

Class 10: The cycle, part I

To do

- Kiparsky 2000 study questions (for Thursday)
- Bibliographic exercise (for Thursday)
- Chamorro assignment (due Tuesday)

Overview: How are phonological rules ordered with respect to morphological operations? Or can we get the same interactions without ordering?

1. SPE: the transformational cycle

“We assume as a general principle that the phonological rules first apply to the maximal strings that contain no [syntactic] brackets, and that after all relevant rules have applied, the innermost brackets are erased; the rules then reapply to maximal strings containing no brackets, and again innermost brackets are erased after this application; and so on, until the maximal domain of phonological processes is reached.” (p. 15)

Classic example: Palestinian Arabic (data originally from Brame—was discussed in K&K)

Verbs without objects (the extra spacing is just for legibility of *fí* sequences)

<i>subject</i>	<i>‘study’</i>	<i>‘understand’</i>
2sg. masc.	da.rás+t	fhím+t
2sg. fem.	da.rás.+ti	fhím.+ti
3sg. masc.	dá.ras	fí.him
3sg. fem.	dá.ra.s+at	fíh.m+at
1pl.	da.rás.+na	fhím.+na
2pl.	da.rás.+tu	fhím.+tu
3pl.	dá.ra.s+u	fíh.m+u

- What’s the stress rule for this language, based on the ‘study’ paradigm?
- Give a rule for the V-∅ alternations.
- Determine the ordering of the two rules.

Verbs with objects

<i>object</i>	<i>‘he understood X’</i>	<i>‘she understood X’</i>	<i>‘You (masc.) understood X’</i>
1sg.	fi.hím.+ni	fi.h.m+át.+ni	fhím+t.+ni
2sg. masc.	fíh.m+ak	fíh.m+a.t+ak	fhím+.t+ak
2sg. fem.	fíh.m+ik	fíh.m+a.t+ik	fhím+.t+ik
3sg. masc.	fíh.m+u	fíh.m+a.t+u	fhím+.t+u
3sg. fem.	fi.hím.+ha	fi.h.m+át.+ha	fhím+t.+ha
1pl.	fi.hím.+na	fi.h.m+át.+na	fhím+t.+na
2pl.	fi.hím.+kum	fi.h.m+át.+kum	fhím+t.+kum
3pl.	fi.hím.+hum	fi.h.m+át.+hum	fhím+t.+hum

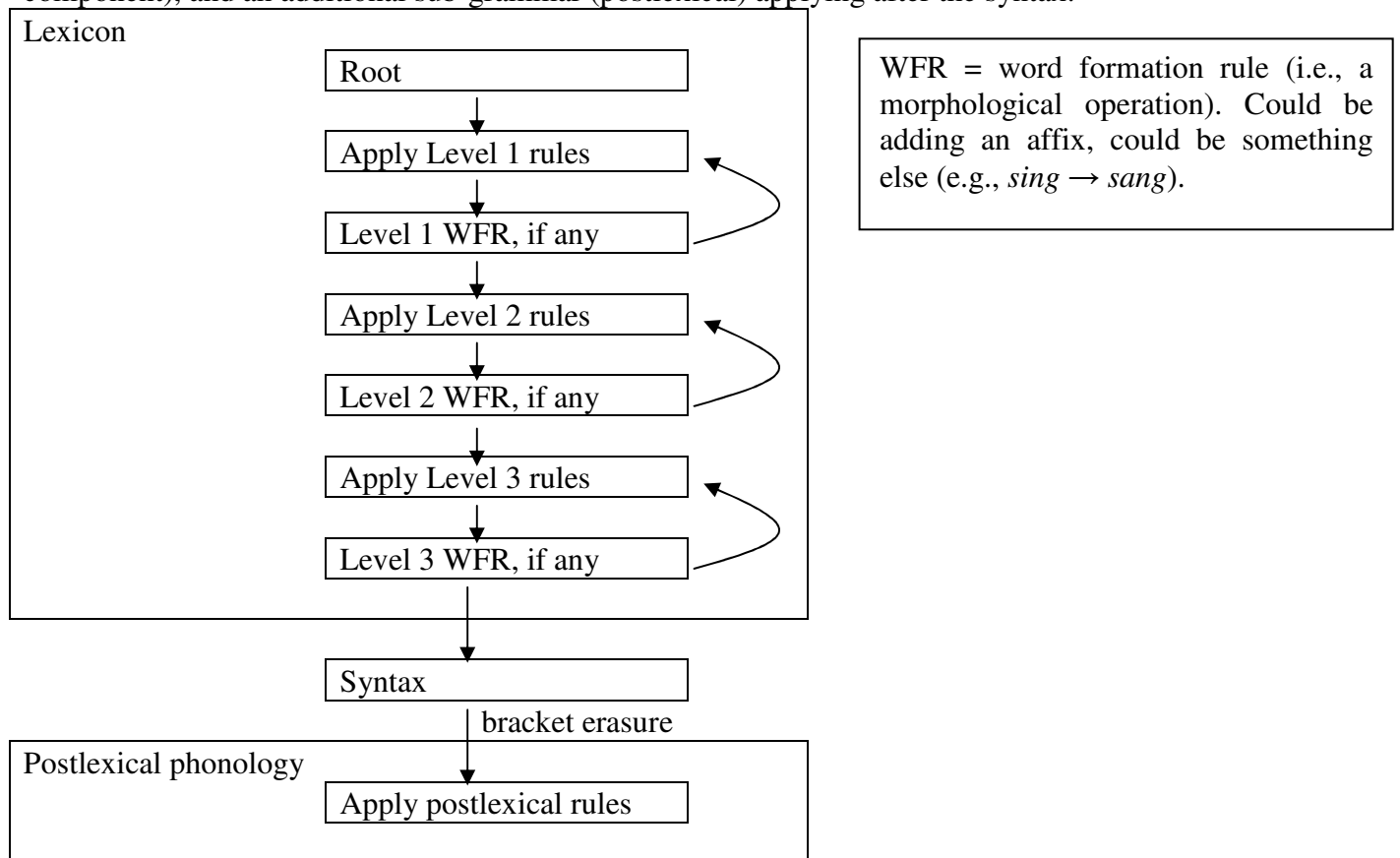
- Step through the derivations of the following forms, using the convention from SPE given above—we're assuming that the verb and subject suffix are bracketed together:

