Umlaut in the Germanic languages

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1. Introduction

Vowel harmony in the standard sense is rare in Germanic, though height harmony is attested for Buchan Scots (Paster 2004) and Old Norwegian (Sandstedt 2017, 2018); the quantity-based phenomenon of "vowel balance" found in some Norwegian and Swedish dialects (and in Övdalian) can also involve vowel-to-vowel assimilation (Riad 1998). More widespread are phenomena commonly referred to as *umlaut*, which have their historical origin in the regressive assimilation of one or more stem vowels to a subsequent suffix vowel or glide. The most widespread type involves fronting before /i, j/ (*i-umlaut*), but other types exist, such as rounding before /u, w/ (*u-umlaut*) and lowering before /a/ (*a-umlaut*). In most cases, the umlaut-triggering vowel has since undergone deletion or has merged with other vowel qualities. As a result, the synchronic vowel alternations labelled "umlaut" in the present-day Germanic languages must, by and large, be viewed as morphologically conditioned. In some analyses to be discussed below, the umlaut-triggering element is still assumed to be active in the phonology, e.g. in the form of a floating feature or even a full vowel. In this chapter, we focus on German and Icelandic as examples of modern-day Germanic languages in which umlaut phenomena are particularly notable and have been extensively researched.

2. Umlaut in German

2.1 Overview

The German term "Umlaut" commonly refers to both the use of the letters <ä>, <ö> und <ü> in German orthography, as well as to an alternation between vowels in German, the latter being the subject of the present chapter. As indicated above, the phenomenon has existed throughout the history of German(ic) from its beginnings. Umlaut in the phonological perspective is a systematic relation between non-front vowels and corresponding front vowels in specific morphological contexts. In (1a–g), alternating vowels are given along with example pairs. In each of the pairs, the second vowel is the umlauted one.

31 (1) i-umlaut in German

32   a.   /oː/ – /øː/

33   *Vogel* [foːɡəl] 'bird-N' – *Vögel* [føːɡəl] 'bird-N.PL'

34   b.   /ɔ/ – /œ/

35   *Gott* [ɡɔt] 'god-N' – *Götter* [ɡœtɐ] 'god-N.PL'

36   c.   /uː/ – /yː/

37   *Buch* [buːχ] 'book-N' – *Büchlein* [byːçlaɪn] 'book-N.DIM'

38   d.   /ʊ/ – /ʏ/

39   *dumm* [dʊm] 'dumb-ADJ' – *dümmer* [dʏmɐ] 'dumb-ADJ.COMP'

40   e.   /aː/ – /ɛː/

41   *zahm* [tsaːm] 'tame-ADJ' – *zähmen* [tsɛːmən] 'tame-V.INF'

42   f.   /a/ – /ɛ/

43   *lang* [laŋ] 'long-ADJ' – *länglich* [lɛŋlɪç] 'long-ADJ'

44   g.   /aʊ/ – /ɔʏ/

45   *laufen* [laʊ̯fən] 'run-V.INF' – *läuft* [lɔʏ̯ft] 'run-V.3SG.PRS.IND'

46

47 Some properties of umlaut in Modern Standard German are noteworthy here: first, the six vowels

48 given here plus the diphthong /aʊ/ form the exhaustive list of umlautable vowels, with the first

49 vowel in the pair strictly determining the nature of its umlauted counterpart. Second, the umlauted

50 vowel always appears in the morphologically derived form; and finally, there exists a large range of

51 such morphological derivations, across all major word classes.

2.2   Phonological properties

53 Two basic questions need to be answered here. First, on the input: which vowels of the German

54 vowel system undergo umlaut? Second, on the output: how do the output vowels relate to their

55 counterpart vowels in each pair (1a–g)? For answering these questions, the place of the input and

56 output vowels need to be considered within the system of the German vowel system. In Table 1, the

57 monophthongal vowel phonemes of present-day German are presented along with one of the

58 possible featural analyses. For these features, alternative analyses exist in the pertinent literature,

discussing alternatives to the use of [tense] or [front]/[back], the non-perfect correlation between tenseness and length, and other aspects.

