural	Gloss
pé	dii-pé	ma-dii-pé	'spear grass'
wú	dii-wu	ma-dii-wú	'ashes'
wííwi	di-wííwi	ma-wííwi	'chicken'
lámúsí	di-lámúsí	ma-lámúsí	'order'
pálásila	di-pálásila	ma-pálásila	'float'
púlúpúútwá	di-púlúpúútwá	ma-púlúpúútwá	'butterfly'

Morphologically conditioned phonological alternations ... Or morphologized residues?

- ❖ The distinction between morphological and phonological patterns also depends essentially on the **abstractness** of phonological (and morphological) analyses and the **persistence** of historical changes.

Level ordering or historical laxing in English?

Base	'Level 1' affix	'Level 2' affix	Order
párent	paréntal	párenthood	L1 Affix > Stress > L2 Afix
áctive	actívity	áctivist	

- ❖ **Phonological analysis:** Stress is assigned after the attachment of 'Level 1' affixes and before the attachment of 'Level 2' affixes.
- ❖ **Morphological analysis:** Forms with 'Level 1' affixes are frozen residues of a formerly productive phonological process (of 'trisyllabic laxing'); only 'Level 2' affixes are productive.

Stem allomorphy in English?

	w/Stem allomorph	Regular	w/Stem allomorph	Regular
Singular	knife	fife	man	van
Plural	knives	fifes	men	vans

- ❖ **Phonological analysis:** Stem alternations are defined by 'readjustment rules' triggered by lexical or class/number features.
- ❖ **Morphological analysis:** The alternating forms are frozen historical residues, which are again learned by speakers.

Stem allomorphy in French?

	1st	2nd	3rd
Singular	finis	finis	finis
Plural	fini ss on	fini ss ez	fini ss ent

- ❖ **Phonological analysis:** Stem alternations are defined by 'readjustment rules' triggered by lexical or class/number features.
- ❖ **Morphological analysis:** The alternating forms are frozen historical residues, which are again learned by speakers.

The nature of 'morphologization'

- ❖ The patterns above all have well-understood historical origins:
 - ❖ The stress shift in *párent~paréntal* reflects a process of trisyllabic shortening last active in Middle English (Lahiri & Fikkert 1999).
 - ❖ The voicing contrast in *knife~knives* reflects an intervocalic voicing process from earlier stages of English. Voiced fricatives like /v/ were then stranded when vocalic inflectional endings were lost.
 - ❖ The vowel contrast in *man~men* is the residue of a process of umlaut ('fronting'), originally triggered by the front vowel in the historical Germanic suffix *iz (Fortson 2010: 361).
 - ❖ The stem in the 1pl form *finissons* of French FINIR 'finish' derives from the Vulgar Latin inchoative *fini-sc-imus* (Rheinfelder 1967: 190)
- ❖ Do these historical processes persist in a restricted form in the modern languages, or do the languages merely preserve some residual outputs?

Diagnostic part-whole relations?

- ❖ Can morphological units be defined in terms of their place in a linguistic 'chain of being', between sound patterns and syntax?

From phonemic parts to morphemic wholes (Hockett 1961:29)

Each sentence consists of clauses, each clause consists of phrases, each phrase consists of words, **each word consists of morphemes and each morpheme consists of phonemes**. (Bloomer et al. 2004: 180)

The simplest and earliest assumption about the relation between morphemes and phonemes was that a morpheme is **composed of** phonemes: the morpheme *cat* is composed of the phonemes /k/, /æ/, and /t/ in that arrangement.

This put phonemes and morphemes in line with words, phrases, and sentences, since it was also assumed that a word consists of one or more morphemes (in a specified arrangement), a phrase of one or more words, and so on.

The Bloomfieldian extrapolation

This assumption is either explicit, or implicit but very close to the surface, in much of the early Prague discussion and in Bloomfield's postulates [Bloomfield (1926)].

The wording ... clearly implies that morphemes are composed of phonemes.

While Bloomfield does not say quite this, he does say ... that 'The morphemes of a language can thus be analyzed into a small number of meaningless phonemes.'