[fihim+Ø] [fihim+na] [[fihim+Ø]+na] [[fihim+Ø]+ak] [[fihim+at]+ni] [[fihim+at]+ak] [[fihim+t]+ni]
 V he V we V he us V he you V she me V she you V you me

- Which forms would be different if we did all the morphology first and then applied the phonological rules?

2. Lexical phonology

Kiparsky argues that this is not enough (see Pesetsky 1979 for an earlier proposal along the same lines). Different sub-grammars apply at different levels of morphology (in the lexical component), and an additional sub-grammar (postlexical) applying after the syntax.



(Should the root really pass through the Level 1 rules first thing or go straight to WFR? Not clear.)

3. Properties of the lexical component: cyclicity

Within each level, the phonological rules apply after each morphological operation (thus the loops in the picture above).

Evidence/examples

- WFRs can be sensitive to derived phonological properties: e.g. English *-ize*, which doesn't apply to stems with final stress. Kiparsky's interpretation of the *-ize* case is that stress rules apply to the stem on the previous cycle.

Internal brackets are erased after each level, so WFRs and phonological rules don't have access to morphological information from the previous level. Postlexical rules don't have access to any bracketing.

Evidence/examples

- Postlexical rules are automatic in the sense that they don't admit of lexical exceptions, and don't care about morphological information. (Or at least that is the strong version of the claim! It may not be 100% true...)

4. Properties of the lexical component: strict cycle condition

The idea was to allow lexical rules (at least those that change feature values, rather than filling in underspecified ones) to apply only to environments newly made, by either a morphological operation or a phonological rule *in the same cycle*. This phenomenon is known as **non-derived environment blocking (NDEB)**.

Lexical phonology's attempts to deal with NDEB were always kind of a mess, and I don't think we've done much better since then, so rather than go through the details of the proposals, I'd rather just give two classic examples, from Kiparsky, and review his 1982 proposal, so that you have an idea of what the problem is.

Finnish

Ignore various other rules: vowel harmony, degemination, a~o...

<i>to X</i>	<i>Let him/her X!</i>	<i>'active instructive infinitive II'</i>	<i>she/he was Xing</i>	
halut+a	halut+koon	halut+en	halus+i	'want'
noet+a	noet+koon	noet+en	nokes+i	'smudge (?)'
piet+æ	piet+køøn	piet+en	pikes+i	'pitch'
filmat+a	filmat+koon	filmat+en	filmas+i	'film'
cf.				
oll+a	ol+koon	oll+en	ol+i	'be'
aja+a	aja+koon	aja+en	ajo+i	'go'
puhu+a	puhu+koon	puhu+en	puhu+i	'speak'

- So $t \rightarrow s / _ i$. Can we modify the rule to deal with these monomorphemic cases?

tila	'room'	lahti	'Lahti'	cf.	
æiti	'mother'	mæti	'roe'	paasi	'boulder'
silti	'however'	limonaati	'lemonade'	sinæ	'you (sg.)'
valtion	'public'			kuusi	'six'

- Another rule is needed to account for this vowel alternation:

joke+na	'river' essive sg.	joki	'river' nom. sg.
mæke+næ	'river' essive sg.	mæki	'hill' nom. sg.
æiti+næ	'mother' essive sg.	æiti	'mother' nom. sg.
kahvi+na	'coffee' essive sg.	kahvi	'coffee' nom. sg.

