Opacity: evidence from West Germanic Gemination

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OVERVIEW

TWO APPROACHES TO OPACITY IN OPTIMALITY THEORY

(1) ***Interleaving***

- The phonology applies recursively over progressively larger, more inclusive domains defined by morphological and syntactic structure, i.e. it *cycles*.
- Each phonological domain is assigned to a particular *level*, where each level is characterized by its own constraint hierarchy.
- No transderivational correspondence.
- E.g.: Lexical Phonology and Morphology in OT (Kiparsky 1998a)
  Sign-Based Phonology and Morphology (Orgun 1996a, b)

(2) ***Strong Parallelism***

- The phonology applies *non-recursively*, i.e. the UR→SR mapping is effected by means of a single pass through GEN and EVAL.
- Misapplication arises from multiple parallel *transderivational correspondence* relationships between the output and other (real or virtual) output representations.
- E.g. OO-identity (Benua 1995, 1997; Kager 1995; Kenstowicz 1996; etc.)
  Sympathy (McCarthy 1998; Itô & Mester 1997; de Lacy 1998; etc.)

(3) ***Sympathy***

- The output (or ☞-candidate) is faithful to a designated failed output co-candidate (the ❀-candidate).
- The ❀-candidate is $\aleph_C$, i.e. the most-harmonic of all the candidates that satisfy a low-ranking, crucially dominated selector constraint C (the ★-constraint).
- Debate on the nature of the ★-constraint:
  (i) must be an IO-faithfulness constraint (McCarthy 1998).
  (ii) need not be an IO-faithfulness constraint (Itô & Mester 1997, de Lacy 1998)

WEST GERMANIC GEMINATION AS OPAQUE MORA PRESERVATION

Description (Simmler 1974)

(4) All consonants other than /r/ geminate before [j]

(4a) • after V̆: in all branches of West Germanic

Go		OS	OE	OHG
saljan	‘offer’ INF	*se**ll**ien*	*se**ll**an*	*ze**ll**en*
kunjis	‘race’ GEN.SG	*ku**nn**ies*	*cy**nn**es*	*chu**nn**es*
hafjan	‘lift’ INF	(*af*)*he**bb**ien*	*he**bb**an*	*he**ff**en*
bidjan	‘ask’ INF	*bi**dd**ien*	*bi**dd**an*	*bi**tt**en*

(4b) • after V̄ or VC: only in Upper German (see Braune/Eggers 1975: §96, Anm. 1)

Go		OS	OE	OHG
dailjan	‘divide’ INF	*dēlien*	*dǣlan*	(*ar*)*tei**ll**an*[1] / *teilen*
wēnjan	‘expect’ INF	*wānian*	*wēnan*	(*far*)*uuā**nn**an*[2] / *wānen*
láusjan	‘release’ INF	*lōsian*	*lȳsan*	*lō**ss**an*[3] / *lōsen*
fōdjan	‘feed’ INF *fōdian*	*fēdan*	*vuo**tt**an*[4] / *fuoten*	

[1] Simmler (1974: 215) [2] Simmler (1974: 221) [3] Simmler (1974: 231) [4] Simmler (1974: 238)

(5) /p t k/ geminate before /r l/ after V̆ in all branches of West Germanic:

ON		OS	OE	OHG
snotr	‘wise’	*sno**tt**ar*	*sno**tt**or*	*sno**tt**ar*
bitr	‘bitter’	*bi**tt**ar*	*bit*(***t***)*er*	*bi**tt**ar*

The syllabic basis of West Germanic Gemination

(6) The clusters affected by West Germanic Gemination were *heterosyllabic* in Common Germanic (Kauffmann 1887, Murray & Vennemann 1983, Vennemann 1988: 42-47)

(7) The constraint ***[**$_{s}$**C**j (Calabrese 1994: 163-165) is superordinate in Common Germanic. Evidence from Gothic:

