Revisiting Self-Destructive Feeding in Javanese

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1 Introduction

Self-destructive feeding (SDF henceforth) is a type of opacity where "an earlier rule feeds a later rule that in turn crucially changes the string such that the earlier rule's application is no longer justified" (Baković 2011:59). A case of SDF is found in Javanese (Austronesian), where n-deletion self-destructively feeds h-deletion (1).

(1) SDF in Javanese (Lee 1999, 2007)

	UR	a. /omah+ne/	b. /kulit̪+ne/	c. /səkolah+an/
n-deletion:	n → ∅ / C_	∅	∅	
h-deletion:	h → ∅ / V_V	∅		∅
	SF	[omae]	[kulit̪e]	[səkolaan]

Specifically, the deletion of /h/ obscures why /n/ is deleted in the first place, because the existence of /h/ is a crucial part of the structural description of the n-deletion rule. Therefore, n-deletion self-destructively feeds h-deletion.

Although proposals have been made to account for the data above, it has been neglected that both n-deletion and h-deletion are cases of nonderived environment blocking (NDEB henceforth). Moreover, the approaches based on Optimality Theory (Prince and Smolensky 1993) adopted by Lee (1999) and Lee (2007) – namely Sympathy (McCarthy 1999) and OT with Candidate Chains (OT-CC; McCarthy 2006) – are somehow outdated. The aim of this paper is thus to make an updated proposal that also accounts for the NDEB effects cooccurring with SDF. Section 2 introduces the notion of SDF and explains why n-deletion and h-deletion are cases of NDEB. Section 3 reviews previous accounts for SDF in Javanese and points out their weaknesses. Section 4 makes a new proposal using underspecification and contextual faithfulness. Section 5 concludes.

2 Nonderived Environment Blocking

Nonderived environment blocking (NDEB) refers to cases where a phonological process is blocked unless the structural description is morphologically or phonologically derived (Kiparsky 1982, 1993) as exemplified by Finnish assibilation (2).

(2) NDEB in Finnish (Kiparsky 1993)

	UR	a. /halut+i/	b. /vete/	c. /sata/	d. /tila/
Vowel raising:	e → i / _ #		i		
Assibilation:	t → s / _ i	s	s		
	SF	[halusi]	[vesi]	[sata]	[tila]

Assibilation only applies when /t/ appears at morpheme concatenation boundaries (2a), or when its structural description is met by the application of a prior rule – in this case, vowel raising, which raises mid vowels before a word boundary to high vowels (2b). (2c) undergoes neither rule because the environment of neither rule is satisfied. The word-initial /t/ in (2d) does not assibilate, even though it appears before /i/ like (2a-b), because it is neither at a morpheme boundary (i.e., a morphologically-derived environment) nor in front of a high vowel derived by other phonological rules (i.e., a phonologically-derived environment).

What has not been noted in previous literature is that n-deletion and h-deletion in Javanese are also cases of NDEB, because they only take place in derived environments too. n-deletion is only observed when a C-initial suffix is attached. Morpheme-internal CN sequences are allowed, and the consonant preceding the nasal could be a stop, nasal, liquid, or even [h] (3).

(3) Morpheme-internal CN clusters

	SF	Gloss
a. sakwèhning	[sak˺wɛhniŋ]	‘all’
b. prayitna	[prajɪt̪˺nɒ]	‘cautious, carefully’
c. ningnang	[niŋnaŋ]	‘no different, exactly the same’
d. pêrnah	[pərnae]	‘the family relationship’
e. rèhné	[rɛhne]	‘seeing that, in view of the fact that’
f. wahné	[wahne]	‘besides’
g. mungguhné	[muŋgʊhne]	‘supposing’

h-deletion is a case of NDEB because morpheme-internal intervocalic /h/ sounds are not deleted (4). [h] is only deleted when the intervocalic environment is formed by suffixation.

(4) Morpheme-internal intervocalic [h]

	SF	Gloss
a. dhihin	[dihin]	‘the first’
b. prihatin	[prɪhatɪn]	‘anxious’
c. bihal	[bihal]	‘mule (smuggler)’ (borrowed from Arabic)
d. trahing	[tra(h)iŋ]	‘being a family member of’
e. mihun	[mihun]	‘rice flour noodle’ (borrowed from Chinese)

In short, since both n-deletion and h-deletion only take place in morphologically derived environments, they are both cases of NDEB.

