

# Exceptions to rhotacism<sup>\*</sup>

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November 2012 (comments welcome)

## Abstract

Little attention has been paid to the numerous contexts in which RHOTACISM underapplies in Classical Latin. An exhaustive survey reveals that few of the explanations that have been advanced for these exceptions can be maintained. An alternative analysis of *s-r* alternations (previously attributed to RHOTACISM) is proposed, under which this alternation is a consequence of an independently motivated process of word-final coronal cluster simplification. This analysis predicts important details of the leveling of *s-r* alternations in late Latin.

Counterexamples to a grammatical rule are of interest only if they lead to the construction of a new grammar of even greater generality or if they show some underlying principle is fallacious or misformulated. (Chomsky and Halle 1968:ix)

## 1 Introduction

With sporadic exceptions (Saussure 1877), intervocalic *s* merges with *r* in Old Latin.

- (1) The sound change:  $s > r / V \_\_ V$

Earlier intervocalic *s* is found in archaic inscriptions (e.g., *Lases* for later *Lares* ‘local deities’; Baldi 2002:213f.) and implicated by comparative reconstruction (e.g., Latin *flōrale* ‘floral’ vs. Vestinian *flusare*; Watkins 1970). This change was actuated no later than the 4th century BCE, as indicated by Cicero’s comment that L. Papirius Crassus, consul in 336 BCE and dictator in 339 BCE, was the first of his line to spell his *cōgnōmen* as *Papirius* rather than the ancestral *Papisius*.

Numerous *s-r* alternations in Classical Latin derive from this sound change. For instance, many nouns have nominative and vocative singulars ending in *s*, but an intervocalic *r* in the singular obliques and throughout the plural.

- (2) Paradigm of ‘honor’:

	nom.	gen.	dat.	acc.	abl.	voc.
sg.	<i>honōs</i>	<i>honōris</i>	<i>honōrī</i>	<i>honōrem</i>	<i>honōre</i>	<i>honōs</i>
pl.	<i>honōrēs</i>	<i>honōrum</i>	<i>honōribus</i>	<i>honōrēs</i>	<i>honōribus</i>	<i>honōrēs</i>

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<sup>\*</sup>Thanks to Adam Albright, Gene Buckley, Elan Dresher, Dave Embick, Mark Hale, Daniel Ezra Johnson, Hilary Prichard, Don Ringe, Meredith Tamminga, and the CLS 48 audience for helpful comments.

These *s-r* alternations—and their ultimate demise in late Latin (see §5)—are widely cited as examples of non-derived environment blocking and of intraparadigmatic leveling. Nearly all discussions of these alternations assume that the underlying representation of ‘honor’ is /hono:s/, so that the oblique *r* is the intervocalic allophone of /s/ (e.g., Albright 2005:19, Foley 1965:62, Gruber 2006:142, Heslin 1987:134, Kenstowicz 1996:377, Kiparsky in press, Klausenburger 1976:314, Matthews 1972:19, Roberts 2012:88, Touratier 1975:264, Watkins 1970:526).

The *r* allophone of /s/ can be generated by neutralizing in intervocalic position whatever features contrast /s/ and /r/. Assuming that *r* is not specified for the predictable [+VOICE] (e.g., Steriade 1987), this may simply be the feature [STRIDENT].

(3) RHOTACISM: [+STRIDENT] → [−STRIDENT] / [+VOCALIC] — [+VOCALIC]

This rule accounts for *s-r* alternations in many masculine and feminine third declension nouns like *honōs-honōris*. Neuter third declension nouns also exhibit *s-r* alternations accompanied by unpredictable changes in the quality of the preceding vowel: e.g., *cucumis-cucumeris* ‘cucumber’, *nemus-nemoris* ‘grove’, *opus-operis* ‘work’. Two adjectives and six verbs show *s-r* alternations, and it can be suggested that certain inflectional affixes exhibit *s-r* alternations (e.g., Embick 2010:73). The appendix provides a reasonably comprehensive list of open-class items exhibiting *s-r* alternations in Classical Latin.

## 1.1 Underapplication of RHOTACISM

Ferdinand de Saussure, who discusses this data in his lectures on Latin and Greek phonology (Reichler-Béguelin 1980) and also in the *Cours de linguistique générale* (Saussure 1916) posthumously compiled from his notes, observes that later sound changes and borrowings have resulted in many instances of intervocalic *s* in Classical Latin (e.g., Baldi 1994, Safarewicz 1932:41f). Saussure regards this as evidence that RHOTACISM has been lost by the classical era (Anderson 1985:54).<sup>1</sup>

Quand on dit : « *s* devient *r* en latin », on fait croire que la rotacisation est inhérente à la nature de la langue, et l’on reste embarrassé devant des exceptions telles que *causa*, *rīsus*, etc.<sup>2</sup> (Saussure 1916:202)

Unlike earlier approaches, generative phonology does not accord any special status to phonological generalizations which are surface-true or exceptionless. It permits lexical exceptions as well as mechanisms like opaque rule interaction, which may explain underapplication in *rīsus*, for instance (see §3.2). However, there has not been any systematic attempt to consider generative mechanisms might account for the observed underapplication.