- *C*j clusters are absent in word-initial position (Calabrese 1994: 164-166)

  e.g. /fIan/ → [fi.an], not *[fjan] ‘hate’ <fian>, <fijan>

- In the manuscripts, word division occurs between *C* and j (Hechtenberg Collitz 1906, Schulze 1908, Hermann 1923, Murray & Vennemann 1983: 515)

  e.g. *mat | jan*, *al | ja*, *sun | ja*
  band | jan, *sōk | jandans*, *háus | jan*

(8) In Common Germanic, CR clusters are heterosyllabic after a monomoric sequence and tautosyllabic after a bimoric sequence: i.e. **ˈV̆C.RV vs ˈV̄.CRV, ˈVC.CRV**.

- Manuscript evidence:

  Gothic: Codex Ambrosianus E (= *Skeireins*), Ambrosianus B (Kiparsky 1998b: §7) [The Codex Argenteus and Ambrosianus A are problematic.]

  OHG: Monsee fragments (Schulze 1908: 408, fn.; cited by Kiparsky 1998b: §8)

  OE (Wetzel 1981, Lutz 1986)

- Poetic metre:

  "In der altgermanischen Poesie bilden alle zweiteiligen Konsonantengruppen Position" (Hermann 1923[1978]: 280; quoted in Murray & Vennemann 1983: 517).

(9) West Germanic Gemination enforces CONTACT (Murray & Vennemann 1983, Vennemann 1988: 40-47)

CONTACT (Clements 1990, 1992; Vennemann 1988: 40)
Given a syllable contact $a_\sigma][_\sigma b$, the sonority value of a is greater than that of b.

	CONTACT	*$[_\sigma$Cj
bid.jan	*!	
bid.djan ☞		*

(10) ——|——[...]——|——|——|——|——> *Sonority*
p t k [...] m n ŋ l r j

- Highly sonorous [j] triggers gemination of all consonants except sonorous [r].
- The liquids only trigger gemination of the least sonorous consonants.

(11) Why not [bid.jan] > *[bi.djan], rather than [bid.jan] > [bid.djan]?

(11a) • Vennemann's answer: "resyllabification [...] would be contrary to the Weight Law" (1988: 45)

PKPROM (adapted from Prince & Smolensky 1993: 39) ≈ Weight Law
If a syllable bears stress, then it is bimoric.

(11b) • Vennemann's answer fails because:
(i) it fails to explain Upper German *tei**ll**an, uuā**nn**an, lō**ss**an, vuo**tt**an*, etc.; see (4b)
(ii) if PKPROM » IDENT$^\mu$, then gemination is predicted everywhere after short vowels.

		CONTACT	PKPROM	*[Cj	IDENT$^{\mu}$
kunja	kun.ja	*!			
	ku.nja		*!	*	
	kun.nja ☜			*	*
weenjan	ween.jan	*!			
	wee.njan 💣			*	
	ween.njan			*	*!
nasida	na.si.da		*!		
	nas.si.da 💣				*

Opaque mora preservation

(12) West Germanic Gemination *preserves mora count*:

e.g.

Gmc. [kun.ja] > WGmc. [kun.nja]
'race' DAT.SG

```
      σ       σ       σ     __σ
     /|\     /|      /|\   / /|
    / μ μ   / μ     / μ μ / / μ
   /  | |  /  |    /  | |/ /  |
  k   u n  i  a > k   u n  i  a
```

(13) The shift of the first consonant into the onset of the following syllable *counterbleeds* Weight by Position, which consequently appears to *overapply*:

(13a) • Weight by Position (Hayes 1989: 258)

```
σ          σ
|          |\
μ          μ μ
|          | |
α  β  →    α β
```

iterative in Gmc (Hayes 1989: 291)

