Phonology-Morphology Interface
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Handout 3

1 Paradigm Uniformity: Overapplication

1.1 Introduction

(1) Definition of opacity [Kiparsky 1973: 79]:
A phonological rule P of the form A → B / C __ D is opaque if there are surface structures with any of the following characteristics:

a. Instances of A in the environment C __ D (underapplication)

b. Instances of B derived by P that occur in environments other than C __ D. (overapplication)

1.2 Sundanese Nasal Assimilation

1.2.1 Data and a rule-based analysis

(2) Sundanese Nasal Assimilation [see Cohn 1990 and Benua 1997 and references cited therein]. These data are representative of the canonical phonology.

a.	[ɲĩãr]	'seek'
	[bɨŋhãr]	'to be rich'
	[ŋãũr]	'say'
	[nĩʔis]	'relax in a cool place'
	[nãʔãtkɨn]	'dry'
b.	[ŋãtur]	'arrange'
	[ŋĩsər]	'displace'
	[ŋũliat]	'stretch'
	[mãrios]	'examine'
	[ŋĩwat]	'elope'

(3) Some questions on the data in (2):

a. How might one write a (nonlinear) rule of Nasal Assimilation?

b. What segments block Nasal Assimilation from applying? What segments are transparent to Nasal Assimilation?

c. How might the opaque/transparent segments in (b) be captured in nonlinear representations?

(4) Sundanese Plural Formation [Benua 1997]:

	singular	*plural*	
a.	[alus]	[ar-alus]	‘be pleasant’
	[ala]	[ar-ala]	‘take’
	[omõŋ]	[ar-omõŋ-ãn]	‘say, their (our, your) words’
b.	[bawa]	[b-ar-awa]	‘carry’
	[dahar]	[d-al-ahar]	‘eat’
	[hormat]	[h-al-ormat]	‘honor’

(5) Some questions on the data in (4):

a. Why is the plural morpheme a prefix in (4a) and an infix in (4b)?

b. How might one explain the alternation between [ar] and [al]?

(6) Sundanese Plural Formation [Benua 1997]:

singular	*plural*	
[ɲĩãr]	[ɲ-ãl-ĩãr]	‘seek’
[ŋãũr]	[ŋ-ãl-ãũr]	‘say’
[mãhãl]	[m-ãr-ãhãl]	‘expensive’
[nãʔãtkɨn]	[n-ãr-ãʔãtkɨn]	‘dry’

(7) Some questions on the data in (6):

a. What problem is posed by the examples in (6)?

b. How might one solve the problem in a rule-based model?

(8) A cyclic solution [see Cohn 1990]:

Input: /ɲ i a r/

Cycle 1

Nasal Spread: ɲ ĩ ã r

Cycle 2

Infixation: ɲ - a l - ĩ ã r

Nasal Spread: ɲ - ã l - ĩ ã r

[ɲ-ãl-ĩãr]

1.2.2 An OT analysis

(9) Two markedness constraints [from Benua 1997]:

a. *VNAS: No nasal vowels

b. *VORAL: No oral vowels

c. *VNAS » *VORAL: This ranking accounts for the fact that nasal vowels are more marked than oral vowels

(10) Two additional constraint (in a-b). The ranking in (c) accounts for Nasal Spreading (i.e. the 'canonical phonology')

a. *NVORAL: No oral vowels in post-nasal context

b. IO-IDENT[NAS]: An input segment and its output correspondent agree in the feature [nasal].

c. *NVORAL » *VNAS » IO-IDENT[NAS]

(11) Tableau for the word [ŋãtur] 'arrange' (from 2b):

	/ŋatur/	*NVORAL	*VNAS	IO-IDENT[NAS]
a.	[ŋatur]	*!		
b.	[ŋatũr]	*!	*	*
c.	→ [ŋãtur]		*	*
d.	[ŋãtũr]		**!	**

(12) How might an OT approach account for the overapplication examples in (6), which are repeated here for convenience?