		+ front - back		- front - back		- front + back	
		- round	+ round	- round	+ round	- round	+ round
+ high - low	+ tense	iː	yː				uː
	- tense	ɪ	ʏ				ʊ
- high - low	+ tense	eː	øː				oː
	- tense	ɛː/ɛ	œ				ɔ
- high + low	+ tense						
	- tense			aː/a			

Table 1: Vowel system of German and umlaut-related pairs

Two additional vowels are not contained in Table 1, namely [ə] and [ɐ]. These occur in unstressed syllables only, are often analyzed as non-phonemic vowels, and never take part in the umlaut alternation, neither as input nor as output. Also, these two vowels are transparent w.r.t. umlaut. [ɐ] is most commonly seen as vocalized /R/, as seen in *Schüler* [ʃyːlɐ] 'pupil' – *Schülerin* [ʃyːlɐʁɪn] 'pupil-FEM'.

    In Table 1, arrows correspond to umlauting pairs (1a–f); the analysis reveals that input vowels are always non-front vowels, either [+back] (/oː/, /ɔ/, /uː/, /ʊ/), or [-back] (/aː/, a/). Output vowels are always vowels bearing [+front]. Partially, this holds for the diphthong /aʊ/–/ɔʏ/ of (1g), for which the second part is identical to the case of /ʊ/–/ʏ/, as in (1b). This observation is captured by claiming that umlaut basically consists in adding a feature [+front] or an equivalent feature such as [palatal] to the vowel in question. The traditional name of *i-umlaut* captures this situation rather well.

    German umlaut, as illustrated in (1), historically derives from the very similar vowel alternation in Old High German, with the crucial difference that the inflectional suffix invariably contains palatal /i, j/; see (2). This suffixal vowel triggers the stem vowels to be a front vowel. As the New High German (NHG) cognates show, the fronting suffix vowel is not present anymore

(although see suffixes in (5a)). In other words, while Old High German umlaut is an instance of
80 vowel harmony, this is not the case for NHG umlaut.

(2) i-umlaut in Old High German

apful – epfili 'apple-N' – 'apple-N.PL' (NHG *Apfel – Äpfel*)

gast – gesti 'guest-N' – 'guest-N.PL' (NHG *Gast Gäste*)

kalb – kelbir 'calf-N' – 'calf-N.PL' (NHG *Kalb – Kälber*)

grabu – grebis 'dig-V.1SG.PRS.IND' – 'dig-V.2SG.PRS.IND' (NHG *grabe – gräbst*)

81

82 Umlaut can thus be treated as the addition of the fronting feature to a vowel not bearing this feature.
83 Thus, in accordance with most of the more recent treatments, as a "rule" of feature addition; see
84 Féry (1994); Wiese (1987, 1996). This is in contrast with accounts from "classical" generative
85 phonology (King 1969; Bach & King 1970) which treats German umlaut as a feature-changing rule.

86   In addition, umlauted vowels are identical to the corresponding input vowels in all other
87 features (length, tenseness, rounding, height), except for low vowels /aː, a/ with their [-low]
88 counterparts. Note that the German vowel system has no low, front vowels /æː, æ/. In other words,
89 the umlaut relation is defined over existing vowel phonemes. Umlaut is not a relation between
90 allophones, as in older stages, but one between phonemes with independent existence.

91   As a "rule" relating phonemes of the language, umlaut is in a feeding relation to other
92 phonological rules. This is particularly obvious in relation to another much-discussed phenomenon
93 of German phonology, *Dorsal Fricative Assimilation* (Hall 1989; Wiese 2000). As seen in (3), a
94 dorsal fricative following an umlauted vowel will appear as its front/palatal variant.

