The Conundrum of Old Norse Umlaut:
Sound Change versus Crisis Analogy

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This paper pursues an "ingenerate" or phonetically based account of *i*-umlaut as it unfolded in North Germanic. We focus on a famous problem relating to umlaut distributions in *i*-stem nouns: In the long stems of that class (*gestr* 'guest', from earlier *gastiz), where umlaut is arguably less motivated phonetically, it is generally reflected throughout the paradigms, but in short stems (*staðr* 'place', from earlier *staðir), where it is more expected, umlaut is generally absent. A central feature of our understanding of these and other Norse facts is the interleaving of processes of sound change and analogy, the latter of which, by an assumption validated elsewhere, comes into play only under extraordinary circumstances. In contrast to previous work on the conundrum of umlaut in Old Norse, we situate this account in the context of umlaut as a general phenomenon, with parallels in development to that of its West Germanic sisters.[*]

I vikingetiden har de ældre nordboere sikkert også syntes, at den fremtrængende *i*-omlyd (som blandt andet gjorde *a* til *æ* i mange ord) var hæslig og sprogforvrængende, at *gastiR* (= gæster) var langt smukkere end den nye form *gæstiR*. ['In Viking times the old Scandinavians surely also

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thought that the advance of *i*-umlaut (which, among other things, changed
a to *æ* in many words) was ugly and debasing of the language, that *gastiR*
'guests' was far more beautiful than the new form *gæstiR*.']
       —Lund (2001:98), on vowel changes underway in contemporary Danish

1. Introduction.

The spotlight in theoretical discussions of language change has often fallen
on the tightrope stretched between (regular) sound change and (irregular)
analogy (see Kiparsky 2003 for a succinct overview). To a perhaps
surprising extent, the determination of which attested patterns of change
reflect one versus the other of these forces remains a challenge, even for
some of the best-studied data sets, because the effects we see typically are
an interwoven aftermath of both sound change and analogy. Some research
(such as Iverson and Salmons 1996, 2000, 2003) argues that evaluation of
historical evidence still must begin by seeking an account in the engine of
sound change, with recourse to analogy taken only in cases where that
search fails. But while a precise and principled relationship between sound
change and analogy has proven elusive, important recent work has argued
that analogical change likely "is constrained by the entire grammatical
system" (Lahiri 2000a:11–12, commenting generally on the views found in
that volume). One thread in particular—which we shall follow here as
well—recasts analogy away from "basic grammatical principle" to
"reasoned response to crisis in acquisition." On this view, sound changes
are seen as entirely regular (Grimm's Law, for example, though rough edges
obviously may have been smoothed over in prehistory), whereas widespread
analogy takes place only when learners are unable any longer to make
viable phonological generalizations.[1] For example, Dresher (2000) makes
the case that, with the rendering opaque of Middle English Open Syllable
Lengthening, learners were forced to make word-by-word decisions about
whether underlying representations contained long or short vowels rather
than make this determination by rule. In this paper, we apply that kind of

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[1] An anonymous reader sounds a very reasonable note of caution on the notion of
"crisis" in acquisition: We agree that a true crisis in acquisition comes with
"catastrophic language contact" in which "speakers must construct a medium of
communication but may not have access to a coherent target." With Dresher,
however, we use the term "crisis" here as it relates to analogy in a far more limited
sense, where the accretion of competing changes induces learners to make
significantly different analyses about morphological relationships than their elders
had made.

understanding of the role of analogy to another infamous data set, Old Norse *i*-umlaut. In fact, the broad sweep of *i*-umlaut through Germanic generally reveals a cline of analogical effects, from minor category adjustments that preserved the seemingly idiosyncratic products of sound change (as in dialects of Upper German) to pervasive restructurings and the realignment of paradigms around newly emerging categories, which we shall argue occurred over the history of umlaut in North Germanic.

Across West Germanic, however, the dominant evidence is that umlaut took place most consistently in short-stem words (syllables of the shape /CVC-/), but often failed in long stems (/CVVC-/ or /CVCC-/). North Germanic famously evinces precisely the reverse pattern: Most long stems in certain inflectional classes show umlaut, but only a few short stems in those classes do. The familiar Old Norse (ON) *i*-stem nouns cited in 1 exemplify this general difference:

(1) Stem length and umlaut in Old Norse *i*-stems
     Long stem: *gestr* 'guest' < *gastiR
     Short stem: *staðr* 'place' < *staðiR

Recent work on this notorious problem (for example, Buccini 1992, 2000) has underscored the key role played by analogical aspects of the distribution, which likely gave rise to the movement especially of short *i*-stem nouns toward the classes of *a*-stems and *ō*-stems. Other research has contributed to teasing out the likely chronological stages of umlaut's development in Norse and has sharpened our understanding of the early data vis-à-vis umlaut and its conditioning (Schulte 1998, Grønvik 1998). In previous studies, we have concentrated on umlaut's phonetic origins and its initial phonologization with a focus on West Germanic data, but we turn now to how umlaut came to emerge as a categorical enhancement of distinctions already extant among Old Norse morphological paradigms, emphasizing the interplay between sound change and morphology in the late stages of the "lifecycle" of this well charted innovation.

As foreshadowed above, an important insight into the nature of analogy itself comes from the work of Elan Dresher. Citing the collapse of Open Syllable Lengthening (OSL) in Middle English as his core illustration, Dresher (2000:60) argues that "wholesale leveling occurs only as a response to a crisis." That is, widespread leveling is not a *grammatical principle*, "easily available at any time", but rather more a strategy for salvaging the generalizations of a previous generation as learners are forced to build grammars from problematic morphophonological input. We maintain here that Old Norse *i*-umlaut was forged in just such a crisis, itself precipitated

by conflicting factors that included widespread weakening, syncope, and apocope of umlaut-triggering vowels. In consequence, the Norse circumstances—particularly in the *i*-stem nouns—differ critically from those in the sister languages and therefore stand apart from the outcomes across the rest of Germanic, where umlaut either remained closer to its original phonetic distribution or was largely eliminated.[2] As phonetic umlaut began to die out, in other words, Norse learners were still able to build a generalization about its role within nominal paradigms, albeit one much different from that apparently inferred in the other dialects—one that came to reinforce the developing distinction between long- and short-stem word forms. In sum: The distribution of umlaut in early West Germanic reflects sound change with relatively minor analogical tinkering, whereas in North Germanic, learners found themselves having to make increasingly remote hypotheses and ever more implausibly abstract analyses in order to rationalize the ambient linguistic data, which, in learning-crisis response, they ultimately recategorized and restructured into superficially more coherent patterns.

The paper is organized as follows. First, we review a growing body of research showing that the earliest umlaut was deeply rooted in the physics and physiology of coarticulation, born within the sound system itself rather than imposed from without—that is, that umlaut was "ingenerate" in its phonetic origins in the sense argued in Iverson and Salmons 2003. One consequence of this understanding is that umlaut would have first affected only short stems across West Germanic, becoming prone to exceptionality in long stems where it was later and less extensively implemented, and less articulatorily motivated. Second, we turn to the seemingly paradoxical Old Norse data, in which short stems do not show umlaut but long stems do. In brief, our analysis is that in Old Norse long stems, where the stimulus was phonetically less direct, umlaut developed later, just as in West Germanic. As the process spread and became increasingly general in North Germanic, however, learners came to make overly broad generalizations, eventually leading to the incorporation of umlaut effects in the underlying representation of long-stem forms. Subsequently, as the phonetic impetus for umlaut passed away, so did its derivational effects where it had been still

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[2] Thus, umlaut in West Germanic *i*-stems either appears throughout the paradigm, whether long stem or short (compare Old English *giest* and *stede,* Old Saxon *stedi*), or comes to occur just in the plurals (compare reflexes of Old High German *gast ~ gesti* 'guest, guests', etc.).

operating, that is, in short-stem paradigms, whose prosodic juxtaposition to long-stem paradigms was now enhanced by a vocalism distinction. Third, we show how this analysis extends to other problems of Norse *i*-umlaut, particularly the related issues of the -*ja* stem nouns (where umlaut is more pervasive) and the patterns in -*jan* verbs (where stem length parallels umlaut in the *i*-stem nouns). Finally, we explore the ramifications of the Old Norse case for a broader understanding of *i*-umlaut in Germanic generally, an issue that modern research has neglected to a remarkable degree. We show that in Old Norse, late in the lifecycle of this sound change, developments fit in very naturally with the hypothesis of umlaut's ingenerate origin and its subsequent morpholexical circumscription.

