MORPHOLOGY-PHONOLOGY INTERFACE

GROUP 5
CONTENT

- INTRODUCTION
- INTERFACE
- INTERFACE PRINCIPLES
- ALLOMORPHY AND AFFIX COMPETITION
- CYCLICITY AND CO-PHONOLOGIES
- THE MORPHOLOGICAL USE OF PHONOLOGY
- SUMMARY
INTRODUCTION

• Today’s presentation seeks to explain the interaction that takes place between morphology and phonology or how morphology and phonology interrelate.
INTERFACE

• This notion refers to the ways in which properties of one kind of structure (morphological or phonological) relate to those of another structure.

• For example, the phonological structure of a word can influence the selection of an affix that can be attached to that particular word.
The English suffix -al, for instance, can only be attached to verbs that end in a stressed syllable:

- arríve—arrival
- recíte—recital
- chátter—*chatter-al

Accent=stress
These kinds of interaction between morphology and phonology show that there must be an interface between the morphological and the phonological properties of words.
INTERFACE

• Interface means that different kinds of information about linguistic constructs i.e. words can influence each other. In order to fully understand the notion of interface in the domain of morphology, information on the words in a language need to be provided by the grammar.
A word has a three-tier structure called the **tripartite parallel structure**. This is made up of the phonological form, the morphological form and the meaning.

The English word *baker* for example can be structured as such:

Ba.ker – [bei.kƏ](Phonological)
Bak.er (Morphological)
‘bak-’ bakes ‘-er’ one who (Meaning)
• The –er in baker is a **cohering suffix** which means that it forms one domain of syllabification with the stem to which it has been attached as opposed to non-cohering suffixes which form their own domain of syllabification.

*help.less*

• -less-Non cohering suffix.
Interface Principles

• Morphological structure may affect the computation of phonological forms. Hence, the internal morphological structure of words must be accessible to phonology.

• There are many examples from different languages where instances of interface between morphology and phonology are seen.
Interface Principles

• We will be looking at some examples from Dutch in the formation of complex words.

• Using phonological derivation to compute the phonetic forms of words, three steps are involved in the formation of complex words in Dutch.
Interface Principles

**Step 1**: Attaching the string of segments of the plural suffix to the stem which is a morphological operation.

**Step 2**: Computation of the prosodic structure of a word in particular the way in which a word is syllabified.

**Step 3**: Scanning of the singular and plural forms as to the applicability of phonological rules or constraints.

Step 2 and 3 are phonological operations.
The three steps are illustrated here for the singular and plural forms of the word *hoed* “hat” ($\sigma$= syllable):

Step 1; morphology      hud  hud-en
Step 2; syllabification  (hud)$_\sigma$  (hu)$_\sigma$. (den)$_\sigma$
Step 3: syllable final devoicing  (hut)$_\sigma$
   (not applicable).

Plural nouns in Dutch are formed by adding the suffix –en to the stem of the noun.
• In this example we see that the lexical morpheme ‘hud’ has two different shapes [hud] and [hut]. The variation is basically governed by a phonological constraint of Dutch. Allomorphy is thus a predictable effect of the phonology of Dutch.

• The word [huden] consists of five(5) segments which are structured in two ways; the phonological and morphological structure.
This illustrates a general point concerning the interface between morphology and phonology. That is, the potential asymmetry between morphological and phonological structures.
Interface Principles

• The phonological structure is where we have the main idea that sounds of a word are arranged in higher units.

• Sound segments combine into syllables (σ), syllables into feet (F), and finally feet into phonological words (ω).

• The word [huden], is a foot consisting of two syllables of which the first is the head and carries stress. That is,[‘hu.den]
Interface Principles

- fig. 1.0

```
N
/    /
N_{stem} Suffix
/    /
hydro
/    /
F
/\  /
ω
```

- morphological structure
- phonological structure
Interface Principles

• The morphological structure is composed of the stem ‘hoed’ and the suffix ‘-en’.

• This hierarchical organization of a word’s segment is also known as **prosodic structure**.