95

96 (3)   Umlaut and Dorsal Fricative Assimilation

97 *Buch* [buːχ] 'book-N' – *Büchlein* [byːçlaɪn] 'book-N.DIM'

98 *Dach* [dax] 'roof-N.' – *Dächer* [dɛçɐ] 'roof-N.PL'

99 *Loch* [lɔχ] 'hole-N.' – *löchrig* [lœçʁɪç] 'hole-ADJ'

100

101 As for prosodic properties, four types of words need to be distinguished: (i) The stock of
102 monosyllabic stems from Germanic origin forms the largest group of umlauted items. (ii) A reduced
103 final syllable, either schwa [ə], vocalized [ɐ], or a syllabic consonant, is unaffected by umlaut: these
104 vowels neither umlaut nor do they act as a causer or blocker of umlaut. (iii) As shown in (4a), the
105 umlauted vowel in words with two or more full vowels always is the stressed and final vowel. Klein
106 (2000) therefore treats umlaut as the right-edge anchoring of a floating feature. Stress shift from the
107 base form is possible here, but stress on the vowel without word stress is not, as exemplified in (4b).
108 The one known exception occurs in the pair *ˈBischof* - *ˈBischöfe* 'bishop' – 'bishop-PL'.

109

110 (4)   Umlaut in multisyllabic words[1]

111   a.   stressed vowels

112   *Hallo* [ˈha.lo]/[ha.ˈloː] 'hello' – *Hallöchen* [ha.ˈløː.çən] 'hello-DIM'

113   **Hallochen* [ˈha.lo.çən], **Hällochen* [ˈhɛ.loː.çən], *?Hallóchen* [ha.ˈloː.çən]

114   *Motor* [ˈmo.toɐ]/[mo.ˈtoːɐ] 'motor-N' – *Motörchen* [mo.ˈtøːɐ.çən] 'motor-N.DIM'

115   **Motorchen* [ˈmo.toɐ.çən], **Mótörchen* [ˈmo.tøɐ.çən], *?Motórchen* [mo.ˈtoːɐ.çən]

116   b.   unstressed vowels

117   *Zebra* [ˈtseː.bʁa] 'zebra-N' – *Zebrachen* [ˈtseː.bʁa.çən] 'zebra-N.DIM'

118   **Zebrächen* [ˈtseː.bʁɛ.çən]

119   *Oma* [ˈʔoː.ma] 'grandma-N' – *Omachen* [ˈʔoː.ma.çən] 'grandma-N.DIM'

120   **Omächen* [ˈʔoː.mɛ.çən], **Ömachen* [ˈʔøː.ma.çən]

121

2.3   Umlaut and morphology

123 The umlaut alternation is found in a substantial range of different morphological contexts, but
124 exclusively in derived environments, including inflection and derivation of all word classes
125 undergoing inflection and derivation. This situation results from language change, in which the
126 domain of umlaut and its conditions have continuously changed since the Old High German period,
127 making it difficult to state generalizations over these morphological conditions.

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1 See also Féry (1994) for examples with unstressed full vowels and the claim that speakers sometimes accept the non-umlauted variants.

However, a few observations hold quite generally: Firstly, umlaut always affects the derived form, see examples of (1). Second, umlaut affects predominantly, but not exclusively, stems from the native Germanic stock, plus the suffix *-tum/-tümer*, as in *Reichtum/Reichtümer* 'wealth-N.SG/PL'.

Thirdly, some morphological contexts (almost) invariably cause umlaut on the stems with suitable vowels, some other contexts vary in their inclination, and some contexts never cause umlaut. Lieber (1987) introduced the distinction between umlaut-conditioning and umlaut-variable suffixes, with some suffixes classified as umlaut-conditioning in (5a–b), and those classified as umlaut-variable in (5c). For a slightly different listing of suffixes, see also Féry (1994).