3 Previous Accounts

3.1 Sympathy

Two accounts have been proposed to account for SDF in Javanese. Lee (1999) used McCarthy's (1999) Sympathy theory. In brief, Sympathy accommodates opacity in OT by "selecting a failed candidate to influence the output, and exercising that influence through a kind of faithfulness of the output to this failed candidate." More specifically, a sympathetic candidate (marked with ❀) mediates between the input and the output via a special faithfulness called *sympathy*. An input-output faithfulness constraint acts as a *selector* to choose the ❀-candidate, which is the relatively more harmonic one that does not violate the selector constraint. The final winning candidate must not only be the optimal candidate selected by the relatively ranked constraints in a language, but also be as faithful to the ❀-candidate as possible.

When it comes to Javanese, Lee (1999) proposed five constraints. To account for h-deletion, the markedness constraint *VhV must outrank the faithfulness constraint MAX (5). As for n-deletion, the markedness constraint *CN must outrank MAX. More highly ranked markedness constraints over MAX ensure that a VhV sequence or a consonant-nasal cluster is resolved by deleting one of the segments. To make sure that the nasal instead of the first consonant in the CN sequence gets deleted, another constraint MAX-STEM, which penalizes the deletion of any stem segment from the input, must also outrank MAX. Because the nasal always appears in the suffix, its removal will not violate MAX-STEM but the removal of the first consonant in the stem will (6). However, without Sympathy, [omane] is selected instead of [omae] (7).

(5) Evaluation of /səkolah+an/ (Lee 1999:33)

/səkolah+an/	*VhV	MAX
a. ☞ səkolaan		*
b. səkolahan	*!	

(6) Evaluation of /kulit̪+ne/ (Lee 1999:32)

/kulit̪+ne/	*CN	Max-Stem	Max
a. ☞ kulit̪e			∗
b. kulit̪ne	∗!		
c. kuline		∗!	∗
d. kulie		∗!	∗∗

(7) Evaluation of /omah+ne/ (Lee 1999:34)

/omah+ne/	*CN	*VhV	Max-Stem	Max
a. ☹ omae			∗	∗∗!
b. 💣 omane			∗	∗
c. omahne	∗!			
d. omahe		∗!		∗

To solve this problem, a sympathetic constraint ❀ DepO Max-Stem was proposed. This constraint penalizes any insertion of segments in comparison with the ❀-candidate picked out by the selector Max-Stem. *CN also needs to outrank *VhV because only such ranking avoids the fully faithful candidate [omahne] being undesirably selected as the ❀-candidate. Since the relatively more harmonic candidate that also does not violate Max-Stem is [omahe], the constraint ❀ DepO Max-Stem thus militates against any insertion in comparison with [omahe]. As long as ❀ DepO Max-Stem is ranked above Max, the actual winning candidate [omae] is successfully selected (8).

(8) Sympathetic evaluation of /omah+ne/ (Lee 1999:35)

/omah+ne/	*CN	*VhV	Max-Stem	❀ DepO Max-Stem	Max
a. ☞ omae			∗		∗∗
b. omane			∗	∗!	∗
c. omahne	∗!		✓	∗	
d. ❀ omahe		∗!	✓		∗

3.2 OT-CC

The second solution, implemented in Lee (2007), used the OT-CC theory (McCarthy 2006) which refers to the intermediate level of derivation via candidate chains. Unlike Standard OT, Gen of OT-CC must produce candidates in a chain by imposing gradual divergence requirement and harmonic improvement requirement (McCarthy 2006:14). All candidate chains begin with a fully faithful candidate, and the next candidate must always be “gradually divergent’ and harmonically improved” compared with the previous one. That is, if there exists candidate chains as in (9):

(9) Exemplar candidate chains
Chain 1 <Cand$_1$>
Chain 2 <Cand$_1$, Cand$_2$>
. . .
Chain n <Cand$_1$, Cand$_2$, ..., Cand$_n$>

Cand$_1$ is always the fully faithful candidate, and only one faithfulness constraint is violated each time to get from Cand$_1$ to Cand$_2$, from Cand$_2$ to Cand$_3$, and so on.