• Therefore, instead of the term ‘phonological word’ the term **prosodic word** may be used.
Interface Principles - Asymmetry

• There seem to be no interaction between morphology and phonology in Fig. 1.0 but it illustrates the asymmetry of phonological and morphological structure with respect to the /d/

• Morphologically /d/ forms a unit with the preceding sounds and phonologically, it combines with the following sounds.
Interface Principles- Optimality Theory

• Optimality theory serves as an alternative to the above phonological derivation form in computing phonetic forms.

• In the example of *hoeden*, there are three relevant constraints;

• **FinDevoicing**: demands that obstruents are voiceless in syllable-final position.
Interface Principles- Optimality Theory

- **Faithfulness**- the phonetic realization of a word or morpheme should be identical to its underlying form, and not deviate from that underlying form

- **No Empty Onset**- syllables should begin with a consonant
# Interface Principles- Optimality Theory

<table>
<thead>
<tr>
<th>/hud/</th>
<th>NO EMPTY ONSET</th>
<th>FINDEVOICING</th>
<th>FAITHFULNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>((hud)_{\sigma})</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>((hut)_{\sigma})</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>/hud-\epsilon/</td>
<td>NO EMPTY ONSET</td>
<td>FINDEVOICING</td>
<td>FAITHFULNESS</td>
</tr>
<tr>
<td>((hu)<em>{\sigma}(d\epsilon)</em>{\sigma})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>((hu)<em>{\sigma}(t\epsilon)</em>{\sigma})</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>((hud)<em>{\sigma}(\epsilon)</em>{\sigma})</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interface Principles- Optimality Theory

• The existence of allomorphy shows that constraints can be violated.
• Asymmetry in optimality theory can be expressed by alignment constraint.
• The edges of the stems should be aligned with the edges of phonological constituents such as the syllable.
Interface Principles- Optimality Theory

• There are two alignment constraints involved; alignment left and alignment right which require that the left and right morphological stem boundaries are aligned with the phonological constituents boundaries.

• Alignment Right is violated in the case of hoeden because of a higher ranked constraint; No Empty Onset Constraint
Interface Principles- Optimality Theory

• If Alignment Right is ranked higher than No Empty Onset constraint, *hoeden* will be syllabified as *hoed.en* giving it a wrong phonetic form [hut.ən].

• Ranking of No Empty Onset constraint is specific to the interface between morphology and phonology in the grammar of Dutch.

• Therefore;

  ALIGNMENT LEFT >> NO EMPTY ONSET >> ALIGNMENT RIGHT
Interface Principles- Syllabification

• The morphological structure of compounds plays an essential role in the computation of the phonetic forms of words with respect to both syllabification and stress.

• Consider these examples,
  
    (bal)σ(kan)σ(ker)σ
  
  • [[balk]N[anker]N]N “beam brace”
    (balk)σ(an)σ(ker)σ
Interface Principles- Syllabification

• The difference between the two compounds is their different syllabification patterns, where, morphological structure influences the syllabification of compounds.

• Since the phonological word is the domain of syllabification, we will get the result that in a compound the edges of its constituents coincide with phonological word boundaries.
Interface Principles- Syllabification

• There necessity to distinguish words in the morphological sense and phonological words is a clear illustration of the asymmetry between phonology and morphology.

• A morphological word may correspond with more than one phonological word. In many languages this is the case for compounds, syllabification patterns are one type of evidence for this.
Interface Principles- Vowel Harmony

• The domain of application of phonological rules or constraints is another source of evidence for the prosodic structure of complex words. In the case of Hungarian compounds, **vowel harmony** serves to determine their prosodic structure.

• In Hungarian, the vowels of a word are all either front vowels or back vowels.
Interface Principles- Vowel Harmony

• Vowel harmony implies that many suffixes have two allomorphs, one with a front, and one with a back vowel, as illustrated by the following words (Siptár and Törkenczy 2000: 63):

b. perd-ül-és-etek-től “from your (PL) twirling around” ford-ul-ás-otok-tól “from your (PL) turning around”
There are four different suffixes. Each of them has two allomorphs, one with a front vowel, and one with a back vowel. The difference is that the two roots of these words have a front vowel /e/ and a back vowel /o/ respectively.