singular	*plural*	
[ɲĩãr]	[ɲ-ãl-ĩãr]	‘seek’
[ɳ̃ãũr]	[ɳ̃-ãl-ãũr]	‘say’
[mãhãl]	[m-ãr-ãhãl]	‘expensive’
[nãʔãtkɨn]	[n-ãr-ãʔãtkɨn]	‘dry’

(13) OT model needs to account for correspondence between Input and Output (IO Correspondence) and between Output and Output (OO-Correspondence). See, for example, Benua (1997) and the studies in Downing, Hall & Raffelsiefen (2005a):

/ɲ i a r/		/ɲ i a r/	
↓		↓	IO-Correspondence
[ɲĩãr]	→	[ɲ-ãl-ĩãr]	

OO-Correspondence

(14) An Output-Output constraint [see Benua 1997]:

OO-IDENT[NAS]: All output correspondents agree in the feature [nasal]

→ Overapplication is predicted to be the correct outcome if this OO constraint is ranked high (see below).

(15) Since the analysis refers to output correspondents, each candidate consists of the set of all such output-output correspondents. In this example, this set includes the singular and the plural. These candidate sets are usually referred to as <u>paradigms</u>. Four such paradigms can be compared:

a. [ɲiar ~ ɲ-al-iar]

b. [ɲĩãr ~ ɲ-ãl-iar]

c. [ɲiar ~ ɲ-ãl-ĩãr]

d. → [ɲĩãr ~ ɲ-ãl-ĩãr]

(16) Tableau for the example in (15). This is slightly different from the analysis presented in Benua (1997), although the constraints are the same:

	/ɲ i a r/	*NVORAL	OO-IDENT[NAS]	*VNAS	IO-IDENT[NAS]
a.	[ɲiar ~ ɲ-al-iar]	*!			
b.	[ɲĩãr ~ ɲ-ãl-iar]		*!*	***	***
c.	[ɲiar ~ ɲ-ãl-ĩãr]	*!	**		***
d.	→ [ɲĩãr ~ ɲ-ãl-ĩãr]			*****	*****

(17) Questions on (16):

a. OO constraints are sometimes referred to as 'paradigm uniformity' constraints. Explain why.

b. The ranking in (16) is language-specific. Can one give a general ranking schema for paradigm uniformity effects?

1.3 Final Devoicing and Vowel Lengthening

1.3.1 The canonical pattern

(18) Alternations between voiced and voiceless obstruents in Modern German:

a.	Dieb	[diːp]	'thief'	Dieb-e	[diː.bə]	'thieves'
	Rad	[ʀaːt]	'wheel'	Rad-es	[ʀaː.dəs]	'wheel (gen. sg.)'
	Tag	[taːk]	'day'	Tag-e	[taː.gə]	'days'
	Nerv	[nɛʀf]	'nerve'	nerv-ös	[nɛʀ.vøːs]	'nervous'
	Haus	[haʊs]	'house'	Haus-es	[haʊ.zəs]	'house (gen. sg.)'
	orange	[oʀaŋʃ]	'orange'	orang-e	[oʀaŋ.ʒə]	'orange (adj. ending)'
b.	bunt	[bʊnt]	'colorful'	bunt-e	[bʊn.tə]	'colorful (adj. ending)'
	krank	[kʀaŋk]	'sick'	krank-e	[kʀaŋ.kə]	'sick (adj. ending)'
	nass	[nas]	'wet'	nass-e	[nasə]	'wet (adj. ending)'
	Bach	[bax]	'stream'	Bäch-e	[bɛçə]	'streams'
c.	streb-sam	[ʃtʀeːp.zaːm]	'ambitious'	streb-e	[ʃtʀeː.bə]	'strive (1 sg)'
	Bünd-nis	[bʏnt.nɪs]	'alliance'	Bund-es	[bʊn.dəs]	'alliance (gen sg.)'
	bieg-sam	[biːk.zaːm]	'bendable'	bieg-en	[biː.gən]	'bend (1 pl)'
	les-bar	[leːs.baːɐ̯]	'readable'	les-en	[leː.zən]	'read (1 pl)'

