Phonology-Morphology Interface
Jadertina Summer School
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Handout 4

1 Paradigm Uniformity: Underapplication (part 1)

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 s-Dissimilation in Swabian German

1.2.1 The data and a rule-based treatment

(2) Contrast between [s] and [ʃ] in one context in Standard German and Swabian German:

	Standard	*Swabian*	
nass	[nas]	[nas]	'wet'
Tisch	[tɪʃ]	[tɪʃ]	'table'

(3) The contrast between [s] and [ʃ] is neutralized to [ʃ] before all consonants except for /k/ in both Standard German and Swabian German, cf. (a-b) vs. (c). These data are usually assumed to require a rule of s-Dissimilation, according to which /s/ becomes [ʃ] before /p t/ [Scott 2006, Alber 2001]:

		Standard	*Swabian*	
a.	Speck	[ʃpɛk]	[ʃpɛk]	'bacon'
	Speise	[ʃpaizə]	[ʃpais]	'food'
	Knospe	[knɔspə]	[knoʃpə]	'bud'
	Haspel	[haspəl]	[haʃpəl]	'hasp'
b.	stark	[ʃtaʁk]	[ʃtɔɐk]	'strong'
	Staat	[ʃtaːt]	[ʃtaːt]	'country'
	Fenster	[fɛnstɐ]	[fɛnʃtɐ]	'window'
	Konstanz	[kɔnstants]	[kɔnʃtants]	'Constance'
	Post	[pɔst]	[poʃt]	'mail'
	Last	[last]	[laʃt]	'burden'

c.	Skat	[skaːt]	[skaːt]	‘card game’
	Sklave	[sklaːvə]	[sklaːvə]	‘slave’
	Skelett	[skelɛt]	[skəlɛt]	‘skeleton’
	brüsk	[bʀʏsk]	[bʀʏsk]	‘brusque’
	Kiosk	[kiːɔsk]	[kiɔsk]	‘kiosk’

(4) [s] regularly becomes [ʃ] before [p t] (but not before [k]) in loan words in both varieties of German:

Stop	[stɔp] ~ [ʃtɔp]
Stil	[stiːl] ~ [ʃtiːl]
Spezies	[speːtsjəs] ~ [ʃpeːtsjəs]

(5) s-Dissimilation before sonorant consonants (including [v]):

	Standard/Swabian	
schreiben	[ʃʀaibən]	‘to write’
Schlange	[ʃlaŋə]	‘snake’
Schmuck	[ʃmʊk]	‘jewelry’
Schnee	[ʃneː]	‘snow’
schwarz	[ʃvaʀts]	‘black’

(6) Provisional rule:

/s/ → [ʃ] / __ [p t v n m l ʀ] (every consonant except for /k/)

(7) The relevant feature for s-Dissimilation has been argued to be [high] [see Hall 1992, Wiese 1996, Alber 2001]. [high] is assumed not to be a daughter of [DORSAL] because the rule applies before coronal, labial and dorsal segments:

	p b m f v	t d s z n l	ʃ ʒ	k g	ʀ
[LAB]	√				
[COR]		√	√		
[DOR]				√	√
[high]	–	–	+	+	–

Note: Various models of feature geometry have proposed that [high] is independent of [LAB], [COR] and [DOR]; see, for example, Lahiri & Evers (1991).

(8) s-Dissimilation rule in two dialects:

a. Standard German: /s/ → [+high] / # __ [–high]
b. Swabian German: /s/ → [+high] / __ [–high]

(9) No s-Dissimilation in Swabian German if the /s/ and consonant are separated by a morpheme boundary [Scott 2006]. This is true for derivational (see a) and inflectional morphemes (see b-c). Note that s-Dissimilation underapplies in these examples.