(5) Umlaut-conditioning suffixes

    a.   derivational

        -chen, *-lein*, *-ig*, *-isch*, *-in*, *-lich*, *-in*

    b.   inflectional

        nouns: *-er*, *-e*, zero (PLURAL)

        adjectives: *-er* (COMPARATIVE), *-st* (SUPERLATIVE)

        verbs: *-st*, *-t* (SG.PRS.IND)

    c.   umlaut-variable

        -er (DEVERBAL AGENTIVE NOUN)

The latter class is demonstrated by *fahren – Fahrer* 'drive' – 'driver' vs. *rauben – Räuber* 'rob' – 'robber', with identical derivation but a crucial difference in the vowel behavior.

2.4 Issues and analyses

Productivity: The morphological nature of umlaut is revealed by the fact that – in present-day Standard German – umlaut is bound to lexically specified cases. However, recent discussion discovered that at least in the derivation of diminutive nouns, umlaut applies productively, as demonstrated by loan words such as *Skandal* [skan.'daːl] 'scandal-N' – *Skandälchen* [skan.'dɛːl.çən] 'scandal-N.DIM' or *Bus* [bʊs] 'bus-N' – *Büschen* [bʏs.çən] 'bus-N.DIM'. The pattern applies to many new formations.

156   Stem or affix feature: For some authors, the phonological feature responsible for umlaut (such

157 as [front]) is part of the stem (Wiese 1987, 1996), for others (Lieber 1987; Féry 1994, for

158 productive cases only, *-chen* in particular) it is part of the affix.

159   Morphology or phonology: While we have noted the phonological patterning in §2.2 above,

160 from the morphological perspective German umlaut is thus a prime example of a morphological

161 process (Wurzel 1984), i.e., as a tool for forming or relating words not by combining morphemes,

162 but by (phonologically constrained) changes in the phonological material.

163   **3.   Umlaut in Icelandic**

164 Icelandic displays a wide range of stem-vowel alternations, many of which are due to historical

165 umlaut processes. I-umlaut alternations appear in various morphological contexts, but are more

166 complex than their German counterparts. More famously, Icelandic has a productive pattern of u-

167 umlaut alternations, in which the historical umlaut trigger is often still present (as [ʏ]). For this

168 reason, u-umlaut is often analyzed as a synchronic assimilation process, making it more analogous

169 to vowel harmony than any other attested umlaut phenomena in the Germanic languages.

170   **3.1. I-umlaut and other stem vowel alternations**

171 In Modern Icelandic, as in German, i-umlaut occurs in certain morphologically derived contexts

172 (Árnason 2011). However, these are far less productive than in the German case, and are largely

173 confined to closed inflection classes or unproductive derivational suffixes; see (6) for illustrative

174 examples. Just as in German, there is typically no overt triggering front vocoid present in the

175 umlauting suffix. If the umlaut trigger is a phonological entity, it must thus be covert (e.g. a floating

176 feature; Klein 1995).

177

178   (6)   a.   Past subjunctive forms of certain verb classes

179   *bundum* [ˈpʏnt-ʏm] '[we] bound'   *byndum* [ˈpɪnt-ʏm] '[we] would bind'

180   *þorðum* [ˈθɔr-ð-ʏm] '[we] dared'   *þyrðum* [ˈθɪr-ð-ʏm] '[we] would dare'

181   *fórum* [ˈfouːr-ʏm] '[we] went'   *færum* [ˈfaiːr-ʏm] '[we] would go'

182	b.	Singular present indicative forms of certain verb classes	
183		*sofa* [ˈsɔːv-a] '[they] sleep'	*sef* [sɛːv-Ø] '[I] sleep'
184		*hlaupa* [ˈl̥øyːp-a] '[they] run'	*hleyp* [l̥eiːp-Ø] '[I] run'
185		*njóta* [ˈnjouːt-a] '[they] enjoy'	*nýt* [niːt-Ø] '[I] enjoy'
186	c.	Comparatives of certain (irregular) adjectives and adverbs	
187		*dökkur* [ˈdœhk-ʏr] 'dark (M.NOM.SG)'	*dekkri* [ˈdɛhk-r-ɪ] 'darker'
188	d.	With various derivational suffixes	
189		*glaður* [ˈklaːð-ʏr] 'joyful (M.NOM.SG)'	*gleði* [ˈklɛːð-ɪ] 'joy'
190		*stjóri* [ˈstjouːr-ɪ] 'director, boss (NOM.SG)'	*stýra* [ˈstiːr-a] 'to direct, steer'