2. Umlaut as a Fundamentally Phonetic and Phonological Process.

The classic structuralist interpretation of Germanic umlaut, sketched by Twaddell (1938) and filled out by works like Penzl 1949, holds that umlaut happened in one fell swoop, a catastrophic event where all umlaut allophones were phonemicized at the moment when weakening or apocope eliminated the triggering *i* or *j*. A series of recent works (Iverson, Salmons, and Davis 1994; Iverson and Salmons 1996, 1999, 2000, 2003; Holsinger and Salmons 1999; Howell and Salmons 1997; among others, all building on Buccini 1992) has provided a detailed challenge to that position. This still emerging school of thought develops a view of umlaut as tightly rooted in the phonetics: Umlaut, growing out of universal patterns of vowel-to-vowel coarticulation, began precisely where it was most strongly motivated as an ease-of-articulation measure, namely, where the distance across the vowel space was greatest. This was in forms of the shape /aCi/; indeed, the fronting (and raising) effect on short /a/ is known widely as "primary umlaut" in West Germanic. On the other hand, umlaut appeared last where it was least motivated, that is, where the distance across the vowel space was shortest (/uCi/) (Iverson and Salmons 1996, 1999, 2000; Howell and Salmons 1997). In other words, throughout West Germanic, *a* was assimilated to a post-tonic *i* earliest and across the broadest territory, *o* somewhat less and *u* least. This is illustrated in 2, where the solid line reflects the strongest coarticulatory motivation for umlaut and the dotted lines the weakest, using /i/ as the example of an umlaut "trigger."

(2) Distance across vowel space as a correlate of susceptibility to umlaut
      (following Howell and Salmons 1997:93–96)
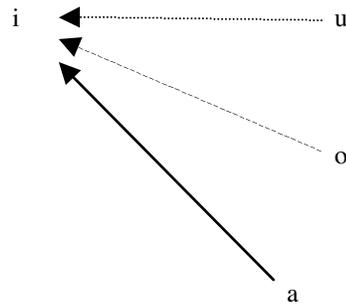
At the same time, the coarticulation was inhibited by obstructions in the form of certain consonant clusters intervening between trigger and target (see Iverson, Salmons, and Davis 1994; Howell and Salmons 1997). Among these structures, geminates as well as clusters with marked place features (that is, velars, then labials) blocked umlaut most frequently, while coronal clusters least commonly blocked umlaut (largely of the high back vowel, as suggested by 2). This is illustrated in 3.

(3) Umlaut blocking by place features of intervening geminates
      (from Howell and Salmons 1997:98)

		Most prone to block		Least prone to block
		-ukxi	-upfi	-utsi
Aperture	[±high]	++++	+--+	+--+
Place	[±coronal]	---+	---+	-+++
	[±labial]	+---	+++-	+---
	[±dorsal]	+++-	+---	+---

One important aspect of this perspective that previous work has not yet discussed in detail is how umlaut correlates with stem weight in West Germanic. So called primary umlaut was ubiquitous in short-stem words containing the appropriate "target" vowel (short *a*), that is, in words with shapes of the form /(C)aCi/, but there was widespread failure of historic West Germanic *i*-umlaut overall in heavy stem forms, which is to say in root syllables with rhymes of the shape /V:/, /VG/ or /VC/. Even primary umlaut fails in most dialects where a coda *h*, *r*, *l* followed the short *a*, as illustrated in 4a below. Likewise, as illustrated in 4b, the previously mentioned Upper German umlaut failures associated with geminates are by their nature limited to heavy stem syllables. In other cases, less regular than those with

velar geminates, *i*-umlaut failure is associated with long, nonlow vowels even in open syllables (4c).

(4) Examples of West Germanic umlaut failure
     (from Iverson and Salmons 2000)
     a. Coda blocking in Old High German and Modern German:

	Old High German	*Modern German*	
-x-	maht ~ mahti	Macht ~ Mächte	'power, powers'
-l-	haltan ~ haltis	halten ~ hälst	'to hold, hold-2SG.PRES.'
-r-	starch ~ starchiro	stark ~ stärker	'strong, stronger'

     b. Failure of Upper German umlaut with nonlow vowels over
        geminates (Schirmunski 1962:201–203)

	Dialect	*Std. German*	*Historical form*	
-kk-	muck	Mücke	OHG mucka	'midge, gnat, fly'
			(cf. Old Saxon *muggia*)	
-kk-	šduk	Stück	OHG stucki	'piece'
-xx-	khuxə	Küche	OHG kuhhina	'kitchen'

     c. Failure of Upper German umlaut with nonlow, long vowels
        (Schirmunski 1962:201–203)

	Dialect	*Std. German*	*Historical form*	
-V:g-	lu:gə	Lüge	OHG lugin	'lie' (noun)
-V:m-	dro:^{n}mə	träumen	MHG tröumen	'to dream'

In Netherlandic, umlaut in short vowels beyond /a/ is obscured by other historical developments (see Buccini 1992 for detailed discussion), but it is safe to say that "… in the western dialects all long vowels remain unaffected by *i*-umlaut—that is, what we traditionally call 'Secondary Umlaut' in German, does not affect coastal Dutch" (Howell and Salmons 1997:92–93).

All the phenomena just described point to a gradual unfolding of umlaut in West Germanic, treated as early phases in the lifecycle of sound change per Iverson and Salmons 2003 (see also Kiparsky 2003:330–332). Indeed, these varied patterns offer telling snapshots of umlaut's evolution: In Old High German, the blocking of umlaut shows restrictions even where the distance across vocalic space was the greatest possible. In Netherlandic, umlaut's development was interrupted early; the western dialects basically did not evolve much beyond primary umlaut, whereas those in the east extended umlaut in a cline of increasing applicability, eventually becoming part of the morphology although other, later, changes obscured this evolution. The umlautless residues of Upper German dialects showcase the

last corners of the grammar that umlaut reached. Here *i*-umlaut generalized to a pervasive phonological process, affecting all the possible forms, save those with the phonologically least umlaut-friendly environments.

Critical to our interpretation is the fact that the early stages of this lifecycle show little or no morphological sensitivity: Old High German primary umlaut is a straightforwardly phonological phenomenon, with roots deep in coarticulatory phonetics. In Upper German dialects, umlaut reached almost complete generality and here we find often massive morphological restructurings and realignments, typically in combination with other processes that must have motivated changes elsewhere in the grammar. For example, the analogical spread of umlaut to mark plurals correlates well, broadly speaking, with the apocope of schwa. Across West Germanic, umlaut morphologized as a plural marker even where there was no historical phonetic motivation for the process (compare Modern German *Mantel ~ Mäntel* 'coat, coats'). Growing from an old generalization made about *i*-stem nouns (OHG *lamb ~ lembir*; see Salmons 1994 and below), this pattern spread across many or even most nominal classes in the apocopating modern German dialects, even to the far larger *a*-stem classes, apparently in order to maintain plural forms distinct from the singulars. Thus, in apocopating southern and central German dialects, etymologically unsupported umlauting plurals of the type *tag ~ täg* 'day, days' are pervasive. (For a few clear examples, see Keller 1961 on Alsatian, Darmstadt, "Upper Austrian," and Luxemburgish.) In short, independent phonological developments promoted the spread of umlaut qua apophonic plural marker in dialects where umlaut had reached a full flowering. By contrast, in Dutch and English, where umlaut matured to a much lesser extent, the process tended to recede over time, leaving only a few marginal traces in the plural systems (such as *mouse ~ mice*).

The body of work just reviewed in capsule here covers essentially all of the major (certainly all of the classic) phenomena related to *i*-umlaut in West Germanic, one of the three branches of the family. The common thread we assume is that the seeds of umlaut were planted early in Germanic, sprouting only in the individual daughters, and not at all in attested East Germanic. This emerging research tradition, however, has not yet addressed the notoriously recalcitrant data of *i*-umlaut in North Germanic, to which we now turn as we cast an eye as well toward the role of paradigmatic contrast in morphology.