## 1.2 Outline

This study considers generative explanations for underapplication of RHOTACISM in Classical Latin, beginning with an exhaustive survey of the contexts licensing surface intervocalic *s* in non-derived and derived environments. This survey reveals that few of the prior attempts

<sup>1</sup>In this regard, Saussure may also have been influenced by the fact that RHOTACISM represents a conditioned neutralization of the phonemic /s/-/r/ contrast, violating the condition of biuniqueness in vogue at the time, but long since outmoded (see Halle 1959:22f).

<sup>2</sup>“Whoever says ‘*s* became *r* in Latin’ implies that rhotacism is inherent to the language, and remains puzzled by exceptions such as *causa* [‘cause’], *rīsus* [‘ridiculed’], etc.”—KG

to explain these exceptions can be maintained. The remainder of the study advances an alternative analysis of *s-r* alternations which does not invoke RHOTACISM, and considers the ramifications of this analysis for the leveling of *s-r* alternations.

### 1.3 Data

Word forms cited here are taken from the *Bibliotheca Teubneriana Latina* (BTL), an electronic corpus of all extant Classical texts; the earliest texts in this corpus are those of Plautus (3rd century BCE), the earliest well-preserved author, and the latest those of Apuleius and Gellius (2nd century CE) at the end of the pagan era. Forms not found in this corpus, whether reconstructed or inferred from incompletely attested paradigms, are indicated with a star (\*).

Transcriptions are given in the Roman alphabet, corresponding to the International Phonetic Alphabet, with the following exceptions. The characters *i* and *u* indicate nuclei [i, u] and glides [j, w] depending on position. The characters *c* and *x* correspond to [k] and [ks], respectively. The digraph *ae* is [aj], and *qu* represents [kw]. Repeated consonants mark geminates, and macrons indicate long vowels.

## 2 Exceptions in non-derived environments

Intervocalic *s* sequences can be found within many roots: *agāsō* ‘lackey’, *asellus* ‘donkey colt’, *asilus* ‘horsefly’, *asinus* ‘wild ass’, *bāsiāre* ‘kiss’, *caesar* ‘head of hair’, *cāseus* ‘cheese’, *casia* ‘cinnamon’, *disertus* ‘eloquent’, *inmusulus* ‘bird of prey’, *lāser* ‘juice of the laserpitium’, *lālīsō* ‘donkey foal’, *miser* ‘pathetic’, *\*murgisō* ‘crafty advocate’ (acc.sg. *murgisōnem*), *pausea* ‘(type of) olive’, *\*pesesta* ‘plague’ (acc.pl. *pesestas*), *prōsāpia* ‘lineage’, *quasillum* ‘basket for wool’, *rēsina* ‘resin’, *susum* ‘from below’, *susurrus* ‘whisper’, *uēsica* ‘bladder’.

### 2.1 Absolute neutralization

In many of these examples, intervocalic *s* corresponds to geminate *\*ss* in an earlier stage of Latin, which did not undergo the rhotacizing sound change; *\*ss* simplified after diphthongs and long monophthongs at a later date. Degemination of *\*ss* is nearly complete by the time of Plautus, though occasional archaic spellings are attested in the Classical period.<sup>3</sup> Kiparsky (in press) proposes that roots which have an intervocalic *s* before a long vowel contain underlying /ss/ so as to block the application of RHOTACISM; a later process (see §3.2) ensures that /ss/ is always realized as singleton *s* in this position. However, this analysis violates the ban on *absolute neutralization* convincingly argued for by Kiparsky (1968, 1973, 1982b, 1993) himself. Furthermore, even if absolute neutralization is allowed, there is still no explanation for the presence of intervocalic *s* after short vowels: e.g., *asinus*, *casia*, *disertus*.

<sup>3</sup>The grammarian Quintilian, writing in the first century CE, claims that *\*ss* persisted after diphthongs and long monophthongs into the 1st century BCE (Allen 1978:35). This claim is dubious insofar as instances of *ss* after long vowels, which Quintilian cites in support of his claim, are exceptionally rare in extant manuscripts, and there is even less evidence that this rare orthographic practice was reflected in contemporary speech. In contrast, extant manuscripts reliably preserve *ss* after short monophthongs; for example, *lassus* ‘weary’ is never spelled *\*lasus*.

## 2.2 Phonological blocking

Historical grammars of Latin (e.g., Leumann 1977:§180, Sihler 1995:§173, Sommer 1902:§119) report that a nearby *\*r* blocked the rhotacizing sound change in words such as *caesar* and *miser*. In light of the fate of intervocalic *\*s* in words such as *aurōra* ‘dawn’ and *soror* ‘sister’, this diachronic explanation is unconvincing. Cser (2010:42f), Gruber (2006:144), Itô and Mester (2003:66), and Roberts (2012:88) all propose synchronic analyses in which RHOTACISM is blocked by the presence of an *r* in an adjacent syllable. Cser (2010), for example, proposes a constraint which disfavors a sequence of non-final *r*’s separated by a short vowel. Unfortunately, even this narrow constraint has numerous exceptions, including many third conjugation present infinitives: e.g., *currere* ‘run’, *ūrere* ‘burn’. Phonological blocking is unlikely to explain these exceptions.