Another important piece of OT-CC is the Prec constraint, the restriction on the order in which constraints are violated. Prec(A,B), where A and B stands for two faithfulness constraints, dictates that candidates in a chain must violate constraint A first before violating B. Skipping A or reversing the order of A and B in violations is penalized (10):

(10) Evaluating PREC constraints
a. Constraint A violation and then constraint B violation (✓PREC)
b. Only constraint B violation (*PREC)
c. Only constraint A violation (✓PREC)
d. Constraint B violation and then constraint A violation (**PREC)
(Lee 2007:338)

Without the help of OT-CC and PREC, Lee (2007) uses constraints *CN, *VhV, MAX-STEM and MAX-SUFFIX to account for Javanese SDF, but the wrong output form is selected (11). Once the candidates in (11) are replaced by valid candidate chains in (12) and a constraint PREC(MAX-SUFFIX,MAX-STEM) is added above MAX-SUFFIX, [omae] can be correctly selected (13).

(11) Without OT-CC (Lee 2007:345)

/omah+ne/	*CN	*VhV	MAX-STEM	MAX-SUFFIX
a. ☹ omae			*	*!
b. 💣 omane			*	
c. omahne	*!			
d. omahe		*!		*

(12) Valid chains of /omah + ne/ and the faithfulness constraints they violate listed in order
a. <omahne> Faithful parse
b. <omahne, omahe> *Max-Suffix
c. <omahne, omane> *Max-Stem
d. <omahne, omahe, omae> *Max-Suffix → *Max-Stem
e. <omahne, omane, omae> *Max-Stem → * Max-Suffix
(Lee 2007:346)

(13) Evaluation of /omah+ne/ with OT-CC and PREC (Lee 2007:347)

/omah+ne/	*CN	*VhV	MAX-STEM	PREC	MAX-SUFFIX
a. <omahne> < >	*!				
b. <omahne,omahe> <MAX-SUFFIX>		*!			*
c. <omahne,omane> <MAX-STEM>			*	*!	
d. ☞ <omahne,omahe,omae> <MAX-SUFFIX,MAX-STEM>			*		*
e. <omahne,omane,omae> <MAX-STEM,MAX-SUFFIX>			*	*!*	*

(13a–b) are fatal because they violate more highly ranked markedness constraints. Among (13c-e), because PREC(MAX-SUFFIX,MAX-STEM) requires that MAX-SUFFIX is violated before MAX-STEM, (13d) incurs the least number of PREC violations by violating the two constraints in order. Therefore, the final winning candidate is the last form in chain (13d), namely [omae].

However, both Sympathy and OT-CC are suboptimal because they both acknowledge the intermediate stages of a derivation, making them not much different from rule-based serialism. More importantly, neither account captures the NDEB effects mentioned in section 2. Thus, a new OT account that avoids referring to intermediate stages and captures NDEB simultaneously is needed.

4 Proposal

4.1 Underspecification

Many theories have been proposed to deal with NDEB, including the Strict Cycle Condition (Mascaró 1976), Sequential Faithfulness (Burzio 2000), Colored Containment (van Oostendorp 2007), and Optimal Interleaving with Candidate Chains (Wolf 2008). However, as argued in Rasin (2023), the best theory which avoids the problems of persistent blocking, blocking within suffixes, and non-contrastive trigger (see section 3 and 4 of Rasin 2023 for details), is Kiparsky's (1993) underspecification theory used with morpheme structure constraints (Halle 1959, 1962, Chomsky and Halle 1968). Thus, this paper adopts the underspecification theory[1].