3. The Old Norse Data and Their Interpretation.

The classic examples of umlaut failure in Old Norse are found among *i*-stem nouns. The illustration in 5 on the following page presents the Proto-Norse *i*-stem paradigms, showing the division arising there between masculine and feminine forms, and giving, for comparison, reconstructions of the Proto-Germanic (*anst- = 'joy') as well as Proto-Indo-European endings.

(5) Proto-Norse, Proto-Germanic, and Proto-Indo-European *i*-stem noun endings[3]

		PN masc.	~	PN fem.	<	PGmc	<	PIE
Sg.	Nom.	$*$-i-z		$*$-i-z		$*$anstiz		$*$-i-s
	Gen.	$*$-ī-z		$*$-ē-z		$*$ansteiz		$*$-ey-s
	Dat.	$*$-ī		$*$-ē		$*$anstai		$*$-ēy
	Acc.	$*$-i^n		$*$-i^n		$*$anstī^n		$*$-i-m
Pl.	Nom.	$*$-ī-z		$*$-ī-z		$*$anstejez		$*$-ey-es
	Gen.	$*$-ij-ō^n		$*$-ij-ō^n		$*$anstijō^n		$*$-y-ōm
	Dat.	$*$-i-mz		$*$-i-mz		$*$anstimiz		$*$-i-mis
	Acc.	$*$-in		$*$ī-z		$*$anstinz		$*$-i-ns

Over time, endings weakened ever more dramatically and, crucially, differentially according to the weight of the root syllable. As a result, a new split emerged between Old Norse short (or light) and long (or heavy) stems, illustrated in 6 with respect to the masculine paradigms.

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[3] The Proto-Scandinavian paradigms come from Haugen 1982:90 (also reprinted in Buccini 1992), the Germanic and Indo-European ones from Bammesberger 1990:125. While some have argued that important inner-Norse differences existed with respect to umlaut (Syrett 1994, compare also Noreen 1970:6), we follow here the traditional line that the basic process was coherent across all of Old Norse for the period in question; compare Schulte (1998:74–75).

(6) Attested Old Norse *i*-stem nouns (Noreen 1970:265–272)

		Short *i*-stem	Long *i*-stem
Sg.	Nom.	staðr	gestr
	Gen.	staðar	gests
	Dat.	stað	gest
	Acc.	stað	gest
Pl.	Nom.	staðer	gester, gæstir
	Gen.	staða	gesta
	Dat.	stǫðom, staðum	gestom, gæstum
	Acc.	staðe	geste, gæsti

Moving from the assumed proto-pattern in 5 to the extant Norse paradigms in 6 involves crossing some ill-mapped territory, but it seems clear that a number of the umlaut triggers found in Proto-Norse were lost before the period when the stem-weight distinction came to associate closely with umlaut. The very early loss of some triggers, in both long and short stems of this paradigm, initiates uncertainty for learners, disturbing what would have been uniform umlaut based on the Proto-Norse endings in 5. Consider these examples. First, Grønvik (1998:124) reviews evidence that the GEN.SG. of *i*-stems was marked with *-āR* as in the Runic proper name *sāwilāgāR*. Second, most scholars analyze DAT.SG. forms with <-ai> as having been /e:/, such as the proper name from the Tune stone (an early inscription, from ca. 400 C.E.) *wōðurīðē* (Haugen 1982:89, Nielsen 2000:86–87) or the Charnay clasp (ca. 550–600 C.E.) masc. *faþē* 'husband, leader' (Antonsen 1975:20, also 34, 77). We suspect that by the period when umlaut becomes active, this pattern had already extended to other parts of the paradigm as well. For instance, in forms like ACC.SG. *gast* (see below), we suspect incipient weakening of the *-i*, which was lost entirely by the classic period, and lowering effects of the nasal are also possible. Such developments, we conclude, triggered sufficient opacity in the paradigm to confuse or at least increase the burden of learning on the generation acquiring the language, especially after additional weakening of endings.

Accepting Schulte's suggestion that variability plays a key role in these developments, a paradigm for *i*-stem nouns at a point not long after umlaut was introduced would have included sets of variable suffixes like those in 7.

(7) Suffix variability due to reduction

Sg.	Gen.	*-eR, *-āR/-aR	>	-ar
	Dat.	*-ē, -e, -ə	>	-Ø
	Acc.	*-ē, -e, -ə	>	-Ø

We assume the lowering effect of a following reconstructed nasal in the accusative singular was a likely first step in reduction, removing it from the set of umlaut-inducing suffixes. The critical broader point is that a learner working from such inputs would not have been able to recover a clear umlaut trigger in a number of important cells of the paradigms, long before continued reductions had led to the paradigm presented in 6.

We begin with a review of *i*-stem noun paradigms, then turn to similar data involving the *-ja* stem nouns and certain forms of verbs within the class i weak paradigms (*-jan* verbs). While the *i*-stem noun patterns are not without exception, a basic generalization holds over time: In Proto-Germanic, this nominal class had an "umlaut trigger" (*i in the post-root syllable) throughout most of the paradigm, yet by the Old Norse period, those triggers had become eroded in accordance with the weakening and loss of endings known as the Germanic *Auslautgesetze*, thus making umlaut opaque to new generations of learners.

Considerable support exists for an internal chronology in which triggers were weakened, and eventually lost, earlier after long stems than after short stems. This sequence bias is known sometimes as "Sievers' Law of Syncopation" (Prokosch 1938:135). Though the earliest inscriptions show retention of suffix *i* even in heavy stems (including our long-stem example, see Gallehus *-gastiz*), the broad pattern of Runic evidence points to syncope earlier in heavy stems than in light stems, as represented in 8.

(8) Runic forms with (heavy) and without (light stems) *i*-syncope
     (Nielsen 2000:259–264)[4]
     Heavy stems
     Björketorp (ca. 675)   bᴀrutz   'breaks'[5]
     Björketorp   haidz   'brightness' (<*haidiz)
     Eggja (ca. 700)   manz   'men' (< *manniz)

     Light stems
     Rök (ca. 825)   sitiz   'sits'
     Oklunda   sakiz   'guilty'

Beyond the documented survival of umlaut triggers in short-stem nouns, the dominant comparative Germanic evidence points toward this conclusion as well (see Buccini 1992:266, also 2000; Isaksson 2000:18–19, Grønvik 1998:64–65, Schulte 1998:51), namely, that syncope occurred earlier after long stems than after short stems. The long and short *i*-stem words in 6 then showcase the crux of the conundrum: Umlaut survives in Old Norse nouns largely where syncope must have happened first, but paradoxically is absent where the trigger survived longer.

As noted at the outset, some progress on this question has been made by taking into account the role of analogy. Indeed, there has long been recognition in this connection of the general migration of the feminine *i*-stems, a minority class, into the largest feminine noun category, the ō-stems (see Buccini 1992:264–270). As Prokosch (1938:246) puts it, the Old Norse *i*-stem feminines, "with few exceptions, have gone over to the *ā* declension" (Prokosch refers to the Indo-European "*ā* declension" for Germanic "ō-stem.") These were already remarkably similar (with often identical endings), save for the original presence of *i*-umlaut in the former and *u*-umlaut in the latter (compare Noreen 1970:259, 266). Recent work also calls attention to the analogical shift of the masculine *i*-stems over to the *a*-

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[4] Recent work has led to the rejection of some Runic evidence earlier taken to be central to this discussion, such as the sequence of letters *gestumR* on the Stentoften inscription, which once was understood to be the 'guest' word DAT.PL., whose *i* had been lost. A key word boundary of that inscription has been reinterpreted, however, leading specialists now to read the word as *hagestumz* 'stallions'. See Schulte (1998:82) and Nielsen (2000:96–97) for discussion and references.