(The acute accents on the vowel letters of Hungarian orthography indicate length.)
Interface Principles - Vowel Harmony

• The name Budapest for the capital of Hungary is a compound in which the names of the two cities Buda and Pest have been combined.

• It seems to violate the phonological constraint of vowel harmony because the first two vowels are back, and the last one is a front one.
Interface Principles- Vowel Harmony

• However, there is no violation under the assumption that the domain of vowel harmony is the phonological word, not the word in the morphological sense.

• The distinction between cohering and non-cohering suffixes is relevant for the distribution of syllables.
Interface Principles- Vowel Harmony

• We thus see here another instantiation of the asymmetry between morphological and phonological structure that we discussed above.
• Here are the two relevant structures for *Budapestnek*:

  prosodic structure: (buda) (pestnek)
Interface Principles- Vowel Harmony

• The correct dative suffix is -$nek$, since the dative suffix is a cohering suffix, and hence forms one phonological word with the preceding material.

• The vowels within each of the phonological word are harmonic.

• In the first phonological word all vowels are front, in the second one they are all back.
Allomorphy and Affix Competition

- An allomorph is a variation in the phonological shape of a morpheme which may or not be an effect of phonology.
- This usually happens to the case in languages with morphological systems having more than one stem-form and each stem-form has to be used for specific inflectional categories.
- Allomorphy may also be a completely predictable effect of phonology, as shown in the previous section for the allomorphy related to final devoicing in Dutch.
Allomorphy and Affix Competition cont’d

• Sometimes, the phonological alternations are regular too, but apply to restricted set of words only.

• For example, the Dutch diminutive suffix has five (5) allomorphs, whose distribution is predictable (the letter ‘e’ stands for a schwa (ə), and ‘ng’ indicates the velar nasal (ŋ):
Allomorphy and Affix Competition cont’d

• a. -je after stem-final obstruents; lip “lip” lip-je
• b. -etje after sonorant consonants preceded by a short vowel with primary or secondary stress; ring “ring” ring-etje
• c. -pje after stem-final /m/ except in cases falling under b; riem “belt” riem-pje
• d. -kje after stems ending in the velar nasal /ŋ/; kóning “king” konin-kje
• e. -tje elsewhere
• These rules apply only to diminutive nouns.
Allomorphy and Affix Competition cont’d

- Example, the Dutch complex word *stil-te* “silence” is not realized as *[stiləte]*.

- Thus, these rules must mention the morphological property [+ diminutive] in the description of their structure. This means they are **morphologically conditioned** phonological rules.

- In other cases, the rule applies to a fixed set of lexical items. That is, the alternation is lexically conditioned.
Allomorphy and Affix Competition cont’d

• For instance, it applies to a number of monosyllabic Dutch nouns: in the plural form (and some derived words) the stem vowel is lengthened. (Open Syllable Lengthened)

• Example;

• Singular          Plural
  d[ɑ]g “day”          d[aː]gen
  h[ɔ]f “court”        h[oː]ven
  w[ɛ]g “road”         w[eː]gen
Allomorphy and Affix Competition cont’d

• It might also be the case that a rule is governed both by morphological and by lexical features, as is the case for German umlaut.

• This is where back vowels of stems are fronted before certain suffixes that have front vowels or glides

• *Umlaut*  
  *No umlaut*

• Vater “father”—Väter-chen (dim)  
  Onkel “uncle”-Onkel-chen (dim)
Allomorphy and Affix Competition cont’d

• Dutch has two counterparts to the English deverbal and denominal suffix ‘-er’. They are –er and –aar.

• The two affixes look like allomorphs in the sense that they are phonologically identical.

• However, it is impossible to assign them a common underlying form from which we can derive the surface forms through morphological rules or constraints.
• This is because, there is no general phonological constraint for Dutch that vowels in word-final unstressed syllables must be reduced to schwa. Hence, -er cannot be derived phonologically from -aar.