(19) Final Devoicing (FD): [–sonorant] → [–voice] / ___]$_\sigma$

(20) Long vowels contrast with short vowels before sonorant consonants (in a) and before a voiceless obstruent (in b):

a.	Stall	[ʃtal]	'stall'	Stahl	[ʃtaːl]	'steel'
	Hölle	[hœlə]	'hell'	Höhle	[høːlə]	'cave'
b.	Bett	[bɛt]	'bed'	Beet	[beːt]	'bed (horticulture)'
	Bett-en	[bɛtən]	'beds'	Beet-e	[beːtə]	'beds (horticulture)'
	bitte-n	[bɪtən]	'ask'	biet-en	[biːtən]	'offer'
	spuck-en	[ʃpʊkən]	'spit'	spuk-en	[ʃpuːkən]	'spook'
	schoss	[ʃɔs]	'shot'	Schoss	[ʃoːs]	'lap'
	offen	[ɔfən]	'open'	Ofen	[oːfən]	'oven'

(21) Long vowels occur regularly before a voiced stop (see a) or voiced fricative (see b); short vowels are rare in this position [King 1969, Jessen 1996); see (23) below]:

a.	Leber	[leːbɐ]	'liver'
	Vogel	[foːgəl]	'bird'
	Laden	[laːdən]	'store'
b.	Hase	[haːzə]	'hare'
	Riese	[ʀiːzə]	'giant'
	Garage	[gaʀaːʒə]	'garage'
	Löwe	[løːvə]	'lion'

(22) Vowel Lengthening (VL): V → Vː / ___ [+voice, –son]

(23) Idiosyncratic exceptions to Vowel Lengthening involve both stops (in a) and fricatives (in b). The first are loans from languages like Dutch or Yiddish or historically derived from Low German dialect spoken in Northern Germany. The examples in (b) are loans from English, French, or Slavic [see Jessen 1996]:

a.	Bagger	[ag]	'excavator'	b.	Blizzard	[ɪz]	'blizzard'
	Egge	[ɛg]	'harrow'		clever	[ɛv]	'clever'
	Ebbe	[ɛb]	'low tide'		Sovjet	[ɔv]	'Soviet'
	Robbe	[ɔb]	'seal'		Puzzle	[ʊz]	'puzzle'
	Krabbe	[ab]	'crab'		Saison	[ɛz]	'season'

Note: Jessen observes that there are far fewer examples in the (7b) category; these examples strike him as having a 'strong foreign character'.

(24) Final Devoicing and Vowel Lengthening don't interact in many examples:

a.	*Hase* /hazə/	*Haus* /haʊz/	b.	*Hase* /hazə/	*Haus* /haʊz/
1. FD	----	haʊs	1. VL	haːzə	-----
2. VL	haːzə	------	2. FD	-----	haʊs
	[haːzə]	[haʊs]		[haːzə]	[haʊs]

Note: VL only applies to monophthongs. Diphthongs do not lengthen.

(25) Vowels are predictably long before a voiceless obstruent if the vowel is long in another member of the 'paradigm'. Note that this is an example of overapplication.

Dieb	[diːp]	'thief'	Dieb-e	[diː.bə]	'thieves'
Rad	[ʀaːt]	'wheel'	Rad-es	[ʀaː.dəs]	'wheel (gen. sg.)'
Tag	[taːk]	'day'	Tag-e	[taː.gə]	'days'
beige	[beːʃ]	'beige'	beig-e	[beːʒə]	'beige (adj. ending)'
lies	[liːs]	'read (imper. sg.)'	les-en	[leːzən]	'read'

(26) Two historical stages illustrating Final Devoicing and Vowel Lengthening [King 1969]:

a. Stage 1:

Rad	[ʀat]	'wheel'
Rad-es	[ʀaːdəs]	'wheel (gen. sg.)'

b. Stage 2:

Rad	[ʀaːt]	'wheel'
Rad-es	[ʀaːdəs]	'wheel (gen. sg.)'