The essence of this theory is that, in the UR, some segments are underspecified while others are fully-specified (Kiparsky 1982, Archangeli and Pulleyblank 1989). Take Finnish assibilation for example (14). The voiceless alveolar obstruent which alternates on the surface [t$\sim$s] is underspecified as /T/ (14a-b), but that before /i/ in the UR is fully-specified /t/ (14d). Assibilation is a feature-filling rule which fills [+cont] to /T/ before /i/ and changes it to [s] (14a-b). For all underspecified /T/'s that do not undergo assibilation, a default rule T $\rightarrow$ t applies after assibilation (14c). Underlyingly fully-specified /t/ does not undergo assibilation or the default rule because both rules are feature-filling rules that can only apply to underspecified segments (14d).

(14) Underspecification derivation for Finnish assibilation

	UR	a. /haluT+i/	b. /veTe/	c. /saTa/	d. /tila/
Vowel Raising:	e $\rightarrow$ i / _ #		i		
Assibilation:	T $\rightarrow$ s / _ i	s	s		
Default:	T $\rightarrow$ t			t	
	SF	[halusi]	[vesi]	[sata]	[tila]

Two questions need addressing if the underspecification theory is adopted: "which segments"[2] and "what feature" should be underspecified. The Finnish example demonstrates that segments that we would like to protect from further phonological changes should be fully-specified, because the /t/ in a /ti/ sequence – which could be affected by assibilation – is fully-specified for protection. Therefore, in Javanese, the non-morpheme-final /h/ and /n/ segments (i.e., those that do not alternate in NDEB) should be fully-specified, while others are underspecified /H/ and /N/.

The more challenging question is what feature to underspecify. Unlike the Finnish case where the surface alternation happens between two segments [t$\sim$s], the alternations in Javanese are always between a segment and ∅. When [t] alternates with [s], where the two segments only differ by [cont], it is easily decided that [cont] should be the feature to be underspecified to accommodate later alternations. But when the alternation is simply between the presence and absence of a segment, and one assumes that the absence of a segment is attributed to whichever feature being unspecified on the surface, the choice of the feature to be underspecified among all features becomes unclear.

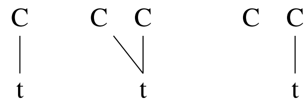
Thus, I choose to adopt the autosegmental underspecification-based account used by Kiparsky (1993) for Finnish consonant gradation. Kiparsky (1993) assumed that the skeletal tier containing C (consonantal) and V (vowel) slots are separated from the melodic tier hosting the segments. Fully-specified short and long consonants are associated with one and two C slots respectively, but underspecified geminates are associated with one C slot and preceded by another unassociated C slot (15). Segments must be fully-specified in order to appear on the surface. In other words, the linking and delinking between a consonant and a C slot can determine a consonant's presence or absence. Applying this idea to Javanese, I propose that underspecified segments /H/ and /N/ are not linked to C slots but fully-specified ones are, as in (16). Under the OT framework, the following constraints in (17) will be needed, and how SDF as well as NDEB are accounted for is shown in (18).

[1]For drawbacks of Kiparsky's (1993) theory, see Burzio (2000) and Inkelas (2000).

[2]Rasin (2023) discusses in detail how to determine the under- and fully-specified segments using the morpheme structure constraints he drafted. This paper will not go into the details but simply adopt his key idea of protecting segments that should not be easily changed by later phonological rules.

(15) Autosegmental underspecification representation for Finnish

a. short b. long c. underspecified



(adapted from Rasin 2023, (48))

(16) Autosegmental underspecification representation for Javanese

a. underspecified /H/ b. fully-specified /h/

(17) Constraints responsible for SDF (to be completed)

a. SPECIFY: Assign one violation for each segment that is not linked to a C/V slot (cf. SPECIFY[T] in Myers 1997:861 and Zoll 2003:241).

b. MAX_{full}: Assign one violation for each underlying fully-specified segment removed[3].

c. *VhV: Assign one violation for each fully-specified [h] between two vowels.

d. DEPLINK: Assign one violation for each association line added between a segment and a C slot (cf. NOLINK[place] in McCarthy 2008:278).