## 2.3 Loanwords

Intervocalic *s* occurs regularly in Greek loanwords, which may take either Greek or Latin inflectional suffixes. For instance, the nom.sg. form of ‘music’ may either be *mūsicē*, as in Greek, or Latin-like *mūsica*. With one exception (*tūs-tūris* ‘incense’),<sup>4</sup> however, RHOTACISM does not apply to foreign roots following Latin inflectional patterns: *ambrosia* ‘food of the gods’, *\*asōtus* ‘libertine’ (acc.sg. *asōtum*), *basis* ‘pedestal’, *basilica* ‘public hall’, *cerasus* ‘cherry’, *gausapa* ‘woolen cloth’, *lasanum* ‘cooking utensil’, *nausea* ‘nausea’, *pausa* ‘pause’, *philosophus* ‘philosopher’, *poēsis* ‘poetry’, *sarīsa* ‘lance’, *seselis* ‘seseli’. Intervocalic *s* is also preserved in loanwords from other languages: Germanic *glaesum* ‘amber’, *bisōntes* ‘wild oxen’; Celtic *gaesī* ‘javelins’, *omāsum* ‘tripe’.

## 3 Exceptions in derived environments

In light of the difficulties of providing an explanatory account of root-internal exceptions, it has been proposed that RHOTACISM is limited to derived environments.

Rhotacism, for example, changes /s/ to /r/ when, through morphological derivation, /s/ appears between two vowels. (Heslin 1987:134)

Synchronically, rhotacism applies only in *derived environments*...Once its character as a derived-environment process is understood, it can be seen that *rhotacism is virtually exceptionless*. (Kiparsky in press)

Descriptively, intervocalic *s* becomes *r* when the VsV sequence is derived by suffixation. (McCarthy 2003:148)

Additional proposals to constrain the RHOTACISM in non-derived environments are made by Blumenfeld (2003:90), Gruber (2006:149), Roberts (2012), and Touratier (1971:260f). However, intervocalic *s* is permitted in many derived environments.

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<sup>4</sup>Kiparsky (in press) claims that *tūs-tūris* illustrates the productivity of RHOTACISM, but it is just as plausible that the borrowing occurred before the actuation of the rhotacizing sound change:

The substitution of the letter *r* in the oblique case...shows that θύος could not have found its way into Latin later than the fourth century B.C. (Thiselton-Dyer 1911:507)

### 3.1 Root-final exceptions

The best-known instances of RHOTACISM consist of a root-final vowel-*s* sequence followed by a vowel-initial case/number suffixes, as in *honōs-honōris*. However, many Latin nominal roots fail to undergo RHOTACISM in this context (e.g., nom.sg. *-a, us, -um*): \**brīsa* ‘pressed grapes’ (acc.sg. *brīsam*), *carbasus* ‘fine linen’, *casa* ‘hut’, *causa* ‘cause’, *fūsus* ‘spindle’, *nāsus* ‘nose’ (see also *nāsūtus* ‘witty’), *pūsus* ‘little boy’ (see also *pusillus* ‘petty’), *pīsum* ‘pea’, *rosa* ‘rose’; *amāsiō* ‘lover’ and *equīsō* ‘stable boy’ may also belong to this category, though their internal structure is unclear. One striking example is *uās-uāsis* ‘vase’ (cf. *Lās-Laris* ‘local deity’).

Whereas some verbs exhibit root-final *s-r* alternations (e.g., *quaerere-quaestus* ‘inquire’), others tolerate intervocalic *s*: \**crisāre* ‘writhe amorously’ (2sg. present indicative *crisās*), *quae-sere* ‘beg’, *uisēre* ‘view’.

### 3.2 Perfects and agent nominals

While most verbs take the *-t-* allomorph of the perfect suffix and form agent nominals in *-tor*, roots ending in *t* and *d* select the *-s-* perfect allomorph and the *-sor* agent nominal allomorph.<sup>5</sup> The *s*-initial allomorphs trigger phonological adjustments: the root-final coronal is assibilated and devoiced to *s* after short vowels (4a) and deleted altogether after long nuclei (4b), producing surface intervocalic *s*.

(4) Perfect passive participles and agents:

a.	<i>metere</i>	‘reap’	<i>messus</i>	‘reaped’	<i>messor</i>	‘reaper’
	<i>fodere</i>	‘dig’	<i>fossus</i>	‘dug’	<i>fossor</i>	‘digger’
b.	<i>plaudere</i>	‘applaud’	<i>plausus</i>	‘applauded’	<i>plausor</i>	‘cheerer’
	<i>lūdere</i>	‘play’	<i>lūsus</i>	‘played’	<i>lūsor</i>	‘player’

Heslin (1987) argues this underapplication is the result of opaque rule interaction and that these data do not constitute true exceptions to RHOTACISM. Heslin proposes that *s*-initial allomorphs trigger assibilation of a root-final coronal stop, but a later process partially masks assibilation by simplifying medial geminate consonants before diphthongs and long monophthongs.<sup>6</sup> This is illustrated below (5–7).