[5] The *i* in a related suffix, however, was still preserved in a form of the same word in the nearby Stentoften inscription, dated to the first half of the 7th century. See Schulte 1998 for arguments on reduction (as opposed to apocope/syncope) of final vowels in Runic, albeit with a differing interpretation of some parts of this picture.

stems, which is the largest class of masculine nouns (see Buccini 1992, 2000, as well as Voyles 1992 or Isaksson 2000). Noreen (1970:266–268, elsewhere) already sketches a pattern of such analogical changes, recapitulated in 9.

(9) Apparent analogical influence from *a*-stem nouns on masculine *i*-stem noun suffixes; compare 6 above (based on Noreen 1970:268)

	New suffix < a-stems	*Early attested i-stem suffix*
GEN.SG.	-s	-ar
DAT.SG.	-e (-i)	-Ø
NOM./ACC.PL.	-ar	-er/-e
ACC.PL.	-o ~ -u (rare)	-e

For instance, where *staðr* 'place' would originally have inflected for the genitive singular as *staðar* and the dative singular as *stað*, we now find *staðs* (compare *a*-stem *dags* 'of the day') and *staðe* (compare *dage*), and other forms in the paradigm already had identical suffixes (to wit, ACC.SG. -Ø, GEN.PL. -*a*, DAT.PL. -*om*). The *a*-stem nouns in Proto-Germanic lacked triggers for *i*-umlaut throughout, of course (see the paradigms in Bammesberger 1990:39), and their Old Norse reflexes accordingly are all without *i*-umlaut (Noreen 1970:246–255). As becomes relevant in the discussion just below, these morphological category shifts greatly compromised the association between *i*-stem inflection and umlaut, not least from the vantage point of the learner of the language.[6]

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[6] An alternative understanding of these changes in the morphology has been developed by Voyles (1992:116–117), who proposes that *a*-stem endings were simply added on top of old *i*-stem endings across the whole paradigm, and that this led to alternations based on stem-weight differences. By virtue of Sievers' Law, an *i* would be inserted before *j* after a long foot, as exemplified in these hypothetical developments among dative plurals:

	Long stem	*Short stem*
Addition of *a*-stem endings:	*gasti-umz	*staði-umz
Application of Sievers's Law	*gastijumz	*staðjumz
Umlaut triggered by *i*, but not *j*	*gestijumz	*staðjumz
Reduction	*gestumz	*staðumz

This provides an explicit account of the Old Norse forms, but it is problematic on several counts. First, the philological base of the analysis requires reading the inscription on the Stentoften Stone as the 'guest' word, which, as noted above, no longer appears tenable. Second, it seems odd for Sievers's Law still to have been active at this presumably late stage of umlaut development (see Kim 2001, for

As is clear from the research reviewed throughout this paper, most modern scholarship builds a predominately morphological, rather than phonological account of Old Norse umlaut. Some other recent work, though, imputes a purely phonological basis to the bias toward umlaut in long stems but away from it in short stems. Thus, Lahiri (2000b:120, 102–106) sees Old Norse umlaut simply "as always restricted to heavy stems—that is, light stems *never* underwent umlaut," even at its earliest stages of unfolding. Such a scenario involves the uncomfortable stipulation that a sound change with obvious roots in the physiology and mechanics of coarticulation was also prosodically restricted, without offer of any phonological motivation for the restriction.[7] This restriction also conflicts with the nature of umlaut across Germanic generally, which is that short stems (because of the closer proximity between trigger and target, and thus greater susceptibility to V-to-V coarticulation) are actually the more likely to umlaut, whereas umlaut failure in long stems is well attested. Under an ingenerate account as we advocate, however, grounded in the phonetics of coarticulation from which umlaut indubitably sprang, this is readily explained.

The fair number of exceptions to the conundrum of Old Norse umlaut—short *i*-stem nouns with umlaut and long *i*-stems without—make Lahiri's scenario even more unlikely, in our view. In addition to the exceptions explored in Braroe 1979 and Buccini 2000, a number of others are accessible already in Noreen 1970:267–269; some illustrations are given in 10.

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example). Third, tacking an extra set of endings onto the existing suffixes of a paradigm is itself peculiar in that double affix marking is typically only sporadic and idiosyncratic, as reflected in the *hapax legomenon* of the lone doubly marked plural in English, *child-er-en*. That is, analogy based on categories rather than individuals tends to replace endings, not build over them.

[7] Riad (1988:17), by contrast, relates the umlaut bias in Old Norse to a conceivable syllable weight difference in the development of initial stress: "When stress gets concentrated to the initial syllable, in heavy syllables earlier than light ones, the initial syllable becomes open to change by the succeeding *i*."

(10) *i*-umlaut exceptions in Old Norse: masculine long *i*-stems without
    umlaut[8]
    stulðr 'theft'
    burðr 'birth'
    sauðr 'sheep'
    sultr 'hunger'

More generally, though, if the correlation "short stem = no umlaut / long stem = umlaut" were strictly phonological in its origins, what would have disturbed that relationship and precipitated the observed morphological realignments? Exceptions to the pattern appear to underscore the morphological sensitivity of umlaut at this point in the history of Scandinavian, but they also reveal a correlation that ties the phonology and morphology together, because in the paradigms of the exceptions, suffixes and umlaut are aligned. Umlaut goes hand in hand with the paradigms, in other words, in that the exceptional masculine long-stem forms without umlaut inflect like regular short stems (which are also without umlaut), while the exceptionally umlauted short-stem words inflect like regular (umlauted) long-stem nouns. Similarly, the feminine *i*-stems lose *i*-umlaut as they move over to the *ō*-declension, conspicuously because, for phonological reasons, *i*-umlaut was never a part of that declension. There is thus an emergent pattern marrying stem-type with occurrence of umlaut, namely, the one already noted: "short stem = no umlaut / long stem = umlaut." Instructively, even the exceptions to this generalization follow the morphological pattern of the category that they are exceptions to, because exceptionally umlauted short stems inflect as long and exceptionally unumlauted long stems inflect as short.[9]

To recapitulate, the general occurrence of umlaut throughout the long-stem paradigms (even where it was not phonologically motivated) and its

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[8] Typically, the exceptions to expected *i*-umlaut, as exemplified in this list, are stems whose phonological structure is least hospitable to the ingenerate coarticulation forces underlying the process (as revealed in the West Germanic "umlaut-blocking" data reviewed above), namely, stems with the high vowel *u* followed by a coda liquid plus another consonant. These vestiges of resistance to *i*-umlaut in Norse thus mirror developments elsewhere, underscoring again its phonological uniformity throughout Germanic.

[9] This same generalization holds over some parts of the *-jan* verb paradigms and elsewhere in the grammar (see again Braroe 1979 and Buccini 2000, as well as section 5.1 below).

general absence from the short-stem paradigms (even where it was phonologically motivated) constitute the celebrated conundrum of Norse umlaut that had arisen by the time of the literary period, traditionally dated to around 1050 C.E. These *prima facie* analogical developments appear to have been driven by the reductions in stem allomorphy that they resulted in, for the paradigms of short stems like /stað-/ are now uniformly without umlaut, those of long stems like /gest-/ (< /gast/) uniformly with. Following a line of inquiry pursued in the generative literature first by King (1971, 1973) and then Iverson (1981), it can be shown now that the contrariwise distinction of the literary period, short stem = no umlaut / long stem = umlaut, came about as a natural consequence of rather well understood diachronic events.