(18) SDF and NDEB accounted for (so far):

/omaH+Ne/	SPECIFY	MAX_{full}	*VhV	DEPLINK	MAX
a. ☞ omae					**
b. omane				*!	*
c. omahe			*!	*	*
d. omahne				*!*	
e. omaNe	*!				*
f. omaHe	*!				*
g. omaHne	*!			*	
h. omahNe	*!			*	
i. omaHNe	*!*				

/dihin/	SPECIFY	MAX_{full}	*VhV	DEPLINK	MAX
a. ☞ dihin			*		
b. diin		*!			*

/səkolaH+an/	SPECIFY	MAX_{full}	*VhV	DEPLINK	MAX
a. ☞ səkolaan					*
b. səkolahan			*!	*	
c. səkolaHan	*!				

[3] Note that MAX_{full} and MAX penalize the complete removal of a segment rather than the delinking between a segment and a slot.

/kulit̪+Ne/	Specify	Max$_{full}$	*VhV	DepLink	Max
a. ☞ kulit̪e					∗
b. kuline				∗!	
c. kulit̪ne		∗!		∗	∗
d. kulie		∗!			∗∗
e. kuliNe	∗!	∗			∗
f. kulit̪Ne	∗!				

4.2 Contextual Faithfulness

Although the SDF case and NDEB effects are accounted for, the relatively ranked constraints above are unable to correctly predict the presence of the suffix-initial /N/ (19). This is because the current ranking implies that the best solution for underspecified segments is to remove them. Therefore, the suffix-initial underspecified /N/ is deleted rather than preserved.

(19) Suffix-initial /N/ is not preserved

/kopi+Ne/	Specify	Max$_{full}$	*VhV	DepLink	Max
a. ☹ kopine				∗!	
b. 💣 kopie					∗
c. kopiNe	∗!				

To keep underspecified segments in such contexts, additional requirements on well-formedness are needed. The answer lies in the the strong preference for the CV syllable structure in Javanese. In general, it is widely acknowledged that CV is the most canonical syllable structure as it is the only structure that is found in all languages (Dryer and Haspelmath 2013, a.o.). For Javanese specifically, the most common word shape is CVCVC (Yip 1989:353). Observations of the data confirm this hypothesis too: whether the suffix surfaces as consonant- or vowel-initial depends on the final segment of the root. [-ne] surface when the root ends in a vowel and [-e] shows up when the root ends in a consonant.

Therefore, the [n $\sim \emptyset$] alternation could be the result of avoiding the deletion of the segment that is already part of the CV-alternating pattern. /N/ is underlyingly between two vowels, regardless of whether their neighbors are fully-specified. Removing these segments in turn destroys the preferred syllable structure, which is already in place.

A theoretically-supported constraint designed to protect a certain pattern in the UR is contextual faithfulness (Beckman 1998, Lombardi 1999, 2001, Wilson 2001, Steriade 2009). This paper adopts the kind of constraints with the shape of Max/_*K* (where *K* stands for the context) employed in the P(erceptibility)-map theory (Steriade 2009), which aim to preserve segments in certain UR environments. The constraint responsible for the generalization in Javanese is Max-C/V_V, which penalizes the deletion of any consonant between two vowels in UR. As long as this constraint is ranked above DepLink, intervocalic consonants in the UR can be successfully preserved. It also needs to be outranked by the markedness constraint *VhV, to derive the NDEB effects when an underspecified segment appears on a morpheme edge (20). How these constraints are applied to the SDF case is exemplified in (21).

(20) [n ∼ ∅] alternation accounted for:

kopiNe	SPECIFY	MAX$_{full}$	*VhV	MAX-C/V_V	DEPLINK	MAX
a. ☞ kopine					∗	
b. kopie				∗!		∗
c. kopiNe	∗!					

/səkolaH+an/	SPECIFY	MAX$_{full}$	*VhV	MAX-C/V_V	DEPLINK	MAX
a. ☞ səkolaan				∗		∗
b. səkolahan			∗!		∗	
c. səkolaHan	∗!					