Problems of phonemic distinctiveness

- ❖ If morphemes are composed of phonemes, then it will turn out that **pairs like *knife~knives* share no morphemes**:
 - ❖ Singular *knife* consists of /naɪf/ (and possibly a singular 'Ø').
 - ❖ Plural *knives* consists of /naɪv/ and the plural /z/.
 - ❖ The /f/~v/ alternation cannot be treated as phonological, given productive pairs such as *fife~fifes* and *gaff~gaffs*.
- ❖ The common phonemic material, /naɪ/, is not a morpheme.
- ❖ (The pattern didn't raise difficulties for Bloomfield because he didn't assume that morphemes were composed of phonemes.)

Units as classes

- ❖ Precedents for (technical) solutions were near at hand:
- ❖ Hockett (1942) had formulated principles of phonemic analysis that treated **phonemes** (e.g. /z/) as abstract units, representing classes of **phones** (e.g. [z], [s]) with a non-contrastive distribution.
- ❖ Morphemic analysis could be established on exactly the same basis. A morpheme could be treated as an abstract unit, which represented classes of morphs with a non-contrastive distribution.
- ❖ Defining morphs as sequences of phonemes forged a more indirect link between morphemes and phonemes in a way that avoided the problems posed by morphologically conditioned allomorphy.
- ❖ The morpheme {KNIFE} would represent the two **allomorphs** /naɪf/ and /naɪv/, whereas {FIFE} would represent just /faɪf/.

Morphophonemic alternatives

- ❖ An alternative solution discussed by Harris (1942) and Hockett (1961) represents the final consonant in *knife~knives* by an alternating ‘morphophoneme’ /F/:

We therefore create a morphophonemic symbol, say /F/, which represents /v/ before /-z/ ‘plural’ and /f/ elsewhere, and say that there is but one English morpheme /najF/. (Harris 1942: 170)

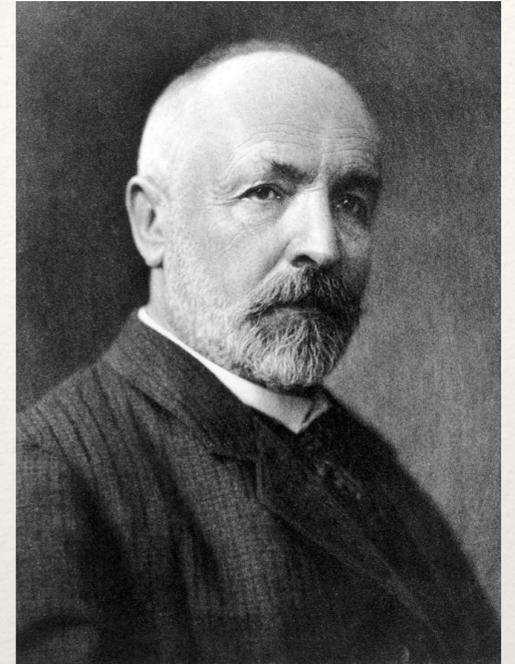
- ❖ Other alternatives include a “morphophonemic formula” that would ensure that “/f/ is replaced by /v/ before /-z/ ‘plural’ in the following morphemes — *knife, wife, ...*” (Harris 1942: 170).
- ❖ Although the specific mechanisms vary, all of these proposals have a common structure, in that **they introduce an abstract level mediating between morphemes and phonemes.**

Diagnostic properties?

- ❖ Can a morphological level be defined where sub-meaningful variants are assembled into units with a communicative function ?

Cantor's diagonalization argument

- ❖ In 1891, Georg Cantor (1845–1912) presented an ingenious 'diagonalization' proof that there were more real numbers than natural numbers.
- ❖ The argument begins with an enumeration of all sequences of binary digits (as in the table).
- ❖ The **complementary sequence** (at the bottom) is then constructed by substituting, for each sequence s_i , a **different** digit in position i .
- ❖ Thus the complement sequence differs from s_1 at position 1, from s_2 in position 2, etc., for all s_i .
- ❖ It therefore follows that the complement sequence cannot occur in the original enumeration.