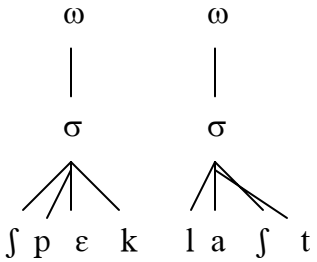
a.	mass-los	[maslos]	'immoderate'
	ess-bar	[ɛsbaʁ]	'edible'
b.	muss-te	[mʊstə]	'had to (preterite)'
c.	ge-küss-t	[gəkyst]	'kissed (past part.)'
	ge-wuss-t	[gəvust]	'knew (past part.)'

(10) Swabian German s-Dissimilation:

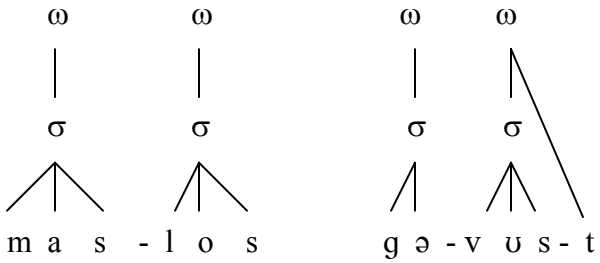
/s/ → [+high] / __ [–high]

Condition: /s/ and following segment belong to the same phonological word (ω)

(11) Prosodic condition illustrated with the two examples *Speck* and *Last*:



(12) To account for the examples in (9) one would need to have prosodic structures in which /s/ does not belong to the same phonological word as the following consonant. This is illustrated with the two words *mass-los* and *ge-wuss-t*:



(13) Consonant-initial suffixes like *–los* and *–bar* in (9a) are separate phonological words [Booij 1985, Hall 2002b, Wiese 1996 and others].
Problem with the prosodic solution: What independent evidence is there that the /t/ in an example like *gewusst* in (12) is extrasyllabic, but not the /t/ in an example like *Last* (see 11)? See Hall (2002a), who argues that there are no extrasyllabic consonants in German

1.2.2 An OT treatment

(14) Constraints necessary for the canonical pattern [Hall & Scott 2006]:

a. OCP-[high]: [αhigh] [αhigh] is disallowed

b. IO-IDENT-[high]: [αhigh] in input is [αhigh] in output correspondent

c. *[–high]: No [–high] consonants.

(15) Lexical contrast between /s/ and /ʃ/ (recall 2):

	/nas/	IO-IDENT-[high]	*[–high]
a.	→[nas]		*
b.	[naʃ]	*!	

	/tɪʃ/	IO-IDENT-[high]	*[–high]
c.	[tɪs]	*!	*
d.	→ [tɪʃ]		

(16) s-Dissimilation for the example *Last* [laʃt] ‘burden’ in Swabian German:

	/last/	OCP-[high]	IO-IDENT-[high]	*[–high]
a.	[last]	*!		*
b.	→ [laʃt]		*	

(17) The following is a simplified inflectional paradigm for the example *lesen* ‘to read’ [Scott 2006]. Note that the stem-final [s] is realized as [s] in the 3 SG and 2 PL forms, even though it is in the correct environment for s-Dissimilation:

	Example	*morph. Structure*	*stem-final C*
1 SG	[leːs]	/leːs/	[s]
2 SG	[liːʃ]	/liːs-ʃ/	Ø
3 SG	[liːst]	/liːs-t/	[s]
1 PL	[leːsət]	/leːs-ət/	[s]
2 PL	[leːst]	/leːs-t/	[s]
3 PL	[leːsət]	/leːs-ət/	[s]

(18) Some questions:

a. How might one explain that s-Dissimilation underapplies in the 3 SG and 2 PL forms in (17)? Hint: try to use the notion of 'paradigm' in your answer.

b. Note that the final segment of the stem is consistently [s] except for the second person singular. How could one explain why this form is different?

c. How might one explain why the vowels do not show 'paradigm uniformity' effects?