4. Explanation of the Events.

Broad agreement exists in the considerable literature on this issue that the loss or shortening of suffix vowels (both subsumed here under the term "syncope," based on the ultimate historical outcome) affected long stems some centuries before it generalized to short stems. The absolute chronology is a matter of longstanding controversy, but this is of little immediate concern.[10] We follow here the basic outlines found in Grønvik (1987:167–189), whose detailed treatment divides developments into four stages, from the earliest, I *urnordisk* "Proto-Norse," through the latest, IV *vikingtidsnorsk* "Viking Era Norse." In Period I umlaut was operative with strictly allophonic results, at a time when the theme vowel *i* had not yet been lost in long stems, so that <gastiR> was pronounced [gästiR] (following his transcription). As Grønvik (1987:182) puts it, "Slike allofoner vil normalt aldri bli grafisk markert, fordi skrivemåten var prinsipielt fonemisk. En skrivemåte som *dohtriR* Tune kan derfor ikke vise om rotvokalen ble uttalt som [o] eller [ö]." ['Such allophones will normally never be marked orthographically, because spelling was in principle phonemic. A spelling like *dohtriR* from the Tune inscription can therefore not show whether the root vowel was pronounced [o] or [ö].'] A key characteristic of Period II (*eldre nordisk*, "Older Norse") is apocope of *i* in long stems, which he dates to around 500 (1987:178, 183). Period III maintains -*i* and -*u* in the short stems until the final stage, Period IV (sometime after 800), when syncope of *i* and *u* was generalized to take place

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[10] See also Grønvik 1998, Nielsen 2000, Riad 1988, Schulte 1998, among earlier sources, for further detailed chronological discussions.

after short stems: "Som trinn IV *vikingtidsnorsk* (*-svensk, -dansk*) kan vi da definere det språktrinn der *-i* og *-u* falt også etter kort stavelse " ['We can define Period IV, Viking Era Norse (or Swedish or Danish), as the stage of the language in which *-i* and *-u* are lost also after short stems.'] (1987:173).

To this chronology we would only add a widely appreciated point, namely, that *i*-umlaut in Old Norse had "ceased to be productive," or lost its phonetic motivation, by the time of the literary period of the language, so that surface forms without umlaut like *staðir* NOM.PL. in fact became possible. On the common assumption that phonetic umlaut developed prior to the loss of suffix vowels via syncope, the language at some time after 500 C.E. then would have had NOM.SG./PL. *i*-stem pronunciations as illustrated in 11, with umlaut in evidence throughout (most of) the paradigms.

(11) *i*-umlaut and syncope effects in early Proto-Norse (post-500, Period II)

	Short stem		*Long stem*	
	NOM.SG.	NOM.PL.	NOM.SG.	NOM.PL.
	/stað+iR/	/stað+iiR/	/gast+iR/	/gast+iiR/
Umlaut:	steð+iR	steð+iiR	gest+iR	gest+iiR
Syncope:	---------	---------	gest+R	gest+iR
	[steðiR]	[steðiiR]	[gestR]	[gestiR]

At this point, umlaut in the short stems is transparent in that the cause of its occurrence, a following *i*, is still present even in the NOM.SG; but in the long-stem NOM.SG. forms, the *i* that is responsible for umlaut is no longer there due to the effects of long-stem syncope. Unumlauted vowels existed elsewhere in the paradigms of both stem types, too (for example, ACC.SG. *stað*, *gast*), of course, but the opacity introduced into long stems by the operation of syncope marked an early step in the confounding of umlaut as a purely phonetically determined generalization. With umlaut still alive in the phonology (that is to say, vowels were still fronted when a following *i* was phonetically present, as in *gestiR* NOM.PL.), we surmise that a new generation of learners, seeking common phonetic ground with the previous generation, inferred that because umlaut could not be predicted from the surface environment in long-stem words like *gestR* NOM.SG., the most coherent account was simply to posit vowels as already front in their underlying representations. Rather than derive umlauted vowels via a rule that was not surface-true, in other words, this generation of learners restructured long-stem morphemes like /gast-/ to /gest-/. Such restructuring would not have been called for in the short stems because there was no opacity in these to confuse learners of the language—short stems showed umlaut where and only where the conditioning factor was still present. But

for long stems, the surface unpredictability of vowel fronting in some forms at a time when umlaut was still active in the phonology likely was sufficient to cause learners to achieve umlaut output parity with their elders via the more transparent means of direct lexical representation of vowel frontness. The result of this relexification to umlauted vowels is shown in 12, where, for the affected long stems, the forms are as attested in the literary language, having an umlauted vowel everywhere in the paradigm (that is, even in ACC.SG. *gest*, etc.).

(12) Effects of long-stem relexification in later Proto-Norse (ca. 700, Period III)

	Short stem		*Long stem*	
	NOM.SG.	NOM.PL.	NOM.SG.	NOM.PL.
	/stað+iR/	/stað+iiR/	/gest+iR/	/gest+iiR/
Umlaut:	steð+iR	steð+iiR	(vacuous)	
Syncope:	---------	---------	gest+R	gest+iR
	[steðiR]	[steðiiR]	[gestR]	[gestiR]

With the emergent opacity of the umlaut process, and with some umlauted vowels now basic rather than derived (and, above all, with the steady weakening and loss of umlaut-triggering *i/j* in the suffixes), *i*-umlaut came to lose its articulatory motivation altogether and "ceased to be phonetically driven," thus making the source of umlauted vowels even harder to figure out for new learners of the language. Arising in Grønvik's Period II and persisting into Period III, this is the Dresherian "crisis" alluded to above, which ultimately was resolved by the removal of *i*-umlaut as a productive phonetic process in the language and by morphologization of its phonological effects. With the phonetic "death" of *i*-umlaut, then, the short stems (which never did restructure because their umlauted vowels were still being derived while the process was "alive") naturally emerge with the unumlauted vowels of their basic or lexical forms intact. Importantly, the long-/short-stem split in these and other paradigms was already becoming an organizing principle of Norse morphology at this point (as across the rest of Germanic), the emergent umlaut difference in root vocalism reinforcing and further securing that distinction's place in the minds of speakers and learners.

At about the same time, perhaps around 800 C.E. now (coinciding with Grønvik's Period IV), syncope generalized to operate after short stems, too, which yields the attested forms of the literary period as illustrated in 13.

(13)   Effects of umlaut death and generalization of syncope to short stems
(ca. 800)

	Short stem		*Long stem*	
	NOM.SG.	NOM.PL.	NOM.SG.	NOM.PL.
	/stað+iR/	/stað+iiR/	/gest+iR/	/gest+iiR/
Umlaut:	…………………..…..…phonetically dead…………………			
Syncope:	stað+iR	stað+iR	gest+R	gest+iR
	[staðR]	[staðiR]	[gestR]	[gestiR]

At this point, the invariant NOM.SG. and NOM.PL. suffixes presumably took on as underlying the syncopated form of their surface manifestations, /-r/ and /-ir/, respectively, with deleted or shortened vowels no longer derived via syncope, and with /R/ merged with /r/.

Restructuring of the underlying representations of the long stems toward umlauted vowels was thus motivated by the opacity that arose in the umlaut process due to the early occurrence of suffix syncope following just long stems. But the ousting of umlaut from the short stems after the death of phonetically triggered umlaut was a well motivated development, too, even though words in these paradigms then reverted to their *status quo ante*, that is, to the earlier unumlauted state. Indeed, as first pointed out by Schane (1971), such reversions often come about because of an apparent preference that contrastive features not be used redundantly in grammars, even when the phonetic environment would seem to call for them. In the history of French, for example, vowel nasalization was once redundant (as it is in many languages, including English), occurring under the assimilatory condition of an immediately following nasal consonant; hence earlier French *bon* [bɔ̃n] 'good' MASC.SG., *bonne* [bɔ̃nə] FEM.SG. But with the subsequent loss of final consonants, the vowel nasalization process became opaque as the incidence of nasality in vowels no longer corresponded with the phonetic presence of a following nasal consonant. Ultimately, nasalization was removed from positions where it was still predictable and phonetically expected: hence modern French *bon* [bɔ̃] MASC.SG., with a contrastively nasalized vowel, but *bonne* [bɔn(ə)] FEM.SG., with a phonetically unexpected oral vowel.[11] The spirit of Schane's observation, in short, is that the product of a no longer transparent phonological process

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[11] The history of nasalization in French, and Romance more generally, remains hotly contested territory on various fronts. Hajek (1997:78–79), for example, notes morphological conditioning and cites alternative proposals for the developments at hand.

may come to be undone, or reversed, just where it still is transparent, that is, where the process is superficially predictable.