s_1	=	0	0	0	0	0	0	0	0	0	0	...
s_2	=	1	1	1	1	1	1	1	1	1	1	...
s_3	=	0	1	0	1	0	1	0	1	0	1	...
s_4	=	1	0	1	0	1	0	1	0	1	0	...
s_5	=	1	1	0	1	0	1	1	0	1	0	...
s_6	=	0	0	1	1	0	1	1	0	1	1	...
s_7	=	1	0	0	0	1	0	0	1	0	0	...
s_8	=	0	0	1	1	0	0	1	1	0	0	...
s_9	=	1	1	0	0	1	1	0	0	1	1	...
s_{10}	=	1	1	0	1	1	1	0	0	1	0	...
s_{11}	=	1	1	0	1	0	1	0	0	1	0	...
\vdots		\vdots	\ddots									

$s = 10111010011\dots$

Flying under the phonemic radar?

- ❖ Careful acoustic and psychoacoustic studies of units ranging in size from words to single-segment affixes have shown that **speakers consistently produce and comprehend durational differences and other phonetic variation that do not determine phonemic contrasts:**
- ❖ At the word level, Gahl (2008) found systematic differences in duration between homophones such as English *time* and *thyme*.
- ❖ Drager (2011) reported variation for *like* in its different functions.
- ❖ At the segment level, Plag et al. (2015) found “significant differences in acoustic duration between some morphemic /s/’s and /z/’s and non-morphemic /s/ and /z/, respectively”.

Phonemic diagonalization?

- ❖ The literature on 'sub-phonemic' contrasts is often interpreted conservatively, as establishing that there is no true homonymy.
- ❖ Yet this literature can also be seen as 'empirical diagonalization'.
- ❖ That is, the elements of an phonemicization of a sound system will exhibit sub-contrastive variation that speakers can discriminate.
- ❖ This suggests that phonemicization provides a discrete description of continuous variation (as orthographic systems do), but doesn't encapsulate the discriminable contrasts of the sound system.
- ❖ Hence morphological analyses cannot operate with phonemic descriptions, or assume that morphologically-relevant properties will be represented in the phonologically contrastive oppositions.

The function of discriminable sub-phonemic contrasts?

- ❖ Even where segmentation is possible and segments and properties can be associated, an analysis may obscure variation that speakers are sensitive to:
- ❖ Davis et al. (2002) found differences in duration and fundamental frequency between words like *captain* and the morphologically unrelated onset *cap*.
- ❖ Baayen et al. (2003) found that speakers produced Dutch nouns with a longer mean duration when they occurred as singulars than as when they occurred as the stem of the corresponding plural.
- ❖ Kemps et al. (2005) tested speakers' sensitivity to prosodic differences, and concluded that "acoustic differences exist between uninflected and inflected forms and that listeners are sensitive to them" (Kemps et al. 2005: 441).

Opportunistic variation

- ❖ From the perspective of a Dutch speaker, singular forms like *rat* 'rat' and *geit* 'goat' **do not recur** in the corresponding plurals *ratten* 'rats' and *geiten* 'goats' but instead have a distinctive prosodic profile that speakers are sensitive to.
- ❖ A form like *geiten* can be segmented into a stem *geit* and suffix *-en*, with the stem assigned lexical properties and the suffix assigned grammatical properties.
- ❖ However, it is an error to identify the plural stem *geit* with the singular form *geit* or to associate plurality solely with the suffix *-en*: the split between *geit* and *-en* does not correlate with a division in meaning between 'caprine' and 'plurality'.
- ❖ Instead, the plural stem is tuned to its morphological environment. From a discriminative learning perspective, this suggests that the function of the affix is not characterizable just in terms of the grammatical meaning that it conveys but also involves the 'stem-tuning' context it provides for learners.

When is “an identical feature” identical?

- ❖ In summarizing experiments that tested speaker sensitivity to differences between the phonemically ‘same’ form, in isolation and as the stem for a plural form, Kemps et al. (2005) conclude:

*The prosodic mismatch effect documented in this study has important consequences for our understanding of the morphological structure of complex words. The way words are written in languages such as Dutch and English suggests that they consist of stems and affixes that are strung together as beads on a string. Phonemic transcriptions convey the same impression. Our experiments show that this impression is wrong. **Plurals are not just singulars with an additional suffix. The precise acoustic realization of the stem provides crucial information to the listener about the morphological context in which the stem appears.***

(Kemps et al. 2005: 441)