(19) Four candidates (paradigms) to consider for the pair [leːs] ~ [liːst] (see 17). Complete paradigms include all of the members of the conjugation in (17); what we see in (a-d) below are simplified paradigms in which only two members are considered.

a. [leːʃ ~ liːʃt….] overapplication

b. [leːʃ ~ liːst….] 'backwards' application

c. [leːs ~ liːʃt….] normal application

d. → [leːs ~ liːst….] underapplication

(20) In the following analysis the following OO constraint is necessary:

OO-[high]: [high] in output correspondents are the same

(21) The 'overapplication' candidate in (a) is incorrectly selected. The intended winner is (d).

	/leːs ~ liːs-t/	OO-[high]	OCP-[high]	IDENT-[high]
a.	[leːʃ ~ liːʃt]			**
b.	[leːʃ ~ liːst]	*!	*	*
c.	[leːs ~ liːʃt]	*!		*
d.	← [leːs ~ liːst]		*!	

Note: It is not important to identify a particular member of the 'lesen' paradigm as the base (i.e. the input). What is important is that the final member of the base be /s/.

(22) McCarthy's (2005) OP model: "…underapplication can only win when overapplication is blocked by a high-ranking constraint …" (p. 197)

(23) The analysis requires a constraint which penalizes one of the members of the (21a) paradigm but none of the members of the (21d) paradigm. This markedness constraint is presented in (b) below:

a. ANCHORING-IO: Any segment at the right periphery of the output GrWd has a correspondent at the right periphery of the input GrWd.

No deletion/epenthesis at the edge; Kager (1999: 137), McCarthy & Prince (1995)

b. ANCHOR-IO-PLACE: The final segment of the word should not change (its place specification). See van Oostendorp (2000)

(24) The high ranking markedness constraint now enables the underapplication paradigm to be selected:

	/leːs ~ liːs-t/	OO-[high]	ANCHOR-IO-PLACE	OCP-[high]	IDENT-[high]
a.	[leːʃ ~ liːʃt…]		*!		**
b.	[leːʃ ~ liːst…]	*!	*	*	*
c.	[leːs ~ liːʃt…]	*!			*
d.	→ [leːs ~ liːst…]			*	

1.3 Tiberian Hebrew
1.3.1 The data

(25) Tibertian Hebrew prohibits word-final consonant clusters [McCarthy 2005: 207]:

/malk/	[malɛk]	'king'
/dammaɕq/	[dammɛɕɛq]	'Damascus'

(26) Vowel Epenthesis in the Jussive [Benua 1997: 99]:

Imperfective Base	*Jussive*	
[yiɣ.lē]	[yiɣel]	'uncover'
[yiβ.ne]	[yi.βen]	'build'
[tiɸ.ne]	[tē.ɸen]	'turn'

Notes:
a. The Jussive is formed by a morphological process of truncation, which deletes the final vowel of the imperfective base.
b. Vowel Epenthesis applies before the final vowel in the Jussive.

(27) No Vowel Epenthesis in the Jussive [Benua 1997: 103]:

Imperfective Base	*Jussive*	
[yiš.bē]	[yišb]	'take captive'
[yiɸ.tē]	[yiɸt]	'be simple'
[yeš.tē]	[yešt]	'drink'
[yēβ.ke]	[yēβk]	'weep'
[yaš.qe]	[yašq]	'cause to drink'

(28) Some questions on the Tiberian data:

a. What might the reason be for the blockage of Vowel Epenthesis in the Jussive forms in (27)?

b. Given the explanation for the blockage of Vowel Epenthesis in (28a), why would Vowel Epenthesis apply in the Jussive in (26)? What is the structural difference between the Jussive forms in (26) and (27)?