(5) VOICE ASSIMILATION:  $[+VOICED] \longrightarrow [-VOICED] / \text{ — } [-VOICED]$

(6) ASSIBILATION:  $\left[ \begin{smallmatrix} +CORONAL \\ -SONORANT \end{smallmatrix} \right] \longrightarrow [+STRIDENT] / \text{ — } [+STRIDENT]$

<sup>5</sup>-*s-* and *-sor* were allomorphic variants of *-t-* and *-tor* before coronal-final roots in some prehistorical stage of Latin, but this phonological conditioning has eroded considerably by the classical era (Embick 2000:217, *pace* Heslin 1987). This is shown by near-minimal pairs *intendere-intentus* ‘extend’ and *impendēre-impensus* ‘expend’, as well as the appearance of *-s-* after roots ending in non-coronal consonants: e.g., *iubēre-iussus* ‘command’, *tergēre-tersus* ‘rub’. The analysis here assumes a suppletive account of this allomorphy for ease of exposition, but no claim is being made about how this allomorphy is computed; it remains an open question.

<sup>6</sup>A formalization of Latin degemination processes raises issues in the representation of geminates and diphthongs that are beyond the scope of this study, but which will be addressed in future work.

(7) Sample derivations and ordering arguments:

/fod-s-us/	/lu:d-s-us/	UR	
fotsus	lu:tsus	VOICE ASSIMILATION	
fossus	lu:ssus	ASSIBILATION	
		RHOTACISM	
	lu:sus	MEDIAL DEGEMINATION	(critical ordering: *lūrus)
<i>fossus</i>	<i>lūsus</i>	SR	

### 3.3 Denominal adjectives

Virtually all Latin nouns have a corresponding denominal adjective consisting of the root, the suffix *-ōs-*, and vowel-initial case/number suffixes. RHOTACISM does not apply in this context.

(8) Denominal adjectives in *-ōs-*:

- |    |               |             |                  |           |
|----|---------------|-------------|------------------|-----------|
| a. | <i>coma</i>   | ‘hair’      | <i>comōsus</i>   | ‘hairy’   |
|    | <i>fābula</i> | ‘story’     | <i>fābulōsus</i> | ‘storied’ |
| b. | <i>uentus</i> | ‘wind’      | <i>uentōsus</i>  | ‘windy’   |
|    | <i>nimbus</i> | ‘cloud’     | <i>nimbōsus</i>  | ‘stormy’  |
| c. | <i>sebum</i>  | ‘tallow’    | <i>sebōsus</i>   | ‘oily’    |
|    | <i>callum</i> | ‘hard skin’ | <i>callōsus</i>  | ‘callous’ |

This constitutes an open class of exceptions, but the exceptionality is characteristic of a single underlying representation, so this does not pose a serious problem for any mainstream theory of lexical exceptionality.

### 3.4 Prefixation and compounding

RHOTACISM does not apply when intervocalic *s* is derived by prefixation, even when the base and prefixed derivative do not stand in a transparent semantic relationship (e.g., *dēserere* ‘forsake’; cf. *serere* ‘sow’).

(9) Intervocalic *s* derived by prefixation:

- |    |                     |             |  |
|----|---------------------|-------------|--|
| a. | <i>antesignānus</i> | ‘commander’ | (cf. <i>ante</i> ‘in front’, <i>signāns</i> ‘marking’) |
|    | <i>dēsecāre</i>     | ‘cut off’   | (cf. <i>dē</i> ‘from’, <i>secāre</i> ‘cut’)            |
| b. | <i>cisalpīna</i>    | ‘cisalpine’ | (cf. <i>cis</i> ‘this side’, <i>alpīna</i> ‘alpine’)   |
|    | <i>disicere</i>     | ‘scatter’   | (cf. <i>dis-</i> ‘apart’, <i>iacere</i> ‘throw’)       |

RHOTACISM also underapplies to intervocalic *s* derived by compounding.

(10) Intervocalic *s* derived by compounding:

- |    |                   |           |  |
|----|-------------------|-----------|--|
| a. | <i>olusātrum</i>  | ‘parsnip’ | (cf. <i>olus</i> ‘vegetable’, <i>ātrum</i> ‘black’)    |
| b. | <i>pedisequus</i> | ‘footman’ | (cf. <i>pedī</i> ‘on foot’, <i>sequor</i> ‘to follow’) |

In both these contexts, there is no plausible source of phonological opacity, but at the same time, underapplication cannot be attributed to diacritic properties of any particular set of underlying representations, either.

This suggests that there are negative morphological conditions on RHOTACISM, in addition to lexical exceptions. Under the assumption that phonological processes and morphological operations are interleaved and assigned to a series of semi-autonomous ‘levels’, as in Lexical

Phonology, it is possible to provide a uniform analysis of the underapplication found in pre-fixation, compounding, and denominal adjective formation by placing these operations (and perhaps MEDIAL DEGEMINATION, as to derive the counterfeeding interaction; e.g., Kiparsky 2000) in a later stratum than that of RHOTACISM (Roberts 2012).

This provides no explanation for underapplication in root-internal and root-final contexts, however. The former cannot reasonably be attributed to non-derived environment blocking, since the latter represent a large class of derived environments in which RHOTACISM is blocked. Furthermore, there are nearly as many lexical exceptions as there are roots which exhibit *s-r* alternations. One may reasonably suspect a generalization has been missed.

The following section provides a unified account of derived and non-derived intervocalic *s*: it does by deriving nominal *s-r* alternations from an independently motivated process found in other third declension roots, and denying that RHOTACISM is a productive process.