- How should the two rules be ordered, given these data? (ignore h~k alternation)

vete+næ	'water' essive sg.	vesi	'water' nom. sg.
kæte+næ	'hand' essive sg.	kæsi	'hand' nom. sg.
yhte+næ	'one' essive sg.	yksi	'one' nom. sg.

- What's the problem in *vesi*?

Sanskrit "ruki"

$s \rightarrow \text{ʃ} / \{r, u, k, i\} _$

da+da+si	'you give'	bi+bhar+ʃi	'you carry'
kram+ʃja+ti	'he will go'	vak+ʃja+ti	'he will say'

Aside: Venneman 1972 proposes that this is because the coarticulations that *r, u, k, i* impose on a following [s] are acoustically similar (though articulatorily diverse). [r] is apparently retroflex, so it would induce retroflexion; [u] would induce rounding; [k] would induce palatalization (because of back tongue position), and so would [i], as it does in many languages. All of these changes (to [ʃ], [s^w], and [ʃ]) would cause the fricative noise of [s] to lower in frequency, because the resonant cavity in front of the constriction becomes bigger. It would therefore be difficult to maintain a contrast between [s] and [ʃ] in the post-*ruki* environment.

- How is this like Finnish:

bisa	'lotus'
busa	'mist'
barsa	'tip'

<i>ablaut</i>	sa:s	'instruct'	/sas+ta/ → sista → [siʃ+{a}]	participle
<i>V-deletion</i>	ghas	'eat'	/ga+ghas+anti/ → dʒa+ ks +anti → [dʒa+ kʃ +anti]	3 pl.

Most other cases of NDEB I've seen require feeding by a morphological operation only (rather than morphological or phonological), so these classics may not be representative.

- Recall Malagasy example: búhu 'carry on back' but /babu+u/ → [babúí] (u → i / uC₀+ __)

5. Aside on strict cyclicity: counterfeeding

Polish (originally from Rubach): $\left[\begin{array}{l} +\text{cor} \\ +\text{strid} \end{array} \right] \rightarrow \text{ç} / _ \left[\begin{array}{l} +\text{syll} \\ -\text{back} \\ +\text{high} \end{array} \right]$ (in nouns) "nominal strident palatalization"

kapelu[s]	'hat'	kapelu[ç]+ik	'little hat'	kapelu[ç]+ik+o	'big hat'
gro[s]	(monetary unit)	gro[ç]+ik	'little grosz'	gro[ç]+iw+o	'big grosz'

$\{k, g, x\} \rightarrow \left[\begin{array}{l} -\text{high} \\ +\text{cor} \\ +\text{strid} \end{array} \right] / _ \left[\begin{array}{l} -\text{cons} \\ -\text{back} \end{array} \right]$ "first velar palatalization"

krzy[k]	'a shout'	krzy[\widehat{tj}]+e+ć	'to shout'		
stra[x]	'fear'	stra[\widehat{j}]+y+ć	'to frighten'		
miaz[g]+a	'squash'	miaż[$\widehat{d\zeta}$]+y+c	'to squash'	miaż[$\widehat{d\zeta}$]+ę	'I squash'

- What's the order of the rules (assuming the rules are correct)?

gma[x]	'building'	gma[\widehat{j}]+ysk+o	'big building'	kapelu[ç]+ik+o	'big hat'
		* gma[ç]+ysk+o			

- If both rules are cyclic (Rubach argues that they are), what prevents *gma[ç]+ysk+o?

6. Kiparsky's (1982) solution

Kiparsky has a nice alternative: assume that every lexical item is really a specific rule, such as $\emptyset \rightarrow \text{tila}$.

- What does the Elsewhere Condition say should happen to this sequence of adjacently ordered rules?