(13b) • Counterbleeding by West Germanic Gemination

```
                   σ       σ           σ     __σ
                  /|\     /|          /|\   / /|
 μ     μ         / μ μ   / μ         / μ μ / / μ
 |     |        /  | |  /  |        /  | |/ /  |
k u n i a →    k   u n  i  a   →   k   u n  i  a

                   σ     σ
                  /|    /|
 μ               / μ   / μ
 |              /  |  /  |
k u n i    →   k   u  n  i
```

cf. 'race' NOM.ACC.SG

(14) CL for loss of j in Lesbian and Thessalian (Wetzels 1985: 304)

```
                            σ      σ               σ     σ
                          //|\    /|\            //|\   /|\
    μ     μ μ            // μ μ  / μ μ          // μ μ / μ μ
    |     |/            / | | |  | |/          / | | |/  |/
k r i n i o     →     k r i n  i o     →     k r i n   o
```

Sievers' Law and the rôle of weight in *j*-triggered gemination (Kiparsky 1998b)

(15) Why is WGmc. Gemination in OHG different from OS and OE?

Kiparsky's (1998b) proposal:

- OS and OE descend from a Gmc. branch with *full Sievers' Law* (as in PGmc), where C.jV does not occur after heavy sequences.
- Upper German descends from a Gmc. branch with *restricted Sievers' Law* (as in Gothic), where C.jV does occur after heavy sequences.

e.g.	*all WGmc.*	*pre-OS/OE*	*pre-OHG*
UR	/sal-I-an/	/food-I-an/	/food-I-an/
Syllabification	sal.jan	foo.di.an	food.jan
Gemination	sal.ljan	n.a.	food.djan

(16) Full Sievers' Law (Sievers 1878; for the early Runic evidence, see Springer 1975)

(16a) /I/ → [i] when sonority peak e.g. /sal-I-da/ → [sa.li.da] 1SG.PRET.IND

/C-I-V/ → [C.jV] unless coda C creates ill-formed moraic trochee

otherwise, [CiV] where
[Cia] → [Ci.a] (hiatus)
[Cii] → [Cii] (coalescence)

(16b)

Short stems		*[$_\sigma$Cj	FtForm	Onset	Contact
sal-I-an	(sa.lja)n	*!			
	(sa.li.)an			*!	
	(sal.)jan ☜				*
sal-I-Is 2SG.PRES.IND	(sa.lji)s	*!			
	(sa.lii)s		*! (μμμ)		
	(sa.li.)is			*!	
	(sal.)jis ☜				*

(16c)

Long stems		$*[_\sigma Cj$	FtForm	Onset	Contact
food-I-an	(foo.)djan	*!			
	(food.)jan		*! (μμμ)		*
	(foo.)di.an ☜			*	
food-I-Is	(foo.)djis	*!			
	(food.)jis		*! (μμμ)		*
	(foo.)di.is			*!	
	(foo.)diis ☜				

(17) Restricted Sievers' Law: reverse the relative ranking of Onset and FtForm

(17a) /I/ → [i] when sonority peak

/C-I-a/ → [C.ja] as hiatus is prohibited, i.e. *[Ci.a]

/C-I-I/ → [C.ji] unless coda C creates ill-formed moraic trochee otherwise, [Cii]

(17b)

Short stems		$*[_\sigma Cj$	Onset	FtForm	Contact
sal-I-an	(sa.lja)n	*!			
	(sa.li.)an		*!		
	(sal.)jan ☜				*
sal-I-Is	(sa.lji)s	*!			
	(sa.li.)is		*!		
	(sa.lii)s			*! (μμμ)	
	(sal.)jis ☜				*

N.B. $*[_\sigma Cj$ » Onset because *[fjan] ≺ [fi.an]; see (7) above.