(21) The SDF case [omae] is also accounted for:

/omaH+Ne/	SPECIFY	MAX$_{full}$	*VhV	MAX-C/V_V	DEPLINK	MAX
a. ☞ omae						∗∗
b. omane					∗!	∗
c. omahne					∗!∗	
d. omahe			∗!		∗	∗
e. omaNe	∗!					∗
f. omaHe	∗!					∗
g. omaHne	∗!				∗	
h. omahNe	∗!				∗	
i. omaHNe	∗!∗					

4.3 Further Application

An important contribution this new proposal makes to the theory of SDF is that it also works for other cases of documented SDF. The most well-known cases come from Turkish (Turkic) (Baković 2011, 2007) as shown in (22). How these SDF cases can also be accounted for using the proposal above is illustrated in (23), with the only difference being the contextual faithfulness constraint MAX-V/C_C used to preserve the epenthetic vowel between two underlying consonants.

(22) SDF cases in Turkish

a. Epenthesis and Velar deletion (Sprouse 1997)

	UR	a. /bebek+n/	b. /ip+n/	c. /bebek+i/
Epenthesis:	∅ → i / C_C#	i	i	
Velar deletion:	k/g → ∅ / V_+V	∅		∅
	SF	[bebein]	[ipin]	[bebei]

b. Elision and Velar deletion (Kenstowicz and Kisseberth 1979)

	UR	a. /ajag+sɯ/	b. /ʧan+sɯ/	c. /bebek+i/
Elision:	s/j → ∅ / C_	∅	∅	
Velar deletion:	k/g → ∅ / V_V	∅		∅
	SF	[ajaɯ]	[ʧanɯ]	[bebei]

(23) Turkish SDF cases under the new analysis[4]

/bebeK+In/		SPECIFY	MAX$_{full}$	*VkV	MAX-V/C_C	DEPLINK	MAX
a. ☞	bebein					∗	∗
b.	beben				∗!		∗∗
c.	bebekn				∗!	∗	∗
d.	bebekin			∗!		∗∗	
e.	bebeIn	∗!					∗
f.	bebeKn	∗!			∗		∗
g.	bebeKin	∗!				∗	
h.	bebekIn	∗!		∗		∗	
i.	bebeKIn	∗!∗					

/ajag+Sɯ/		SPECIFY	MAX$_{full}$	*VkV	MAX-C/V_V	DEPLINK	MAX
a. ☞	ajaɯ						∗∗
b.	ajasɯ					∗!	∗
c.	ajagsɯ					∗!∗	
d.	ajagɯ			∗!		∗	∗
e.	ajaSɯ	∗!					∗
f.	ajaɡɯ	∗!					∗
g.	ajaɡsɯ	∗!				∗	
h.	ajagSɯ	∗!				∗	
i.	ajaɡSɯ	∗!∗					

5 Conclusion

This paper provides more details about the SDF phenomenon in Javanese and a new OT analysis for it. It is found that the rules involved in SDF in Javanese always involved NDEB. That is, both n-deletion and h-deletion only take place at morpheme concatenation boundaries. Previous OT analyses using Sympathy or OT-CC could not account for SDF and NDEB effects simultaneously, and are not ideal in the sense that they both acknowledged the existence of intermediate stages of a derivation.

The new proposal, which uses underspecification and contextual faithfulness, not only manages to account for SDF with Standard OT, but also captures NDEB effects at the same time. More widely speaking, this analysis can also be applied to other SDF cases (e.g., in Turkish). This proposal also leads to an open question for further research: if the SDF phenomenon can be analyzed as how underspecified segments surface in different contexts, then whether SDF is still a genuine type of rule interaction needs to be considered.

References

Archangeli, Diana, and Douglas Pulleyblank. 1989. Yoruba Vowel Harmony. *Linguistic Inquiry* 20:173–217.

Baković, Eric. 2007. A revised typology of opaque generalisations. *Phonology* 24:217–259.

[4]In order not to confuse the readers with capital letters G or K representing the class of velar stops with underspecified segments, which are also traditionally represented by capital letters, I abbreviate the constraint with *VkV, but it essentially targets both [k] and [g].

Baković, Eric. 2011. Opacity and ordering. In *The Handbook of Phonological Theory*, ed. J. Goldsmith, J. Riggle, and A. Yu, 40–67. London: Wiley-Blackwell.

Beckman, Jill N. 1998. Positional Faithfulness. Doctoral dissertation, University of Massachusetts, Amherst.