$\emptyset \rightarrow \text{tila}$
 $t \rightarrow s / _ i$

7. Application to Icelandic (from Kiparsky 1984)

u-epenthesis

dag+ur	‘day <i>m.nom.sg.</i> ’	bæ+r	‘farm <i>m.nom.sg.</i> ’
tek+ur	‘take <i>2/3sg.pres.ind.</i> ’	næ+r(ð)	‘reach <i>2/3sg.pres.ind.</i> ’

- How should *u-epenthesis* be ordered with respect to *j-deletion*:

bylj+ar	‘snowstorm <i>gen.sg.</i> ’	krefj+i	‘request <i>2pl.</i> ’
bylj+ir	‘snowstorm <i>nom.pl.</i> ’	krefj+a	‘request <i>3pl.</i> ’
bylj+i	‘snowstorm <i>acc.pl.</i> ’	krefj+um	‘request <i>1pl.</i> ’
bylj+a	‘snowstorm <i>dat.pl.</i> ’	kref	‘request <i>1sg.</i> ’
bylj+um	‘snowstorm <i>dat.pl.</i> ’	kref+ur	‘request <i>2/3sg.</i> ’
byl	‘snowstorm <i>acc.sg.</i> ’		
byl+s	‘snowstorm <i>gen.sg.</i> ’		
byl+ur	‘snowstrom <i>nom.sg.</i> ’		

In order to prevent *j-deletion* in /bylj+ar/, we could say that /bylj/ has no lexical category, so not until we add an inflectional ending (including Ø for the accusative singular) does it enter the lexical phonology.

- How about the ordering of *u-umlaut*:

/harð+um/	hörðum	‘hard <i>dat.pl.</i> ’
/kalla+um/	köllum	‘call <i>1sg.</i> ’
/saga+ur/	sögur	‘sagas <i>nom.pl.</i> ’
/dag+r/	dagur	‘day <i>nom.sg.</i> ’

syncope, roughly: certain unstressed Vs → Ø / __ {l,r,n,ð,s}V

Additional fact: *syncope* applies before case and derivational endings, but not before the enclitic articles *-inn* and *-ið*.

hamar	‘hammer <i>nom.sg.</i> ’	akur	‘acne <i>nom.sg.</i> ’	höfuð	‘head <i>nom.sg.</i> ’
hamr+i	‘hammer <i>dat.sg.</i> ’	akr+i	‘acne <i>dat.sg.</i> ’	höfð+i	‘head <i>dat.sg.</i> ’
hamr+a	‘to hammer’				
hamar#inn	‘the hammer <i>nom.sg.</i> ’	akur#inn	‘the acne <i>nom.sg.</i> ’	höfuð#ið	‘the head <i>nom.sg.</i> ’
		ökr+um	‘acne <i>dat.pl.</i> ’		
fóður	‘lining <i>nom.sg.</i> ’	dag+ur (/dag+r/)	‘day <i>nom.sg.</i> ’		
fóðr+i	‘lining <i>dat.sg.</i> ’	dag+r+i	‘day <i>dat.sg.</i> ’		
fóðr+a	‘to line’				
fóður#ið	‘the lining <i>nom.sg.</i> ’	dag+ur#inn	‘the day <i>nom.sg.</i> ’		

- First, why no *u-umlaut* in *akur*, under Kiparsky’s theory?

As we'll see later in Anderson, there's an ordering paradox: we have to order *u*-umlaut before syncope (/bagg+ul+i/ → [bögg+l+i]—counterbleeding) but we also have to order syncope before *u*-umlaut (/alin+um/ → [öln+um]—feeding)

- Let's try to resolve the ordering paradox using Lexical Phonology.

- Some more data—can we deal with them?

	Nikulás	'Nicholas'
/dag+r#inn/	dagurinn	'the day <i>nom.sg.</i> '
/lifr#inn/	lifrin	'the liver? <i>nom.sg.</i> ' (apparently this is characteristic of feminines and neuters ending in /...Cr/--I don't remember Kiparsky's story on this and don't have the article any more, so let's just see what possibilities we can come up with)

8. Brief exercise

Conservative European Spanish example (based on Harris)

Palatal and alveolar nasals and laterals contrast:

ka.na	'grey hair'	po.lo	'pole'
ka.ɲa	'cane'	po.ʎo	'chicken'

But the contrast is neutralized in some environments

dez.ðe.ɲ+ar	'to disdain'	don.θe.ʎ+a	'maiden'
dez.ðe.ɲ+o.so	'disdainful'	don.θe.ʎ+a+s	'maidens'
dez.ðen	'disdain (N)'	don.θel	'swain'
dez.ðe.nes	'disdains (N)'	don.θe.les	'swains'

- Assume a rule of syllabification, but let's not worry about how to write it. Write a rule for the neutralization that refers to syllable structure (we can use [σ and] σ). Is it lexical or postlexical?
- The application of the rule in [dez.ðen] looks problematic for strict cyclicity—is there a way out?

See course web page for bare-bones bibliography on lexical phonology.