(17c)

Long stems		*[$_\sigma$Cj	ONSET	FTFORM	CONTACT
food-I-an	(foo.)djan	*!			
	(foo.)di.an		*!		
	(food.)jan ☞			* (μμμ)	*
food-I-Is	(foo.)djis	*!			
	(foo.)di.is		*!		
	(food.)jis			*! (μμμ)	*
	(foo.)diis ☞				

The rôle of weight in liquid-triggered gemination

(18) /CRV/ → [C.RV] unless coda C creates an ill-formed moraic trochee
otherwise, [.CRV]

(19) Examples from Gothic manuscripts (Ambrosianus B and E); see Kiparsky (1998b: §7)
ak | *ran* ‘fruit’ vs *af* | *tra* ‘again’

		FTFORM	*[$_\sigma$CC	CONTACT
akran	(a.kra)n		*!	
	(ak.)ran ☞			*
aftra	(aft.)ra	*! (μμμ)		*
	(af.)tra ☞		*	

Summary

(20) Constraint rankings *prior* to West Germanic Gemination:

- ancestor of OS/OE: *[$_\sigma$Cj, FTFORM » ONSET, *[$_\sigma$CC » CONTACT
- ancestor of OHG: *[$_\sigma$Cj » ONSET » FTFORM » *[$_\sigma$CC » CONTACT

(21)
- West Germanic Gemination involved the demotion of *[$_\sigma$Cj and *[$_\sigma$CC relative to CONTACT.
- The morae assigned to erstwhile short coda consonants were opaquely preserved.

LEVELS VS SYMPATHY

(22) **A note on moraic correspondence**

I assume the following version of IDENT$^{\mu}$ (for formalization and typological justification, see Bermúdez-Otero in prep.: ch. 2)

IDENT$^{\mu}$ Either (i) an output segment is attached to the same number of morae as its input correspondent;
or (ii) an output segment whose input correspondent is non-moraic is solely licensed by a single mora.

In this formulation, IDENT$^{\mu}$ penalizes:
- shortening
- lengthening
- vowel desyllabification

but it does not inhibit:
- Weight by Position
- glide vocalization

N. B. This formulation simplifies the argument below, but is not crucial to the conclusion that a sympathy analysis requires *[$_{\sigma}$Cj to be th ★-constraint.

Stratal analysis

(23)
- The constraint rankings established in (20) hold in the lexical phonology.

  Evidence: morphologization of Sievers' Law in Gothic.
  Neuter long stems resist vocalization (Braune/Ebbinghaus 1973: §95)
  e.g. /riik-I-Is/ → [riik.jis], *[rii.kiis] ‘kingdom’ GEN.SG

- The reranking of CONTACT relative to *[$_{\sigma}$Cj and *[$_{\sigma}$CC takes place at a low level, probably postlexically.

- Morae assigned to short coda consonants in the lexicon are preserved postlexically by IDENT$^{\mu}$.

(24a)

Lexical phonology					
/bid-I-an/	IDENT$^{\mu}$	*[$_{\sigma}$Cj	FTFORM	ONSET	CONTACT
bid.djan	*!	*!			
bi.djan		*!			
bi.di.an				*!	
bid.jan ☞					*

(24b)

Postlexical phonology					
[bid.jan]	IDENT$^{\mu}$	FTFORM	CONTACT	*[$_{\sigma}$Cj	ONSET
bi.di.an	*!				*
bi.djan	*!			*	
bid.jan			*!		
bid.djan ☜				*	

Sympathy analysis

(25) • The opaque winning candidate violates IDENT$_{IO}^{\mu}$ through consonant lengthening. This violation is *opaque* insofar as it is not required to satisfy a higher-ranked markedness or IO-faithfulness constraint.

In fact, the markedness and IO-faithfulness violations of the transparent losing candidate (marked below as ☹) are a *proper subset* of those of the opaque winning candidate.

• The opaque winning candidate is faithful to the mora count of the ❀-candidate: i.e. IDENT$_{❀O}^{\mu}$ » IDENT$_{IO}^{\mu}$.

• The ❀-candidate is selected by ★-*[$_{\sigma}$Cj, which is crucially dominated by CONTACT.