Burzio, Luigi. 2000. Cycles, non-derived-environment blocking, and correspondence. In *Optimality theory: Phonology, syntax, and acquisition*, ed. J. Dekkers, F. van der Leeuw, and J. van de Weijer. Cambridge: Cambridge University Press.

Chomsky, Noam, and Morris Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.

Dryer, Matthew S., and Martin Haspelmath. 2013. *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology.

Halle, Morris. 1959. *The Sound Pattern of Russian*. The Hague: Mouton & Co.

Halle, Morris. 1962. Phonology in generative grammar. *Word* 18:54–72.

Inkelas, Sharon. 2000. Phonotactic blocking through structural immunity. In *Lexicon in focus. Studia grammatica*, ed. B. Stiebels and D. Wunderlich, 7–40. Berlin: Akademie Verlag.

Kenstowicz, Michael, and Charles Kisseberth. 1979. *Generative Phonology: Description and Theory*. New York: Academic Press.

Kiparsky, Paul. 1982. Lexical morphology and phonology. In *Linguistics in the Morning Calm*, ed. The Linguistic Society of Korea, 3–91. Seoul: Hanshin.

Kiparsky, Paul. 1993. Blocking in nonderived environments. In *Studies in Lexical Phonology*, ed. S. Hargus and E. M. Kaisse, 277–313. San Diego: Academic Press.

Lee, Minkyung. 1999. A case of sympathy in Javanese affixation. In *Optimal Green Ideas in Phonology*, ed. K. Baertsch and D. A. Dinnsen, 31–36. Indiana: IULC Publications.

Lee, Minkyung. 2007. OT-CC and feeding opacity in Javanese. *Studies in Phonetics, Phonology, and Morphology* 13:333–350.

Lombardi, Linda. 1999. Positional faithfulness and voicing assimilation in Optimality Theory. *Natural Language & Linguistic Theory* 17:267–302.

Lombardi, Linda. 2001. Why Place and Voice are different: Constraint-specific repairs in Optimality Theory. In *Segmental Phonology in Optimality Theory: Constraints and Representations*, ed. L. Lombardi. Cambridge: Cambridge University Press.

Mascaró, Joan. 1976. Catalan phonology and the phonological cycle. Doctoral dissertation, Massachusetts Institute of Technology.

McCarthy, John J. 1999. Sympathy and phonological opacity. *Phonology* 16:331–399.

McCarthy, John J. 2006. Candidates and derivations in optimality theory. Ms., University of Massachusetts at Amherst.

McCarthy, John J. 2008. The gradual path to cluster simplification. *Phonology* 25:271–319.

Myers, Scott. 1997. Ocp effects in Optimality Theory. *Natural Language and Linguistic Theory* 15:847–892.

van Oostendorp, Marc. 2007. Derived environment effects and consistency of exponence. In *Freedom of Analysis*, ed. S. Blaho, P. Bye, and M. Kraemer. Berlin: Mouton de Gruyter.

Prince, Alan, and Paul Smolensky. 1993. Optimality Theory: Constraint interaction in generative grammar. Ms., Rutgers University.

Rasin, Ezer. 2023. Morpheme structure constraints solve three puzzles for theories of blocking in nonderived environments. *Linguistic Inquiry* 1–37.

Sprouse, Ronald. 1997. A case for enriched inputs. Ms., University of California, Berkeley. Available as ROA-193 from the Rutgers Optimality Archive.

Steriade, Donca. 2009. The phonology of perceptibility effects: The P-map and its consequences for constraint organization. In *The Nature of the Word: Studies in Honor of Paul Kiparsky*, ed. K. Hanson and S. Inkelas, 151–179. Cambridge, MA: MIT Press.

Wilson, Colin. 2001. Consonant cluster neutralisation and targeted constraints. *Phonetics in Phonology* 18:147–197.

Wolf, Matthew. 2008. Optimal interleaving: Serial phonology-morphology interaction in a constraint-based model. Doctoral dissertation, University of Massachusetts at Amherst.

Yip, Moira. 1989. Feature geometry and cooccurrence restriction. *Phonology* 6:349–374.

Zoll, Cheryl. 2003. Optimal Tone Mapping. *Linguistic Inquiry* 34:225–268.

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