According to King (1969: 53): "Final Devoicing was an innovation in the grammar of most German dialects around A.D. 1000, in any case not later than 1200. Lengthening of vowels before voiced obstruents was an innovation in the grammar of Early Modern German; that is, the documents indicate that it was a rule added around A.D. 1400, several centuries later than the final devoicing rule was added."

(27) Rule ordering analysis [King 1969: 51-54; Downing, Hall & Raffelsiefen 2005b]:

	Stage 1:			*Stage 2:*	
	/ʀad/	/ʀad-əs/		/ʀad/	/ʀad-əs/
1. FD	ʀat	------	1. VL	ʀaːd	ʀaːd-əs
2. VL	-----	ʀaːd-əs	2. FD	ʀaːt	-----
	[ʀat]	[ʀaːdəs]		[ʀaːt]	[ʀaːdəs]

Notes:

● There is no Vowel Lengthening in nonalternating examples like *weg* [vɛk] 'away' because the historical /g/ was restructured to /k/.

● Stage 2 illustrates 'overapplication' (see 1b), i.e. Vowel Lengthening overapplies in the example [ʀaːt].

● King (1969: 53) writes: "In traditional presentations this change [i.e. the change from short to long vowels, T. A. H.] would be called *analogical levelling*, here levelling under pressure from other forms in the paradigm that have long vowels."

1.3.2 An OT analysis

(28) Four (simplified) paradigms in (a-d) for Stage 2 for the example *Rad* ~ *Rad-es*. Paradigm (a) is correct and (b-d) are not.

a. → [ʀaːt~ʀaːdəs] overapplication

b. [ʀaːdəs~ʀadəs] 'backwards' application

c. [ʀat~ʀaːdəs] normal application

d. [ʀat~ʀadəs] underapplication

(29) Complete paradigms involve all words with the same lexeme. This is illustrated below for the one lexeme 'Rad'. In each paradigm there are inflectional *and* derivational forms. Note that the stem vowel is consistently long, even though the vowel quality varies.

	'Rad' paradigm:	
example	*stem vowel*	*gloss*
Rad	[aː]	'bicycle, wheel'
Rad-es	[aː]	'bicycle (gen. sg.)'
Räd-er	[ɛː]	'bicycles'
Räd-er-n	[ɛː]	'bicycles (dat.)'
Räd-chen	[ɛː]	'small wheel'
Rad-ler	[aː]	'cyclist'

(30) Constraints required for the analysis:

a. OO-μ: Vowels in output forms have the same number of moras in other members of the paradigm

b. *V [+vc]: No output with a short vowel before a voiced obstruent

c. DEP-IO-μ: No insertion of a mora

d. MAX-IO-μ: No deletion of a mora

(31) Vowel Lengthening in the canonical phonology follows from the ranking *V [+vc] » DEP-IO-μ. Note that it does not matter if the input vowel is long or short. (See the OT literature on the principle 'Richness of the Base').

	/haːzə~hazə/	*V [+vc]	DEP-IO-μ
a.	→ [haːzə]		*
b.	[hazə]	*!	

(32) The PU effect (i.e. 'overapplication') requires the ranking O-O-μ, *V [+vc] » DEP-IO-μ. The assumption here is that the stem vowel is short in the input, but the same results would obtain with an input long vowel.

	/ʀad/	OO-μ	*V [+vc]	DEP-IO-μ
a.	→ [ʀaːt~ʀaːdəs]			**
b.	[ʀaːt~ʀadəs]	*!		*
c.	[ʀat~ʀaːdəs]	*!		*
d.	[ʀat~ʀadəs]		*!	

(33) The ranking OO-μ, *V [+vc] » DEP-IO-μ in (32) matches the general ranking for overapplication in paradigms proposed by Benua (1997: 43), namely:

O-O-Identity, Markedness » I-O Faithfulness.

See also McCarthy's (2005) Optimal Paradigms model, which has a similar general ranking for overapplication

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