This development is not ineluctable, however, as there exist cases in which phonological processes rendered opaque by other changes continue to function as before even in environments where their effects do remain transparent. For example, *u*-umlaut in Modern Icelandic is still very much alive, turning stressed short *a* into *ö* (unstressed *a* into *u*) before *u* in the next syllable, as in appropriately suffixed forms of *barn* 'child', viz., *börnum* DAT.PL.; but this substitution also affects words of that class even when the historical following *u* is no longer present, as in *b ö r n* NOM./ACC.PL. (Anderson and Iverson 1976, Iverson 1978). Here, due to the absence of a phonetic trigger, *u*-umlaut has become opaque in the same way as did *i*-umlaut in the Old Norse long stems. Yet the loss of phonetic conditioning for *u*-umlaut did not precipitate a leveling of the paradigm and restructuring of base vowels as occurred earlier with respect to *i*-umlaut in long stems, hence partially opaque *u*-umlaut continues to operate and produce alternations under morphologically (*börn*) as well as phonetically (*börnum*) defined conditions. Moreover, *u*-umlaut in the modern language has become interactionally opaque, too, by virtue of not being fed by the *u*-epenthesis that interrupts a word-final sequence of consonant plus *r*, as in /fatnað+r/ → *fatnaður* NOM.SG. 'suit of clothes' (*fötnuður). But *u*-umlaut continues to operate in the language before basic *u*, as in /fatnað+um/ → *fötnuðum* DAT.PL., not to be undone or removed in environments where it is still predictable (*fatnaðum). The trend toward reversion under circumstances of partial opacity is thus not inexorable, but where it does occur, motivation for the phenomenon may well lie in a preference for transparency to be associated consistently with predictability, that is, for product to emerge uniformly from process rather than sometimes from process and sometimes from restructured base forms.

Of course, *i*-umlaut continued to operate in literary Old Norse—indeed, into Modern Icelandic—as a morphologically defined operation, too (Iverson 1978), but earlier restructuring of underlying vowels in the long *i*-stems vitiated its synchronic relevance in those particular paradigms. In the short *i*-stems, by apparent extension, *i*-umlaut was eliminated as well, albeit at a point while the process was still phonetically active and before any restructuring of underlying short-stem vowels could take place. In other words, because restructuring of vowels in the long *i*-stems removed *i*-umlaut as a useful generalization from those paradigms, the elimination of *i*-umlaut from the remainder of this class (the short *i*-stems) likely came about gratis, purchased as part of the same package that was bringing vocalic

uniformity to the *i*-stem class, thus leaving no synchronic role for *i*-umlaut to play there. But *i*-umlaut continued to function in other parts of the grammar under morphologically defined conditions, suggesting that the impetus for phonological reversion of a process in some paradigms of a class (the short *i*-stems) is that in others (the long *i*-stems) it has been restructured out of existence.

Still, Schane's observation about reversion in French also parallels the history hypothesized here for short *i*-stems in Old Norse. Once the output of umlaut became phonetically unpredictable (as in syncopated [gestR] or [gästR]) as well as paradigmatically uniform (with [gest-] as the only allomorph), the fronting process ceased where it was still redundant, as it was in [steðiR] (or [städiR]) < /stað+iR/. Up to this stage of the language, new front rounded vowel phonemes had come about as a result of the operation of umlaut in conjunction with the loss of its conditioning factors in long stems (for example, *dø̄ma* < /do:mja/ 'to deem'), while the umlaut of short /a/ had resulted in merger of presumably already extant unrounded vowel phonemes (/a/ > /e/) in both stem types. But the fronting of stem vowels via umlaut remained superficially predictable, and therefore redundant, in the short stems, where conditioning elements remained to trigger the process for a period. Precisely here in the short stems, paradoxically, where the product of the process was still predictable, the effects of umlaut came to be undone just as its phonetic motivation elsewhere (that is, in the long stems) disappeared. In sum, further motivation for removing umlaut from the short stems—causing [steðiR] to revert to [staðiR]—at the time when umlaut-conditioning vowels were still present there but absent in the long stems derives from the fact that the fronting of back vowels had become no longer fully predictable in the language. A consequence of this development of umlaut opacity and vowel restructuring in long stems was that where fronting remained predictable, that is, in the short stems, there it was reversed.

The assumption that umlaut was once present in the short stems is widespread in much modern work (Schulte 1998), moreover, and is also explicit in the classic textbooks: See Gordon (1957:272), who asserts plainly that umlaut in the short stems "has been removed by analogy with the oblique cases." Interestingly, a close parallel to this specific reversion exists elsewhere in Germanic: The Old High German *Rückumlaut* verbs must once have evidenced umlaut which came to be lost by analogy, as argued persuasively by Robinson (1980). For this class of forms, with umlautless preterite optatives like *branti* 'would have burned' (compare *brennen* 'burn'), Robinson has laid out a solid structural case for reversion

from previously umlauted forms, namely, avoidance of ambiguity in the key verbal categories of present vs. preterite optative.[12] (We return to this parallel in the next section.) Just as with Old Norse *staðir* NOM.PL., then, Old High German includes some forms that once must have been umlauted and among which it is the unumlauted form that survives, even in the presence of what had been an umlaut-triggering *i* suffix.

In sum, we join a growing consensus that the attested Old Norse *i*-umlaut pattern reflects tightly interlocked morphological and phonological changes sensitive to stem-class membership rather than purely phonetic factors. As laid out here, there was a readily understandable but subtle interplay between the phonology and the morphology such that differential patterns of weakening/syncope in heavy and light stems led to different morphological analyses by learners over the generations, culminating in the generalization of the literary period that "short stem = no umlaut / long stem = umlaut." We move on now to situate this account in the broader morphology of Old Norse.

5. Umlaut in Other Paradigms.

The clearest test of our explanation for the conundrum of Old Norse umlaut comes from within Old Norse itself: What patterns of non-phonetically/phonologically defined umlaut do we find or not find in other paradigms? Two notable cases of this type are the *-jan* verbs and the *-ja* stem nouns.

5.1. Weak Class i (-jan) Verbs.

In weak verbs of the first class, the long stems often show umlaut throughout the paradigm, while the short stems typically lack umlaut in certain forms (especially in their earliest attestations), namely preterites and past participles, though the pattern is less consistent than in *i*-stem nouns. Examples are given in 14 after Noreen 1970; see also Buccini (1992:268–275), Lahiri (2000b:99–107), and many others.[13]

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[12] As argued by Holsinger and Salmons (1999), this ousting would have been the first truly morphological development in Old High German *i*-umlaut; but even this had phonological roots because a high percentage of "deumlauted" forms involved classic blocking environments, such as the intervening consonant cluster in *zalti* 'would have told'.

[13] Note that this pattern is analogized away later, so that preterit *sótta* 'sought' later appears as *søkta*, and so on. These subsequent developments are not immediately relevant and are thus ignored here.

(14)   Infinitive   Present   Pret. Sg.   Past Participle
        Short stem
        søkia 'to seek'   søke   **sótta**   **sóttr**
        telia 'to tell'   tel   **talða**   **talða**

        Long stem
        dø̄ma 'to deem'   dø̄me   dø̄mða   dø̄mðr
        fø̄ra 'to lead   fø̄re   fø̄rða   fø̄rðr

The parallel to *i*-stem nouns is a rough one, though, since short stems do show umlaut in the present. The verb pattern is also considerably more exception-ridden than its sister in the *i*-stem nouns. We again take this as *prima facie* evidence for a morphological rather than purely phonological accounting of the umlaut distributions, which is further supported by the analogical leveling of many of these forms. In the *i*-stem nouns, moreover, the input to a critical generation of learners became so opaque that umlaut survived only in its association with stem weight (driven by the reanalyses presented above); in the class i weak verbs, umlaut survival was enhanced by the need to mark the most fundamental distinction in the verbal system, preterite versus nonpreterite. The weight distinction became central as in the nominal system, too, but among the short-stem verbs, learners were able to point to umlaut as reinforcing the key distinction in the verbal system, though this device was not available in the long stem verbs due to the restructuring there, parallel to long stem nouns, to the umlauted form in underlying representation. But in the short stem verbs, absence of umlaut came to be a correlate of preterite indicative inflection, in exact parallel to the Old High German *Rückumlaut* verbs reviewed above.

5.2. -ja Stem Nouns.