1.3.2 An OT analysis

(29) Constraints accounting for Vowel Epenthesis in (25-26) [see Benua 1997]:

a. NoCompCoda: Complex codas are disallowed.

b. IO-Dep: No epenthesis.

c. IO-Max: No deletion

(30) Tableaux showing the avoidance of final coda clusters in (25-26):

	/malk/	NoCompCoda	IO-Max	IO-Dep
a.	[malk]	*!		
b.	[mal]		*!	
c.	→ [malɛk]			*

	/yiɣl/	NoCompCoda	IO-Max	IO-Dep
d.	[yiɣl]	*!		
e.	[yiɣ]		*!	
f.	→ [yiɣel]			*

(31) The ranking given in (30) selects the incorrect Jussive form in (27). The intended winner is (a).

	/yišb/	NoCompCoda	IO-Max	IO-Dep
a.	[yišb]	*!		
b.	[yiš]		*!	
c. ←	[yišeb]			*

(32) An OO constraint [see Benua 1997]:

OO-Dep: Output correspondents do not show vowel epenthesis

(33) Since the analysis refers to output correspondents, each candidate consists of the set of all correspondents. In this example, this set (i.e. paradigm) includes the singular and the plural. Four such paradigms can be compared:

a. [yi.šə.bē ~ yi.šeb] overapplication

b. [yi.šə.bē ~ yišb] 'backwards' application

c. [yiš.bē ~ yi.šeb] normal application

d. → [yiš.bē ~ yišb] underapplication

(34) If the OO constraint posited above were high ranking then the overapplication candidate is incorrectly selected as optimal:

	/ya-šbē/	OO-Dep	NoCompCoda	IO-Dep
a.	← [yi.šə.bē ~ yi.šeb]			**
b.	[yi.šə.bē ~ yišb]	*!	*	*
c.	[yiš.bē ~ yi.šeb]	*!		*
d.	[yiš.bē ~ yišb]		*!	

(35) How could the OT model select the underapplication paradigm over the overapplication paradigm?

a. Benua (1997) proposes a mechanism she calls 'Recursive Application"

b. McCarthy (2005) argues that underapplication can only be possible if overapplication is blocked by some high ranking constraint.

(36) Benua's (1997) Recursive Application:

Recursion A:

	/ya-šbē/	OO-DEP	NOCOMPCODA	IO-DEP	>>
a.	[yi.šə.bē]			*!	
b.	[yi.šə.bē]			*!	
c.	[yiš.bē]				
d.	→ [yiš.bē]				

Recursion B:

	/ya-šbē/	OO-DEP	NOCOMPCODA	IO-DEP
a.	[yi.šeb]			*
b.	[yišb]	*	*	
c.	[yi.šeb]	*!		*
d.	→ [yišb]		*	

(37) An alternative analysis [McCarthy 2005 for a similar treatment]:

	/ya-šbē/	OO-DEP	*VCəCV	NOCOMPCODA	IO-DEP
a.	[yi.šə.bē ~ yi.šeb]		*!		**
b.	[yi.šə.bē ~ yišb]	*!	*	*	*
c.	[yiš.bē ~ yi.šeb]	*!			*
d.	→ [yiš.bē ~ yišb]			*	

Note: The markedness constraint *VCəCV is independently motivated.

(38) The treatments proposed above (in 36 and 37) have an apparent problem with the data in (26), which have been repeated below for convenience:

Imperfective Base	*Jussive*	
[yiɣ.lē]	[yiɣel]	'uncover'
[yiβ.ne]	[yi.βen]	'build'
[tiɸ.ne]	[tē.ɸen]	'turn'

→ Explain the problem posed by these data.

(39) An additional constraint [Benua 1997: 116]:

SON-CON: Syllable codas do not rise in sonority

(40) Here are four paradigms for the first example in (38). How could one explain formally that (c) and not (d) is correct?

a.		[yiɣəlē ~ yiɣel]	overapplication
b.		[yiɣəlē ~ yiɣl]	'backwards' application
c.	→	[yiɣ.lē ~ yiɣel]	normal application
d.		[yiɣ.lē ~ yiɣl]	underapplication

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