Class 10: The cycle, part I

To do

- Kiparsky 2000 study questions (for Thursday)
- Bibliographic exercise (for Thursday)
- Chamorro assignment (due Tuesday)

Overview: How are phonological rules ordered with respect to morphological operations? Or can we get the same interactions without ordering?

1. SPE: the transformational cycle

“We assume as a general principle that the phonological rules first apply to the maximal strings that contain no [syntactic] brackets, and that after all relevant rules have applied, the innermost brackets are erased; the rules then reapply to maximal strings containing no brackets, and again innermost brackets are erased after this application; and so on, until the maximal domain of phonological processes is reached.” (p. 15)

Classic example: Palestinian Arabic (data originally from Brame—was discussed in K&K)

Verbs without objects (the extra spacing is just for legibility of *fí* sequences)

<i>subject</i>	<i>‘study’</i>	<i>‘understand’</i>
2sg. masc.	da.rás+t	fhím+t
2sg. fem.	da.rás.+ti	fhím.+ti
3sg. masc.	dá.ras	fí.him
3sg. fem.	dá.ra.s+at	fíh.m+at
1pl.	da.rás.+na	fhím.+na
2pl.	da.rás.+tu	fhím.+tu
3pl.	dá.ra.s+u	fíh.m+u

- What’s the stress rule for this language, based on the ‘study’ paradigm?
- Give a rule for the V-∅ alternations.
- Determine the ordering of the two rules.

Verbs with objects

<i>object</i>	<i>‘he understood X’</i>	<i>‘she understood X’</i>	<i>‘You (masc.) understood X’</i>
1sg.	fi.hím.+ni	fi.h.m+át.+ni	fhím+t.+ni
2sg. masc.	fíh.m+ak	fíh.m+a.t+ak	fhím+.t+ak
2sg. fem.	fíh.m+ik	fíh.m+a.t+ik	fhím+.t+ik
3sg. masc.	fíh.m+u	fíh.m+a.t+u	fhím+.t+u
3sg. fem.	fi.hím.+ha	fi.h.m+át.+ha	fhím+t.+ha
1pl.	fi.hím.+na	fi.h.m+át.+na	fhím+t.+na
2pl.	fi.hím.+kum	fi.h.m+át.+kum	fhím+t.+kum
3pl.	fi.hím.+hum	fi.h.m+át.+hum	fhím+t.+hum

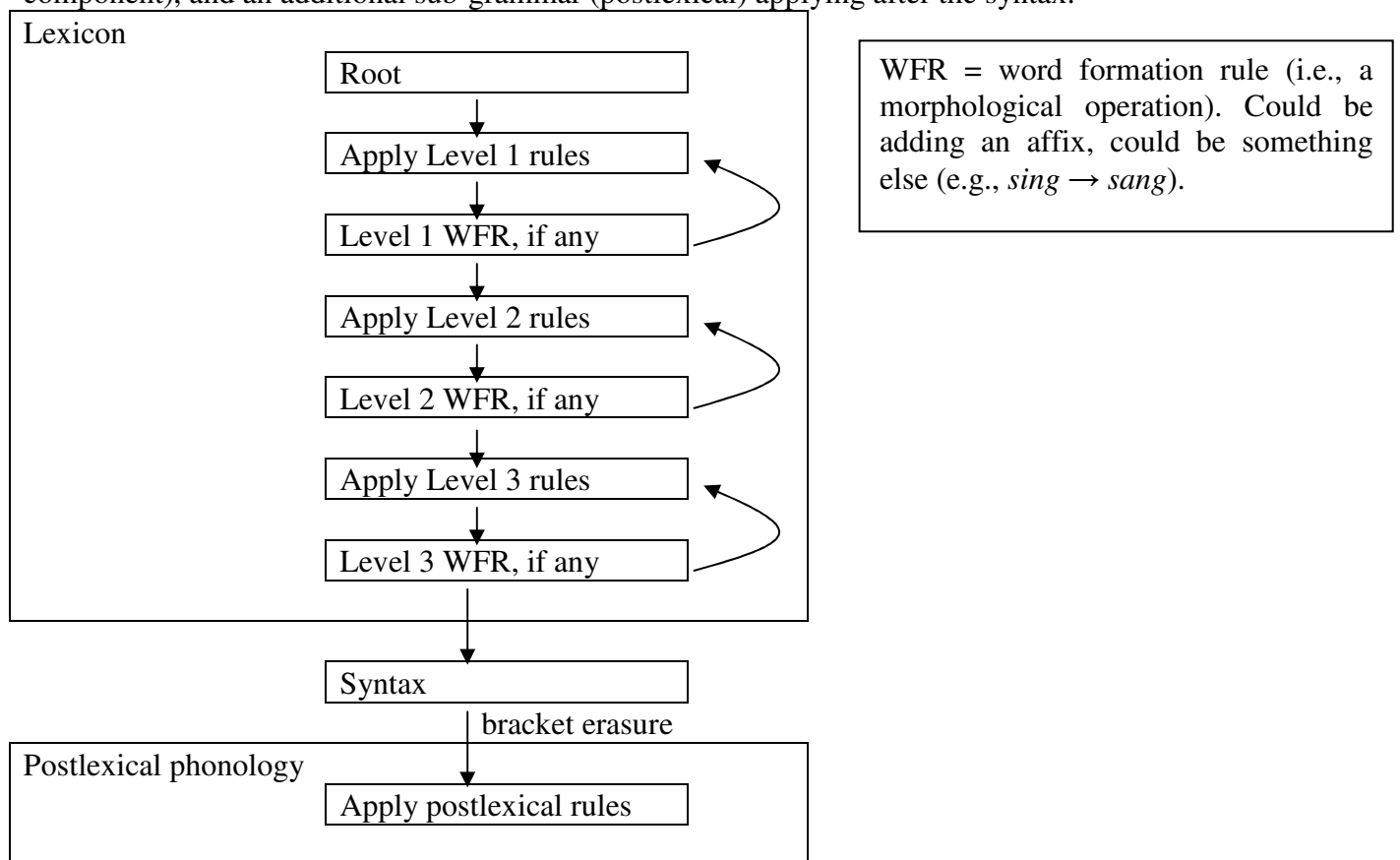
- Step through the derivations of the following forms, using the convention from SPE given above—we're assuming that the verb and subject suffix are bracketed together:

[fihim+Ø] [fihim+na] [[fihim+Ø]+na] [[fihim+Ø]+ak] [[fihim+at]+ni] [[fihim+at]+ak] [[fihim+t]+ni]
 V he V we V he us V he you V she me V she you V you me

- Which forms would be different if we did all the morphology first and then applied the phonological rules?

2. Lexical phonology

Kiparsky argues that this is not enough (see Pesetsky 1979 for an earlier proposal along the same lines). Different sub-grammars apply at different levels of morphology (in the lexical component), and an additional sub-grammar (postlexical) applying after the syntax.



(Should the root really pass through the Level 1 rules first thing or go straight to WFR? Not clear.)

3. Properties of the lexical component: cyclicity

Within each level, the phonological rules apply after each morphological operation (thus the loops in the picture above).

Evidence/examples

- WFRs can be sensitive to derived phonological properties: e.g. English *-ize*, which doesn't apply to stems with final stress. Kiparsky's interpretation of the *-ize* case is that stress rules apply to the stem on the previous cycle.

Internal brackets are erased after each level, so WFRs and phonological rules don't have access to morphological information from the previous level. Postlexical rules don't have access to any bracketing.

Evidence/examples

- Postlexical rules are automatic in the sense that they don't admit of lexical exceptions, and don't care about morphological information. (Or at least that is the strong version of the claim! It may not be 100% true...)

4. Properties of the lexical component: strict cycle condition

The idea was to allow lexical rules (at least those that change feature values, rather than filling in underspecified ones) to apply only to environments newly made, by either a morphological operation or a phonological rule *in the same cycle*. This phenomenon is known as **non-derived environment blocking (NDEB)**.

Lexical phonology's attempts to deal with NDEB were always kind of a mess, and I don't think we've done much better since then, so rather than go through the details of the proposals, I'd rather just give two classic examples, from Kiparsky, and review his 1982 proposal, so that you have an idea of what the problem is.

Finnish

Ignore various other rules: vowel harmony, degemination, a~o...

<i>to X</i>	<i>Let him/her X!</i>	<i>'active instructive infinitive II'</i>	<i>she/he was Xing</i>	
halut+a	halut+koon	halut+en	halus+i	'want'
noet+a	noet+koon	noet+en	nokes+i	'smudge (?)'
piet+æ	piet+køøn	piet+en	pikes+i	'pitch'
filmat+a	filmat+koon	filmat+en	filmas+i	'film'
cf.				
oll+a	ol+koon	oll+en	ol+i	'be'
aja+a	aja+koon	aja+en	ajo+i	'go'
puhu+a	puhu+koon	puhu+en	puhu+i	'speak'

- So $t \rightarrow s / _ i$. Can we modify the rule to deal with these monomorphemic cases?

tila	'room'	lahti	'Lahti'	cf.	
æiti	'mother'	mæti	'roe'	paasi	'boulder'
silti	'however'	limonaati	'lemonade'	sinæ	'you (sg.)'
valtion	'public'			kuusi	'six'

- Another rule is needed to account for this vowel alternation:

joke+na	'river' essive sg.	joki	'river' nom. sg.
mæke+næ	'river' essive sg.	mæki	'hill' nom. sg.
æiti+næ	'mother' essive sg.	æiti	'mother' nom. sg.
kahvi+na	'coffee' essive sg.	kahvi	'coffee' nom. sg.