As Noreen observes, *-ja* stem nouns by the classic Old Norse period have largely merged with the *i*-stems. They show different reflexes, though, with regard to umlaut: While the *i*-stem nouns are generally distinguished by the presence of umlaut in long-stem forms versus its absence in short-stem forms, members of the *-ja* class show consistent umlaut regardless of stem weight. This is exemplified by short stems like *kyn* 'kin' < *kunja-, *bed* 'bed' < *badja-, and by long stems like *klæði* 'cloth', from a presumed *klāðja.[14]

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[14] One tradition, reaching back to Kock 1888, has continued to the present day, in the so-called "period theory of umlaut" assuming that vowels (/i/, /i:/) and glides

(15) Proto-Scandinavian *-ja (from Haugen 1982:90, following his
orthography)

		MASC	*herð- herdsman'	NEUT	*kwaþ- 'song'
Sg.	Nom.		*herðiaz		*kwaþiã
	Gen.		*herðias		*kwaþias
	Dat.		*herðiai		*kwaþiai
	Acc.		*herðiã		*kwaþiã̃
Pl.	Nom.		*herðiōz		*kwaþiu
	Gen.		*herðiõ̃		*kwaþiõ̃
	Dat.		*herðiamz		*kwaþiamz
	Acc.		*herðiã̃		*kwaþiã̃

In these paradigms, no *i/j* is last in the string, nor is any nasalized or directly followed by a nasal. Because the "laws of finals" generally eroded suffixes from the right edge of a word inward, this provides a certain protection to the umlaut-triggering palatal element. As a result, *ja*-stems have changed much less than *i*-stems by classic Old Norse, so that many more umlaut triggers survive, as shown in 16.

(16) Common Scandinavian *-ja (from Haugen 1982:96, following his
orthography)

		MASC.	NEUT.
Sg.	Nom.	*hirþir	*kuē̜þi
	Gen.	*hirþis	*kuē̜þis
	Dat.	*hirþi	*kuē̜þi
	Acc.	*hirþi	*kuē̜þi
Pl.	Nom.	*hirþar	*kuē̜þi
	Gen.	*hirþa	*kuē̜þa
	Dat.	*hirþum	*kuē̜þum
	Acc.	*hirþa	*kuē̜þi

(/j/) triggered umlaut at different times, with /j/ being less of an umlaut inducer than /i/, /iː/. Recent work like Schulte (1998:173–192, passim) and Grønvik (1998:58–60) treats this distinction in terms of Sievers-like alternations between vowel and glide determined by syllable structures. Given that *j* triggers umlaut essentially like *i* does across West Germanic (and that, phonetically, *j* is even more "palatal" than *i*), however, we would need to see strong reasons for adopting this view.

Sources vary in what they posit, but some paradigms showed utterly consistent triggers: While Cleasby-Vigfusson (1957:xvi) gives the long stem neuters as retaining some triggers (*rík-*), the 'cloth' word (neuter short stem, see below) has a trigger throughout the singular and in the NOM./ACC. plural. In view of the more pervasive and well motivated presence of umlaut triggers among long and short *ja*-stems at a later date than in the *i*-stems, it is hardly surprising that *ja*-stems come to enshrine umlaut as a characteristic of the class. In other words, invariance in *ja*-stem vocalism was the grounds for the next generation to restructure the lexical forms to umlauted vowels, whether the stem is short or long.[15]

The question following from this becomes how these changes and their outcomes are connected to the general nature of umlaut across Germanic.

6. The Place of Old Norse in a Pan-Germanic Context.

Across West Germanic, the morphological development of umlaut is still influenced (if indirectly) by older phonetic/phonological patterns, as we saw above in section 1. But in Old Norse, this is not the case: Here morphological realignments have resulted in an anti-phonetic distribution, yet one still tied to the ingenerate roots of umlaut. In order to understand this, we again ask the Dresherian question: To what extent could a learner build generalizations from the ambient input? Dresher's answer for Middle English Open Syllable Lengthening is that learners simply "despair of a rule, and opt instead to choose a consistent vowel quantity [that is, long or short in Middle English nouns] on a word-by-word basis" (2000:59). Norse learners, however, were still able to make generalizations about umlaut—albeit ones rather far removed from its phonetic origins—with the

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[15] We assume that, aside from the monophthongization of *ai to $\bar{e}$ noted above, final vowels are steadily eroded, as traditionally assumed. If we take Schulte's point seriously about weakening as a key factor, we have a clear and certain difference, and one that is not directly dependent on the vowel/glide status of the palatal. Consider a stage where final vowels are weakened but not yet completely lost, just realized as schwa:

I	*staði*	*kunja*
II	*stæðə*	*kynjə*
III	*stað*	*kyni*
IV	*stað*	*kyn*

Stage II is the critical moment. Here some short *i*-stem forms are opaque to learners, but the equivalent *ja*-stem forms had their palatal element temporarily "protected" by the final vowel.

result that patterns of umlaut distribution came to be based on stem weight rather than etymological suffix palatality. In the case of *-ja* stem nouns, for reasons just outlined, umlaut emerged throughout the paradigm. In class i weak verbs, umlaut won out among the restructured long stems, while the short stems split in order to reinforce the distinction between present or subjunctive (with umlaut) and preterite indicative forms (without umlaut). In the *i*-stem nouns, finally, the stem-weight distinction itself came to be marked by the presence of umlaut (long stems) versus its absence (short stems).

The comparative West Germanic evidence provides informative contrasts to the Old Norse situation: In Old High German, some adjustments take place, with the result that umlaut in *i*-stem nouns became associated with the plural, absence of umlaut with the singular (see Salmons 1994 for details). That situation continues to the present in contemporary Standard German, to a perhaps surprising extent, where old *i*-stems are recognizable by umlauted plurals: *Gast ~ Gäste* 'guest, guests', *Nacht ~ Nächte* 'night. nights', etc., versus umlautless old *a*-stems *Tag ~ Tage* 'day, days', *Jahr ~ Jahre* 'year, years', etc., as well as old umlautless feminine ō-stems *Zahl ~ Zahlen* 'number, numbers'. In Netherlandic, *i*-umlaut did not approach the degree of expansion across the phonology or morphology that it did in Old High German or Old Norse (see Buccini 1992, Howell and Salmons 1997, Iverson and Salmons 2000). There, with less commitment to umlaut in the grammar, it was easy enough for learners to build consistent paradigms—paradigms without stem-vowel alternations in the nouns—which were built on the umlautless form, with but one apparent exception (Dutch *stad ~ steden* 'town, towns'). English, too, ultimately ends up with almost this result (there remains but a handful of umlaut alternations like *mouse ~ mice, woman ~ women*), although this language follows a rather more complex historical path in order to get there.

Unlike Netherlandic or English, though, speakers and learners of Norse were heavily invested in umlaut, which had unfolded phonologically to a far greater extent and had emerged to help mark a wide range of important grammatical distinctions. Umlaut here was thus unlikely to be ousted outright from the grammar or even marginalized. Unlike Old High German, moreover, maintenance of the core original relationship between target and trigger was no longer likely, either: Crucial endings were weakening already in the Runic period, with reduction and syncope/apocope of not only the immediately relevant *i* and *j*, but also of *a* and *u*. Nielsen (2000:373–374, see also 259–264), in fact, calls this "the pivotal development" of the relevant period. This situation must have meant that learners were getting

highly variable input with regard to final vowels, which was the key information for structuring paradigms. Indeed, *i*-umlaut at this point must have been dead as a directly phonetic process, but certainly it was alive in the grammar as a part of the morphology, helping to shore up the otherwise tenuous distinction between certain long- and short-stem classes.[16] Under these circumstances, the emergence of extensive analogy is scarcely surprising, having now motivated the movement of a major class, the feminine *i*-stems, largely to another class, and, more importantly for present discussion, the importation of some *a*-stem endings into masculine *i*-stem nouns. And just as the crisis-oriented theory of analogy predicts, outcomes across paradigms vary according to the confusion caused by weakening and eventual loss of final vowels.