## 4 The proper treatment of rhotacism

Most masculine and feminine third declension nouns form a nom.sg. in *-s*, which devoices final obstruents (via VOICE ASSIMILATION) and deletes root-final *t*, *d*.

(11) Third declension masculine/feminine plosive stems:

- |    |            |              |             |              |               |            |
|----|------------|--------------|-------------|--------------|---------------|------------|
| a. | <i>ops</i> | <i>opis</i>  | ‘resources’ | <i>plēps</i> | <i>plēbis</i> | ‘plebeian’ |
| b. | <i>cōs</i> | <i>cotis</i> | ‘whetstone’ | <i>laus</i>  | <i>laudis</i> | ‘praise’   |
| c. | <i>fax</i> | <i>facis</i> | ‘torch’     | <i>rēx</i>   | <i>rēgis</i>  | ‘king’     |

Latin has a bimoraic minimal word requirement, implemented by a process of SUBMINIMAL LENGTHENING (Mester 1994:20f.). As word-final *s* is not moraic in Latin, this produces the quantity alternation in *cōs-cotis*.

### 4.1 Assibilation and coronal consonant deletion

Heslin (1987) attributes coronal consonant deletion to the process of ASSIBILATION also found in *s*-perfects (§3.2), proposing that root-final *t*, *d* first assibilates, then is deleted by FINAL DEGEMINATION. The latter process is evidenced by certain third declension nouns which lack an overt nom.sg. suffix.

(12) Third declension geminate-final stems:

- |    |            |               |               |            |               |         |
|----|------------|---------------|---------------|------------|---------------|---------|
| a. | <i>as</i>  | <i>assis</i>  | ‘bronze coin’ | <i>os</i>  | <i>ossis</i>  | ‘bone’  |
| b. | <i>mel</i> | <i>mellis</i> | ‘honey’       | <i>far</i> | <i>farris</i> | ‘spelt’ |

However, Heslin fails to note two differences between ASSIBILATION in *s*-perfects and root-final coronal consonant deletion in the nom.sg. of third declension nouns. First, word minimality distinguishes between geminates which are (by hypothesis) derived by ASSIBILATION and those which are underlying. The former are subject to SUBMINIMAL LENGTHENING, but the latter are not: compare *cōs-cotis* and *os-ossis*. Secondly, coronal continuants before *s* behave differently in medial and final position. ASSIBILATION does not target continuants, since root-final *n* surfaces faithfully in *s*-perfects: *manēre-mansus* ‘stay’. Before nom.sg. *-s*, however, root-final *n* deletes: *pollis-pollinis* ‘seed’, *sanguis-sanguinis* ‘blood’ (the other nasal phoneme is unaffected: *hiems-hiems* ‘winter’). Heslin’s analysis has no explanation for either of these facts, and thus it can be concluded that ASSIBILATION is not responsible for deletion of coronals before nom.sg. *-s*.

## 4.2 Non-iterativity

As shown in (13), root-final *t*, *d* also deletes when preceded by a sonorant.<sup>7</sup>

(13) Derived word-final *rs* and *ns*:

- |    |                |                  |             |                |                  |           |
|----|----------------|------------------|-------------|----------------|------------------|-----------|
| a. | <i>iners</i>   | <i>inertis</i>   | ‘unskilled’ | <i>concors</i> | <i>concordis</i> | ‘united’  |
| b. | <i>mons</i>    | <i>montis</i>    | ‘mountain’  | <i>frons</i>   | <i>frondis</i>   | ‘leaf’    |
| c. | <i>capiens</i> | <i>capiensis</i> | ‘capturing’ | <i>audiens</i> | <i>audientis</i> | ‘hearing’ |

In (13bc), word-final /...nt-s, ...nd-s/ is realized as *ns*: it does not undergo further deletion, as might be expected given the behavior of underlying word-final /...n-s/ just discussed. Stampe (1979:ix) derives this fact by splitting deletion into two processes, with *n*-deletion preceding *t*, *d*-deletion. This produces the correct output, but requires extrinsically ordered rules with a similar structural description (coronals before *s*) and an identical structural change (deletion).

There is considerable evidence for “self-bleeding” or “non-iterative” phonological processes (e.g., Anderson 1974: chap. 9, Howard 1972:65f., Kavitskaya and Staroverov 2008, Kaye 1982, Kenstowicz and Kisseberth 1977:189f., 1979:319f., Sohn 1971; see McCarthy 2003 and Wolf 2011 for recent reviews), and it is known that not all such processes can be analyzed as two separate rules in a counterfeeding relationship in line with what Stampe proposes for Latin. In Odawa (Piggott 1975:126f.), for instance, word-final high vowels /i, u/ and glides /j, w/ delete, but word-final /...wi/ is realized as [...w], and word-final /...iw/ is realized as [...i]. As Piggott notes, no ordering of separate rules of glide deletion and high vowel deletion will produce both these outcomes. Non-iterativity is a consequence of the hypothesis that rules may be specified for direction of application (Johnson 1972), however. Directional rule application can be likened to sliding a structural description in one direction or another across a string of segments. If a deletion rule which specifies a right context for application (e.g., a following word-final *s*) is applied rightward, i.e., from left to right, the target portion of the structural description has already scanned beyond any potential targets for deletion which it derives.<sup>8</sup>

## 4.3 PRE-S DELETION

Coronal consonant deletion is formalized as deletion a coronal consonant before word-final *s*, and which applies from left to right so that it does not iterate.<sup>9</sup> This rule must apply before SUBMINIMAL LENGTHENING and FINAL DEGEMINATION to obtain the proper vowel length in monosyllable nom.sg. forms.