• So, the basis for choosing between the suffixes -er and -aar is the following:
  – -aar is used after a stem ending in an unstressed syllable, with /l/, /r/, or /n/
  – -er is used elsewhere  Example:
    bedel /beːdɛl/ “to beg” bedel-aar /beːdəlaːr/ “begger”
    bak /bɛk/ “to bake” bakk-er /bɛkər/ “baker”
Allomorphy and Affix Competition cont’d

• Therefore, the two affix end up competing, hence, they are seen as competing affixes: different affixes with the same meaning and domain of application.

• In conclusion, even if allomorphs cannot be derived from a common underlying form, it is nevertheless possible to make phonological generalizations concerning their distribution
Cyclicity and Co-phonologies

• In many languages, the stress patterns of complex words are at least partially determined by the morphological structure.

• Examples of such an interface between morphology and phonology are found in Germanic languages.

• A typical example in English is the compound word ‘sugar cookie’ which has its primary stress on the first syllable, and secondary stress on its penultimate syllable ‘súgar çòokie’
Cyclicality and Co-phonologies

• This stress pattern can be computed as follows:
  – First, we assign stress to each constituent. Both words have penultimate stress.
  – Second step is to determine which of these stress is prominent.
Cyclicity and Co-phonologies

• A traditional way of formalizing this type of computation is to assume that phonological rules of stress assignment apply cyclically in an outward fashion where one begins with the smallest constituents.

\[
\begin{array}{ccc}
\text{[[Sugar]}} & \text{[Cookie]} \\
\text{1st cycle. Main Stress Rule} & 1 & 1 \\
\text{2nd cycle. Compound Stress Rule} & 1 & 2
\end{array}
\]

• On the first cycle, the main stress rule of English stress to one of the vowels of each constituent.
Cyclicity and Co-phonologies

- On the second cycle, the compound stress rules reassigns primary stress to the first primary stressed vowel and causing all other stresses to be automatically lowered by one degree.

- In contrast to traditional analysis, stress is considered nowadays as a property of prosodic constituent.
Cyclicity and Co-phonologies

- First we map morphological structure on stress patterns onto prosodic structure and the prosodic constituents are marked for stress.
- One way of doing this is to use labels “strong” (S) and “weak” (W)
Cyclicity and Co-phonologies

• The prosodic structure of sugar cookie

\[ \omega_s \]
\[ F \]
\[ \sigma_s \quad \sigma_w \]
\[ su \quad gar \]

\[ \omega_w \]
\[ F \]
\[ \sigma_s \quad \sigma_w \]
\[ coo \quad kie \]
Cyclicity and Co-phonologies

• Strong – Weak is a relationship between two sister constituents. One of them is the head of a prosodic category such as foot.

• The first syllable of sugar cookie is the strongest syllable of the strongest phonological word, and hence it carries the primary stress of this compound. The strongest syllable of the weak phonological word, coo, has secondary stress.
Cyclicity and Co-phonologies

• The interface between morphology and phonology for English is covered by the following two mapping principles:
  • (i) each constituent of a compound corresponds with a phonological word;
  • (ii) in the case of N + N compounds, the first phonological word is the strongest.
Cyclicality and Co-phonologies

• Another aspect of the role of morphological structure in the computation of the phonetic forms of complex word is the phenomenon of *co-phonologies*.

• The morphological system of a language may consist of more than one stratum. Each stratum may have its own phonological system, that is, its own co-phonology.

• In Germanic languages, for instance, words that end in non-native suffixes are stressed in the same way as simplex words. Hence, they might carry the main stress of the word.
Cyclicality and Co-phonologies

• Suffixes of Germanic origin, on the other hand, are mostly stress-neutral: the addition of such a suffix does not shift the location of main stress rightward.

  This is illustrated here

• Non-native suffixation, stress on last syllable:

  brygg-eri “brewery”

  individual-itet “individuality”, dans-ör “dancer” or on penultimate syllable: prost-inna “dean’s wife”;
Cyclicality and Co-phonologies

- Native suffixation, stress on first syllable:
  - sök-ande “search”  bo-ende “living”,
  - läs-ning “reading”  bak-else “pastry”

Swedish

- These examples once more show that phonology makes use of morphological information concerning words.
The Morphological Use of Phonology

• Morphology makes use of phonology in natural languages. Example is when a particular affix is conditioned phonologically.