The divergent pattern of syncope in the long and short stems, we have argued, was the overriding force in associating umlaut with stem weight. While stem weight plays well-defined roles even in Proto-Germanic (most famously in the alternations treated by Sievers' Law), its importance in the attested Germanic dialects is hard to overstate. Large parts of both the phonology and morphology, across both nominal and verbal paradigms, are arranged around stem weight and stem-weight distinctions. As in Old Norse, these hinge on the differing development of Proto-Germanic suffixes after long versus short stressed syllables. Consider the examples below in 17, drawn from Boutkan's 1995 tome on the so called Germanic Laws of Finals.[17]

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[16] In this sense, *i*-umlaut remains very much alive even into Modern Icelandic, as shown in Iverson 1978.

[17] Smith (2004) treats a critical subset of these developments in modern prosodic terms, down to the contemporary reflexes of those historical trajectories, covering a range of phenomena like pluralization in Dutch and German, diminutive morphology in Dutch, and so on.

(17) Examples of long-stem vs. short-stem differences in suffixes
     (Boutkan 1995:39–42)

	PGmc.	*Long stem*	*Short stem*
Gothic	*-jas	-eis	-[j]is
	*-was	-ws	-us
OHG, OS	*-i, *-es, *-is, *-iN	-ø	-i
	*-was, *-u, *-us, *-uN	-ø	-u
OE	*-i, *-es, *-is, -iN	-ø	-e
	*-was, *-u, *-us, *-uN	-ø	-u

As these examples imply, the earliest well attested dialects start out on a path toward loss of the basic stem-class patterns of Proto-Germanic, restructuring increasingly around the stem-weight distinction. In a grammar where stem weight plays a substantial role, and a steadily growing one, the sound changes and lexical restructurings described in the present paper would have enabled those learning the language easily to make this basic generalization.

As do we, Buccini (1992:265–266) sees the reduction of *i* earlier after a heavy stem than after a light one as key, suggesting a reorganization of just the type illustrated above in 13: "As a result of the differing treatments according to the weight of the preceding syllable, the masculine nouns now formed two partially distinct declensional types." Following Noreen, Buccini argues that the short *i*-stems were particularly prone to influence from the *a*-stems. (We note that *a*-stems do not involve stem-vowel changes, presenting a presumably attractive pattern of paradigm unity.) At a time of "crisis" from a learner's perspective, to use Dresher's term again, this difference helps to cue learners to acquire short stems mostly, though hardly entirely, without umlaut. Much as Old High German learners reanalyzed umlaut in enhancement of the morphological distinction between singular and plural (a modest step), Old Norse learners reinterpreted umlaut as a way of enhancing the grammar's central stem-weight distinction in significant classes of both nouns and verbs (a much bigger step).

7. Summary and Conclusion.
Old Norse umlaut has long been regarded as a conundrum, one that would seem to be exacerbated by our "ingenerate" understanding of umlaut as a phonetically determined sound change grounded in coarticulation. Superficially, the implementation of umlaut in West Germanic seems difficult to reconcile with the Old Norse facts, where the patterns look to be almost the opposite of those we understand to have been in place at the

inception of umlaut. In fact, however, the fixing of historical umlaut toward the end of its own "lifecycle" accounts for how such seemingly counter-phonetic distributions came about: A combination of factors in Old Norse—the historical priority of syncope in long stems, the analogy of *i*-stem nouns to other classes and the emergent role of stem weight in assigning nouns to declensional classes—combine here at the end stage of the lifecycle of this sound change to yield patterns that are quite the reverse of what is found in West Germanic.

While the resulting alignments are obviously morphological in character, sound change lurks behind the patterns in ways that careful sifting and winnowing of the evidence allow us to find. In particular, we have concluded (with others) that the earlier reduction or loss of umlaut-conditioning vowels following long-stem nouns vis-à-vis short stems is the basis for the distinction that emerged in the literary period between umlauted long stems and unumlauted short stems. Taking the perspective of a (doubtless confused) learner of the language at a time when umlaut is still phonetically triggered but the vowels that condition it are disappearing following long stems, it becomes understandable that the learner would resolve the paradigmatic opacity in long stems by generalizing the same vowel throughout. As it is an umlauted vowel that is produced in long stems by earlier generations of speakers, and as umlaut remains phonetically valid when an /i/ does occur in the following syllable (that is, in nominative plural forms like *gestir*), the only paradigmatically invariant vowel candidate consistent with the requirements of the phonetics and phonology is the umlauted one. Learners at this stage thus relexified long stems like /gast-/ to /gest-/ in order to maintain output similarity to the speech of their elders without going through the steps of abstract or opaque derivation.

In the short-stem nouns, by contrast, learners at this same stage were producing umlauted vowels in most forms of the paradigm due to the fact that the conditioning vowels had not yet been reduced, hence *steðir*/*steðiir*. But now umlaut itself comes to die out as an articulatorily mandated phenomenon, about the same time at which suffix vowel reduction extends to stems of both weight types, short as well as long. With umlaut no longer a phonetic imperative, the loss of conditioning /i/ in nominative singular forms automatically results in reversion to the unumlauted, underlying form of the stem, that is, to *staðr*; in nominative plurals, the umlauted outputs may have held on for a period (*steðir*), but these, too, ultimately reverted to their uniform base vowels on the demise of phonetically triggered umlaut, that is, to *staðir*. The difference between the two stem types, then, is that umlaut was still phonetically "alive" at the time that the long stems

restructured in response to the vowel-reduction learning crisis facing a new generation of speakers, but umlaut was already phonetically "dead" by the time that vowel reduction extended to the short stems. In another nominal paradigm, specifically, the *ja*-stems, umlaut-conditioning /j/ was "protected" by the following vowel, whose reduction and ultimate loss thus had no effect on umlaut, whether following short stems or long; the result is that umlauted stem vowels were retained in *ja*-stems of both weight types. Umlaut was similarly pervasive in weak verbal paradigm reflexes involving the historical *-jan* suffix, appearing throughout in the long stems (*dæma*/*dæmda*) and in nonpast (as well as subjunctive) forms of the short stems (*telja*/*talða*). In short-stem weak verbs, then, umlaut was subject to reversion just as occurred in the short *i*-stem nouns, but here speakers appear to have seized upon the morphologically salient properties of [NONPAST] and [SUBJUNCTIVE] as new categorical triggers of now dephonologized umlaut (compare Iverson 1978).

Supporting a line of argument begun by Buccini (1992) (see also Howell 1999) for the need to reconcile the basic nature of West Germanic and North Germanic umlaut, we underscore that every mechanism invoked here, phonetic and phonological and morphological, is involved in the unfolding of West Germanic umlaut as well; but language-specific factors have led Norse inexorably down its own path, where a greater crisis in acquisition precipitated more dramatic realignments in morphology and underlying lexical representations. We have pursued this analogical account under the highly restricted terms argued for by Dresher (2000), namely, that analogy only becomes active on a large scale under acquisitional crisis conditions. In Dresher's test case, Middle English Open Syllable Lengthening, changes similar to those discussed here (such as syncope/apocope) obscured matters to the point that learners became unable to make any coherent generalization about vowel length: The alternations "lost their phonological basis" and learners were unable to substitute "any alternative association of vowel length with morphological categories" (2000:67). In Old Norse umlaut, the crisis made for more remote associations than in Old High German, where learners realigned the umlaut of the *i*-stems around the already closely related singular versus plural distinction; but the system did not melt down in Norse to the extent it did in Middle English. Due to other analogical developments underway, Norse learners came to connect umlaut to stem weight, exploiting umlaut in

enhancement of a prosodic distinction that was itself at risk with other changes taking place in the grammar.[18]

The unfolding of umlaut in Old Norse thus exemplifies the familiar lifecycle of sound change as well as the impulsion of analogical change, though other aspects of the phenomenon, particularly the social factors alluded to by Lund in the quote at the beginning of this paper, will no doubt remain obscure. Nonetheless, the conundrum of Old Norse umlaut now appears less enigmatic than before, and its historical development can be seen to run more nearly parallel rather than orthogonal to that of its West Germanic sisters.

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[18] For both Middle English Open Syllable Lengthening and Norse *i*-umlaut, we suspect yet another factor is at play. Page's Prosodic Change Hypothesis suggests that prosodic changes are "phonetically abrupt but lexically gradual. In other words, the basic unit of prosodic change is the word, not the sound" (1999:327–328). Prosodically oriented changes like these, then, might be particularly vulnerable to crises leading to further analogical change.

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