<sup>7</sup>Some Latin dictionaries give *mōns-montis*, *capiēns-capiensis*, and so on. This conflates metrical weight and vowel quantity, however: these syllables are heavy “by position” (i.e., by virtue of their complex codas), but there is no reason to believe that they also contain long monophthongs.

<sup>8</sup>Furthermore, Johnson (1972) and Kaplan and Kay (1994) prove that directional application is no more complex in the terms of formal learnability theory than simultaneous application.

<sup>9</sup>There are only two apparent exceptions to this rule: *trāns* ‘across’ and *fers* ‘you bear’. There is no reason to think the final *ns* in the former word is derived from anything else; it is simply a lexical exception. This word has cognates in many Romance languages (e.g., Spanish *tras*-), but no cognate preserves the exceptional *n* (Meyer-Lübke 1935:736f.), suggesting it was lost relatively early. Regarding *fers*, there are some reasons to speculate that is it underlyingly /fer-i-s/, since the -i- theme vowel appears in other forms of this verb (e.g., *ferimur* ‘we are borne’), and an abstract theme vowel is needed to derive the present infinitive -re in *ferre* under the hypothesis that it is derived from underlying /-se/ via RHOTACISM (e.g., Embick 2010:73f., Foley 1965:64).



(14) PRE-s DELETION (condition: rightward application):

$$[+CORONAL] \longrightarrow \emptyset / \left[ \dots \text{---} [+STRIDENT] \right]_{PRWD}$$

(15) Sample derivations and ordering arguments:

/ass/	/kot-s/	UR	
	kos	PRE-s DELETION	(critical ordering: *cos)
	ko:s	SUBMINIMAL LENGTHENING	(critical ordering: *ās)
as		FINAL DEGEMINATION	
as	cōs	SR	

PRE-s DELETION targets all coronal consonants. Of the coronals not yet considered, there is no evidence that roots ending in *s* or *l* select the *s* nom.sg. suffix (though note *puls-pultis* ‘porridge’). However, a root ending in *r* and selecting -s would show a final *s* in the nom.sg., and root-final *r* in the singular obliques and throughout the plural. This is, of course, the pattern of *honōs-honōris*, and suggests the possibility that many third declension nouns exhibiting *s-r* alternations have undergone covert restructuring in Classical Latin been, so that, for example, *honōs* derives from /hono:r-s/. Even a few lexical entries restructured in such a fashion would be sufficient to make non-alternation the default pattern for intervocalic *s* and to ensure the loss of productive RHOTACISM.

An analysis of Latin with a general process of RHOTACISM must incorporate the many negative conditions on its application discussed above. Treating RHOTACISM as the exception rather than the rule would therefore produce considerable grammatical simplification. Discussions of the *evaluation metric* (e.g., Chomsky and Halle 1968:330f.) argue that simplicity of description is a goal of not only the linguist but also of the infant acquiring a first language. This assumption is sufficient to motivate this covert restructuring.

Another advantage of this account is that would also admit a purely phonological account for the differential behavior of *uās-uāsis* and *Lās-Lāris*, or of *quaesere* ‘beg’ and *quaerer* ‘inquire’, for example: by hypothesis, the former root of both *paris* ends in underlying /s/ and the latter in underlying /r/.

## 4.4 Rhotacizing residue

It is not clear whether this account can be extended to neuter *s-r* alternations, which are generally accompanied by unpredictable changes in the quality of vowel to the left of the alternating consonant. If these vowel alternations yield to a purely phonological analysis, it could be argued that the root underlying *cinis-cineris* ends in /r/ and selects nom.sg. -s, although there is no independent evidence for this suffix in third declension neuters. If these vowel alternations require processes sensitive to lexical identity (e.g., readjustment rules), however, it seems plausible that such rules might also be called upon to account for the adjacent *s-r* alternation. A third possibility, and one that seems most desirable, is to analyze the alternating vowel-consonant sequences as allomorphs of noun-forming suffixes. A root /dek/ might be identified in the neuter *decus-decoris* ‘glory’, for instance, given masculine noun *decor* ‘charm’ and impersonal verb *decet* ‘it is fitting’, and several other apparent derivatives. Then, the noun-forming suffix has two phonologically conditioned suppletive allomorphs: /-us/, which appears finally, and /-or/, which appears elsewhere.