(26)

bid-I-an	IDNT$_{❀O}^{\mu}$	FTFORM	ONSET	CONTACT	IDENT$_{IO}^{\mu}$	★-*[$_{\sigma}$Cj
bi.di.an	*!		*			
bid.jan ❀				*!		
bi.djan ☹	*!					*
bid.djan ☜					*	*

Conclusion

(27) The evidence of West Germanic Gemination indicates that Sympathy Theory must countenance the use of markedness constraints as ❀-selectors, i.e. 'extended' sympathy (Itô & Mester 1997).

EVALUATION: OPACITY IN A DIACHRONIC PERSPECTIVE

Issues of explanation: is opacity functional?

(28) Are transderivational correspondence constraints grounded on lexical recognition?

- "Observance of Base-Identity serves to improve the transparency of morphological relationships between words and thus may enhance lexical access." (Kenstowicz 1996: 370)
- "[T]he ❀-candidate is chosen because it obeys a specified faithfulness constraint, and the output is compelled to resemble (i.e., be faithful to) the ❀-candidate. In this way, a sympathetic effect on the input→output mapping indirectly improves recoverability of the input from the output." (McCarthy 1998: 13)

(29) No! If markedness constraints can be ❀-selectors, then the ❀-candidate need not be more faithful to the input than the ☞-candidate, and sympathy need not improve lexical access:

e.g. in West Germanic, $\text{IDENT}_{❀O}^{\mu}$ and IDENT_{IO}^{μ} crucially conflict, with the former being directly responsible for violations of the latter; see tableau (26).

Conclusion: *opacity is not grounded on lexical access.*

(30) Cf. interleaved OT: opacity takes a 'free ride' on the design of the interface of phonology with the rest of the grammar.

- Innovations often arise by through stochastic processes of *hypocorrection* (Ohala 1989, 1992, 1993) whereby automatic phonetic effects are misanalysed as phonologically controlled; hence the effect of 'addition of a rule at the end of the grammar' (Halle 1962: 68; Kiparsky 1970: 309).
- Such innovations can be encoded at the postlexical level, guaranteeing:
  (i) they will be *surface-true* (no access to morphology, no further phonology)
  (ii) they will be able to *render the lexical phonology opaque*.

Issues of generative power: markedness reversal

(31) A generalization lost to interleaved OT?

- "Promotion of faithfulness is the key to serial OT analyses of cyclic effects —in fact it is only faithfulness, and never markedness, that changes its ranking position between levels." (Benua 1997: 90)
- "[T]o the extent that subgrammar theory is predicated on differences between levels of derivation, it is committed to explaining the similarities between them. In particular, it should explain why relative markedness rankings do not differ." (Benua 1997: 218)

(32)	No!	West Germanic	Lexical:	{ *[$_\sigma$Cj, *[$_\sigma$CC } » CONTACT
			Postlexical:	CONTACT » { *[$_\sigma$Cj, *[$_\sigma$CC }

The life cycle of phonological generalizations

(33) A question for (synchronic) grammar theory?

> "[T]his move [sc. OT+serialism] is fundamentally misconceived. For one thing, as Benua (1997[: §3.5.4.2]) argues, two arbitrary constraint hierarchies can differ from one another in many ways, but the actual differences between strata in a single language are quite limited, leaving an unexplained (and perhaps inexplicable) gap between prediction and observation." (McCarthy 1998: 9-10)

(34) No! The explanation for limited cophonology divergence lies in history:

Impact of Lexicon Optimization on an interleaved system (Bermúdez-Otero in prep.: §3.3.3.2):

UR

↓

Stem Level ↑ *input optimization 3*

↓

Stem-level representation

↓

Word level ↑ *input optimization 2*

↓

Lexical representation

↓

Postlexical level ↑ *input optimization 1*

↓

SR ≈ acquisition trigger

Prediction: Phonological innovations tend to percolate historically from lower to higher levels (Kiparsky 1988, 1995; Harris 1989; McMahon 1991; Zec 1993)

ergo

Today's lexical phonology is yesterday's postlexical phonology.

(35) Can strongly parallel OT deduce the life cycle of phonological generalizations from independently required principles?

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