• The English suffix –er can be attached to monosyllabic adjectival stems and to disyllabic ending in a light syllable with few exceptions.

• green greener
  silly sillier
  obese *obeser / more obese
  excellent *excellenter / more excellent
Another morphological use of phonology is seen in the case of reduplication where in Latin especially, a part of the base of the word is copied.

Example:

<table>
<thead>
<tr>
<th>Base</th>
<th>Perfect stem</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>curr-</td>
<td>cu-curr-</td>
<td>run</td>
</tr>
<tr>
<td>dic-</td>
<td>di-dic-</td>
<td>learn</td>
</tr>
</tbody>
</table>

The sound segments of the base are linked to the CV structure where this CV sequence has a morphological function of its own.

Other languages have different ways of reduplicating affixes.
The Morphological Use of Phonology

• In Ilokano, a language of the Philippines, the reduplicative affix of this language can not be specified as “copy the first syllable” but has to be specified in terms of constant abstract phonological shape.

• For example; kaldi- “goat” and kal-kaldi – “goats”
  Púsa- “cat” and pus-púsa – “cats”
The Morphological Use of Phonology

- In this case the reduplicative affix has to be specified as a heavy (or bimoraic) syllable that is a syllable that either ends in a consonant or has a long vowel. In Latin, the reduplicative prefix can be defined as a light syllable.

- Reduplication also occurs with minimal prosodic words. A minimal prosodic word of a language is often a disyllabic foot.
The Morphological Use of Phonology

• Concerning reduplication in these languages, the reduplicant consists of two syllables where these two syllables are copied from the base of the word. *For example: kanku-kanku – “boy” and t’ilpa-t’ilparku-“bird species”.*

• In the second example, it can be seen that the last consonant of the second syllable was not copied. This is because we have the case of an open syllable which is thus unmarked and preferred as compared to the first syllable which is a closed syllable and therefore marked.
The Morphological Use of Phonology

- The morphological use of the prosodic category “minimal prosodic word” is also found in the formation of hypocoristics (endearment forms of proper names) through truncation.

Example

<table>
<thead>
<tr>
<th>Language</th>
<th>Name</th>
<th>Hypocoristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish</td>
<td>Alexandrina</td>
<td>Dina</td>
</tr>
<tr>
<td></td>
<td>Ernesto</td>
<td>Neto</td>
</tr>
<tr>
<td>French</td>
<td>Dominique</td>
<td>Dom</td>
</tr>
<tr>
<td></td>
<td>Valerie</td>
<td>Val</td>
</tr>
<tr>
<td>English</td>
<td>Elizabeth</td>
<td>Liz/Lizzy</td>
</tr>
</tbody>
</table>
The Morphological Use of Phonology

- Lastly, the use of tonal morphemes is also active in the use of phonology in morphology. The tones are used to signal a particular morphological category.

An Example can be seen in the Limburgian dialect of Maasbracht (The Netherlands).

<table>
<thead>
<tr>
<th>Neuter, HLH</th>
<th>Feminine, HL</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiis</td>
<td>Wiis</td>
<td>Wise</td>
</tr>
<tr>
<td>Stiif</td>
<td>Stiif</td>
<td>Stiff</td>
</tr>
</tbody>
</table>
Summary

• In Conclusion:
• Morphological structure appeared to influence the phonetic forms of complex forms through principles of alignment that require phonological boundaries to coincide with morphological ones.
• A second form of interaction is the choice between stem allomorphs or competing affixes. This choice may be governed by considerations of phonological optimality.
Summary

• The non-isomorphy between prosodic structure and morphological structure is also the key to the understanding of the phonological similarities between affixes and clitics.

• Morphology makes use of phonology in a number of ways. Morphological operations may impose phonological constraints on the stems they operate upon. Phonological processes such as copying and truncation have morphological functions.