## 5 The leveling of *s-r* alternations

The phonology of Classical Latin as inferred from the textual record is remarkably stable. There is, however, a gradual tendency for nominal *s-r* alternations to be eliminated in favor of an invariant final *r*. For some roots, leveling is inferred by reconstruction, as the roots are invariant in Classical Latin: *angor* ‘anguish’, *amor* ‘love’, *ardor* ‘heat’, *candor* ‘radiance’, *cruor* ‘blood’, *furor* ‘rage’, *horror* ‘horror’, *plangor* ‘lamentation’, *pudor* ‘shame’ (Quellet 1969:59). Others have attested nom.sg. doublets: *arbōs/arbor* ‘tree’, *calōs/calor* ‘heat’, *clamōs/clamor* ‘shout’, *honōs/honor* ‘honor’, *Lās/Lar* ‘local deity’, *odōs/odor* ‘smell’, *pauōs/pauor* ‘ear’. The older *honōs-honōris* is favored by Plautus, whereas *honor-honōris* is the preferred form of Apuleius some four centuries later, yet it seems that both authors use both nom.sg. variants, assuming this is not an artifact of textual transmission.

### 5.1 Description and details

The introduction of the leveled *r* introduces an alternation the quantity of preceding long monophthongs. Consequently the leveling cannot be described as producing a reduction of allomorphy (Hogg 1979:57).<sup>10</sup> The short vowel in *honor-honōris* derives from a general process of vowel shortening before final liquids.<sup>11</sup>

$$(16) \text{ PRE-LIQUID SHORTENING: } \mu \longrightarrow \emptyset / \left[ \dots \mu \text{ — } [+LIQUID] \right]_{\text{PrWd}}$$

Leveling is restricted to masculine and feminine third declension nouns. Isolated reports that neuters participate in leveling (e.g., Hale et al. 1997:70, Kiparsky in press) are erroneous because the “unleveled” and “leveled” variants in each case differ in ways not predicted by leveling: meaning, vowel quantity, and gender (Kieckers 1930:§II.36). If these pairs are synchronically related, it is presumably because they derive from similar roots, not because one is the leveled variant of the other.

(17) Neuter/masculine “doublets”:

a.	<i>decus</i>	<i>decoris</i>	‘glory’	<i>decor</i>	<i>decōris</i>	‘charm’
b.	* <i>fulgus</i> <sup>12</sup>	<i>fulgoris</i>	‘flash’	<i>fulgor</i>	<i>fulgōris</i>	‘lightning’
c.	<i>tenus</i>	<i>tenoris</i>	‘noose’	<i>tenor</i>	<i>tenōris</i>	‘continuance’

It has been claimed that monosyllabic nouns do not level (e.g., Albright 2005, Kiparsky 1978, Roberts 2012:81), though there are exceptions in both directions: *Lar-Lares* levels, whereas *lepōs-lepōris* ‘grace’ does not. Given the small number of forms involved and the difficulties of relating syllable count to leveling, this is accorded no status here.

Kenstowicz (1996) and Kiparsky (1978) claim that denominal derivatives preserve the \**s* of their base after leveling occurs; e.g., *honor*, *honestus* ‘esteemed’. However, they fail to appre-

<sup>10</sup>Albright (2005) observes that word-final \*-ōs scans as heavy -ōr in the fragments of Ennius. At first blush, this suggests that leveling began before PRE-LIQUID SHORTENING was actuated, preserving the allomorphy-reduction hypothesis. However, word-final consonants syllabify as the onsets of following vowel-initial words (Allen 1978:127, Ryan in press), and in all of Albright’s examples, word-final *r* is followed by a vowel; for example, *clāmōr ad caelum uoluendus per aethera uāgit* ‘he cries a cry fit to soar up to heaven’ is syllabified [kla:mo:rad.kai.lum.wol.wen.dus.pe.raj.θe.ra.wa:git]. Presumably, resyllabification bleeds PRE-LIQUID SHORTENING.

<sup>11</sup>PRE-LIQUID SHORTENING has no surface effect on monosyllables: *fūr-fūris* ‘thief’, *sāl-salis* ‘salt’. This can be accounted for either by adding this condition to the rule, or by ordering it before SUBMINIMAL LENGTHENING so as to produce a “Duke of York” (Pullum 1976) derivation for *fūr*.

<sup>12</sup>This form is not found in the corpus, but occurs in the fragments of Festus (grammarian of the 2nd century CE).

ciate that this observation is predicted if these words are not synchronically related, in which case it is irrelevant to the analysis of leveling. Furthermore, there is no other synchronic precedent in Latin for an *o-e* alternation needed to relate these words.

## 5.2 Analysis

According to a traditional analysis, leveling is the result of lexical restructuring, in which the *r* of allophone of intervocalic /s/ is projected into underlying representation (e.g., Hale et al. 1997:70, Hock 1991:180f., Kiparsky 1965:§2.48, Mańczak 1958:396f.). Two details of the leveling are unexplained by this analysis. First, no explanation is given for the directionality of the change. Indeed, RHOTACISM, which shows signs of decadence in Classical Latin, seems more likely to disappear than to impose itself on underlying representations. Secondly, no account is given for the absence of leveling in neuters.