- How should the two rules be ordered, given these data? (ignore h~k alternation)

vete+næ	'water' essive sg.	vesi	'water' nom. sg.
kæte+næ	'hand' essive sg.	kæsi	'hand' nom. sg.
yhte+næ	'one' essive sg.	yksi	'one' nom. sg.

- What's the problem in *vesi*?

Sanskrit "ruki"

$s \rightarrow \text{ʃ} / \{r, u, k, i\} _$

da+da+si	'you give'	bi+bhar+ʃi	'you carry'
kram+ʃja+ti	'he will go'	vak+ʃja+ti	'he will say'

Aside: Venneman 1972 proposes that this is because the coarticulations that *r, u, k, i* impose on a following [s] are acoustically similar (though articulatorily diverse). [r] is apparently retroflex, so it would induce retroflexion; [u] would induce rounding; [k] would induce palatalization (because of back tongue position), and so would [i], as it does in many languages. All of these changes (to [ʃ], [s^w], and [ʃ]) would cause the fricative noise of [s] to lower in frequency, because the resonant cavity in front of the constriction becomes bigger. It would therefore be difficult to maintain a contrast between [s] and [ʃ] in the post-*ruki* environment.

- How is this like Finnish:

bisa	'lotus'
busa	'mist'
barsa	'tip'

<i>ablaut</i>	sa:s	'instruct'	/sas+ta/ → sista → [siʃ+{a}]	participle
<i>V-deletion</i>	ghas	'eat'	/ga+ghas+anti/ → dʒa+ ks +anti → [dʒa+ kʃ +anti]	3 pl.

Most other cases of NDEB I've seen require feeding by a morphological operation only (rather than morphological or phonological), so these classics may not be representative.

- Recall Malagasy example: búhu 'carry on back' but /babu+u/ → [babúí] (u → i / uC₀+ __)

5. Aside on strict cyclicity: counterfeeding

Polish (originally from Rubach): $\left[\begin{array}{c} +\text{cor} \\ +\text{strid} \end{array} \right] \rightarrow \text{ç} / _ \left[\begin{array}{c} +\text{syll} \\ -\text{back} \\ +\text{high} \end{array} \right]$ (in nouns) "nominal strident palatalization"

kapelu[s]	'hat'	kapelu[ç]+ik	'little hat'	kapelu[ç]+ik+o	'big hat'
gro[s]	(monetary unit)	gro[ç]+ik	'little grosz'	gro[ç]+iw+o	'big grosz'

$\{k,g,x\} \rightarrow \left[\begin{array}{c} -\text{high} \\ +\text{cor} \\ +\text{strid} \end{array} \right] / _ \left[\begin{array}{c} -\text{cons} \\ -\text{back} \end{array} \right]$ "first velar palatalization"

krzy[k]	'a shout'	krzy[\widehat{tj}]+e+ć	'to shout'		
stra[x]	'fear'	stra[\widehat{j}]+y+ć	'to frighten'		
miaz[g]+a	'squash'	miaż[$\widehat{d\zeta}$]+y+c	'to squash'	miaż[$\widehat{d\zeta}$]+ę	'I squash'

- What's the order of the rules (assuming the rules are correct)?

gma[x]	'building'	gma[\widehat{j}]+ysk+o	'big building'	kapelu[ç]+ik+o	'big hat'
		* gma[ç]+ysk+o			

- If both rules are cyclic (Rubach argues that they are), what prevents *gma[ç]+ysk+o?

6. Kiparsky's (1982) solution

Kiparsky has a nice alternative: assume that every lexical item is really a specific rule, such as $\emptyset \rightarrow \text{tila}$.

- What does the Elsewhere Condition say should happen to this sequence of adjacently ordered rules?