The possibility of covert restructuring shows that restructuring does not entail leveling; a further change is needed. In the third declension, nom.sg. -s is in competition with a null nom.sg., the latter being selected by a significant majority of *r*-final roots. If the null allomorph is analyzed as the default, as seems likely, it can be expected to gradually extend at the expense of the -s allomorph. As Kiparsky (1982a:230) argues, a child acquiring Latin who has heard oblique forms *honōs* but has failed to hear or internalize the nom.sg. would posit *honor* (Kiparsky 1982a:230). This is comparable to *overregularization* known from studies of children’s speech errors (e.g., Marcus et al. 1992). This extension results in leveling: e.g., /hono:r-s/ *honōs* > /hono:r-∅/ *honor*. This process might be hastened by variable deletion of final *s* (e.g., Wallace 1982, 1984). Under this analysis, the directionality of the change derives from the directionality of covert restructuring, which has already been motivated in terms of grammatical simplification, and the lack of leveling in neuters follows from the lack of a neuter nom.sg. -s allomorph required for covert leveling.

This proposal is similar in spirit to the analysis of Romance reflexes of the third declension proposed by Lahiri and Drescher (1983). Lahiri and Drescher argue that the spread of the Proto-Romance nom.sg. suffix -is eliminated the contexts for the Proto-Romance analogue of PRE-*s* DELETION, which reveals root-final consonants which were previously deleted in the nom.sg. From Latin *mons-montis* ‘mountain’, this produces Old French nom.sg. *montis*. It is possible to extend their analysis, which only discusses *t*-final roots, so as to also predict the fate of *s-r* alternations in early Romance. The Appendix Probi, a collection of grammatical prescriptions written in the 4th century CE, prescribes Classical *glis-gliris* ‘dormouse’ rather than a nom.sg. *gliris*, presumably a common solecism at the time. The reflexes in Modern Romance reflect this leveling: e.g., Italian *ghiro* (Meyer-Lübke 1935:323).

## 5.3 Paradigmatic matters

The leveling of *s-r* alternations is perhaps the best-known example of a linguistic change thought to be driven by “intraparadigmatic” factors such as a preference for non-alternating paradigms (e.g., Campbell 2004:110f., Hock 1991:180f., Lass 1997:250, Mańczak 1958:396f.). The analysis here does not accord any status to paradigms, non-alternating or otherwise; it recognizes them as epiphenomena, not objects, of grammatical computation. Rather, it derives analogical leveling by means of allomorphic extension of the null nom.sg. suffix. This is further evidence for the proposal of Garrett (2008:127), that all analogical leveling is simply a type of analogical extension.

## 6 Conclusion

A “new grammar of even greater generality” is possible under the hypothesis that RHOTACISM is unproductive in Classical Latin.

## A Appendix: lexical *s-r* alternations

(18) Masculine and feminine nouns:

*aes-aeris* ‘copper’, *arbōs-arbōris* ‘tree’, *calōs-calōris* ‘heat’, *clāmōs-clāmōris* ‘shout’, *colōs-colōris* ‘color’, *flōs-flōris* ‘blossom’, *glīs-gliris* ‘dormouse’, *honōs-honōris* ‘honor’, *labōs-labōris* ‘work’, *Lās-Laris* ‘local deity’, *lepōs-lepōris* ‘grace’, *mōs-mōris* ‘habit’, *mūs-mūris* ‘mouse’, *odōs-odōris* ‘smell’, *ōs-ōris* ‘mouth’, *pauōs-pauōris* ‘fear’, *rōs-rōris* ‘dew’

(19) Neuter nouns:

*cinis-cineris* ‘ash’, *cucumis-cucumeris* ‘cucumber’, *pulis-pulueris* ‘dust’, *corpus-corporis* ‘body’, *crūs-crūris* ‘leg’, *decus-decoris* ‘glory’, *facinus-facinatoris* ‘deed’, *femur-femoris* ‘thigh’, *fēnus-fēnoris* ‘(financial) interest’, *foedus-foederis* ‘treaty’, *frīgus-frīgoris* ‘the cold’, *fūnus-fūneris* ‘funeral’, *genus-genericis* ‘race’, *glomus-glomeris* ‘ball’, *holus-holeris* ‘vegetable’, *iūs-iūris* ‘law; sauce’, *latus-lateris* ‘flank’, *lepus-leporis* ‘hare’, *lītus-lītoris* ‘shore’, *mūnus-mūneris* ‘service’, *nemus-nemoris* ‘grove’, *onus-oneris* ‘load’, *opus-operis* ‘work’, *pectus-pectoris* ‘breast’, *pecus-pecoris* ‘cattle’, *pignus-pignoris* ‘pledge’, *pondus-ponderis* ‘weight’, *pūs-pūris* ‘pus’, *rūdus-rūderis* ‘lump’, *scelus-scleris* ‘wicked deed’, *sīdus-sīderis* ‘constellation’, *stercus-stercoris* ‘feces’, *tergus-tergoris* ‘back, hide’, *tempus-temporis* ‘time; temple (of the head)’, *tūs-tūris* ‘incense’, *ulcus-ulceris* ‘sore’, *uellus-uelleris* ‘pelt’, *uenus-ueneris* ‘attractiveness’, *uulnus-uulneris* ‘wound’

(20) Verbal *s-r* alternations (present infinitive-perfect participle):

*gerere-gestus* ‘carry’, *haerēre-haesus* ‘cling’, *haurire-haustus* ‘draw (water)’, *quaerere-quaestus* ‘inquire’, *queri-questus* ‘complain’, *ūrere-ustus* ‘burn’

(21) Adjectival *s-r* alternations:

*plūs-plūris* ‘more’, *vetus-veteris* ‘old’

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