$\emptyset \rightarrow \text{tila}$
 $t \rightarrow s / _ i$

7. Application to Icelandic (from Kiparsky 1984)

u-epenthesis

dag+ur	‘day <i>m.nom.sg.</i> ’	bæ+r	‘farm <i>m.nom.sg.</i> ’
tek+ur	‘take <i>2/3sg.pres.ind.</i> ’	næ+r(ð)	‘reach <i>2/3sg.pres.ind.</i> ’

- How should *u-epenthesis* be ordered with respect to *j-deletion*:

bylj+ar	‘snowstorm <i>gen.sg.</i> ’	krefj+i	‘request <i>2pl.</i> ’
bylj+ir	‘snowstorm <i>nom.pl.</i> ’	krefj+a	‘request <i>3pl.</i> ’
bylj+i	‘snowstorm <i>acc.pl.</i> ’	krefj+um	‘request <i>1pl.</i> ’
bylj+a	‘snowstorm <i>dat.pl.</i> ’	kref	‘request <i>1sg.</i> ’
bylj+um	‘snowstorm <i>dat.pl.</i> ’	kref+ur	‘request <i>2/3sg.</i> ’
byl	‘snowstorm <i>acc.sg.</i> ’		
byl+s	‘snowstorm <i>gen.sg.</i> ’		
byl+ur	‘snowstrom <i>nom.sg.</i> ’		

In order to prevent *j-deletion* in /bylj+ar/, we could say that /bylj/ has no lexical category, so not until we add an inflectional ending (including Ø for the accusative singular) does it enter the lexical phonology.

- How about the ordering of *u-umlaut*:

/harð+um/	hörðum	‘hard <i>dat.pl.</i> ’
/kalla+um/	köllum	‘call <i>1sg.</i> ’
/saga+ur/	sögur	‘sagas <i>nom.pl.</i> ’
/dag+r/	dagur	‘day <i>nom.sg.</i> ’

syncope, roughly: certain unstressed Vs → Ø / __ {l,r,n,ð,s}V

Additional fact: *syncope* applies before case and derivational endings, but not before the enclitic articles *-inn* and *-ið*.

hamar	‘hammer <i>nom.sg.</i> ’	akur	‘acne <i>nom.sg.</i> ’	höfuð	‘head <i>nom.sg.</i> ’
hamr+i	‘hammer <i>dat.sg.</i> ’	akr+i	‘acne <i>dat.sg.</i> ’	höfð+i	‘head <i>dat.sg.</i> ’
hamr+a	‘to hammer’				
hamar#inn	‘the hammer <i>nom.sg.</i> ’	akur#inn	‘the acne <i>nom.sg.</i> ’	höfuð#ið	‘the head <i>nom.sg.</i> ’
		ökr+um	‘acne <i>dat.pl.</i> ’		
fóður	‘lining <i>nom.sg.</i> ’	dag+ur (/dag+r/)	‘day <i>nom.sg.</i> ’		
fóðr+i	‘lining <i>dat.sg.</i> ’	dag+r+i	‘day <i>dat.sg.</i> ’		
fóðr+a	‘to line’				
fóður#ið	‘the lining <i>nom.sg.</i> ’	dag+ur#inn	‘the day <i>nom.sg.</i> ’		

- First, why no *u-umlaut* in *akur*, under Kiparsky’s theory?

As we'll see later in Anderson, there's an ordering paradox: we have to order *u*-umlaut before syncope (/bagg+ul+i/ → [bögg+l+i]—counterbleeding) but we also have to order syncope before *u*-umlaut (/alin+um/ → [öln+um]—feeding)

- Let's try to resolve the ordering paradox using Lexical Phonology.

- Some more data—can we deal with them?

	Nikulás	'Nicholas'
/dag+r#inn/	dagurinn	'the day <i>nom.sg.</i> '
/lifr#inn/	lifrin	'the liver? <i>nom.sg.</i> ' (apparently this is characteristic of feminines and neuters ending in /...Cr/--I don't remember Kiparsky's story on this and don't have the article any more, so let's just see what possibilities we can come up with)

8. Brief exercise

Conservative European Spanish example (based on Harris)

Palatal and alveolar nasals and laterals contrast:

ka.na	'grey hair'	po.lo	'pole'
ka.ɲa	'cane'	po.ʎo	'chicken'

But the contrast is neutralized in some environments

dez.ðe.ɲ+ar	'to disdain'	don.θe.ʎ+a	'maiden'
dez.ðe.ɲ+o.so	'disdainful'	don.θe.ʎ+a+s	'maidens'
dez.ðen	'disdain (N)'	don.θel	'swain'
dez.ðe.nes	'disdains (N)'	don.θe.les	'swains'

- Assume a rule of syllabification, but let's not worry about how to write it. Write a rule for the neutralization that refers to syllable structure (we can use [σ and] σ). Is it lexical or postlexical?
- The application of the rule in [dez.ðen] looks problematic for strict cyclicity—is there a way out?

See course web page for bare-bones bibliography on lexical phonology.