191

192 A notable difference between i-umlaut in Icelandic and its German counterpart is that, due to a
193 series of historical vowel shifts, i-umlaut has come to involve systematic loss of rounding (along
194 with fronting, when applicable). Front rounded /ʏ, œ, øy/ thus become unrounded [ɪ, ɛ, ei], as seen
195 in (6). If i-umlaut is due to a floating feature, this actively unrounding aspect is potentially
196 problematic for theories where rounding is a privative feature (e.g. Steriade 1987, Clements &
197 Hume 1995, Backley 2011). Historical complexities have also produced quirks in the i-umlaut
198 mappings. For instance, /ɔ/ umlauts to [ɛ] in SG.PRS.IND contexts but to [ɪ] otherwise (cf. 6a vs. 6b).
199 Also, while prevocalic /j/ is typically absorbed under i-umlaut, it can affect the outcome in odd,
200 synchronically unmotivated ways (e.g. /ou/ yields [ai] while /jou/ yields [i]).

201   In the highly conservative lexicon of Modern Icelandic, related words very often differ in
202 stem vocalism in rather arbitrary ways not related to umlaut (e.g. stem ablaut, similar to English *fly*
203 *– flew – flown* or *song – sing*). It is therefore unclear how much a child acquiring Modern Icelandic
204 would have to gain from parcelling out just the "i-umlaut" alternations and posit a phonological
205 mechanism for these, especially given the complexities mentioned above.

206 **3.2. U-umlaut**

207 The vowel alternations referred to as u-umlaut are a pervasive and productive phenomenon in
208 Modern Icelandic. U-umlaut has long been analyzed as involving a synchronic phonological
209 process of regressive assimilation, essentially: a → œ / __ C_0 ʏ (e.g. Valfells 1967, Anderson 1969,
210 1972, 1974, Orešnik 1975, Rögnvaldsson 1981, Kiparsky 1984, Gibson & Ringen 2000, Indriðason

211 2010, Jurgec 2011, Thráinsson 2017). Such an analysis rests on situations where the umlaut-
212 triggering suffix contains an overt [ʏ]. Several inflectional suffixes with [ʏ] do indeed trigger u-
213 umlaut, such as 1PL /-ʏm/ (on all finite verbs), DAT.PL /-ʏm/ (on practically all nouns, adjectives and
214 determiners), or the ACC/DAT/GEN.SG /-ʏ/ and NOM/ACC.PL /-ʏr/ suffix morphs of the productive
215 inflection class of "weak" feminine nouns. Examples involving recent borrowings or foreign names
216 are shown in (7).

217

218 (7) a. *tagga* [ˈtʰak:-a] 'to tag'

219   *töggum* [ˈtʰœk:-ʏm] '[we] tag'

220 b. *app* [ˈahp-Ø] 'app (NOM.SG)'

221   *öppum* [ˈœhp-ʏm] 'apps (DAT.PL)'

222 c. *Súmatra* [ˈsuːmatr-a] 'Sumatra (NOM)'

223   *Súmötru* [ˈsuːmœtr-ʏ] 'id. (ACC)

224 d. *masda* [ˈmast-a] 'Mazda (NOM.SG)'

225   *mösdur* [ˈmœst-ʏr] 'Mazdas (NOM.PL)'

226

227 Equally productive, however, are numerous umlaut-triggering affixes that do not contain a front
228 rounded vowel; these are either vowel-less (zero morphs) or contain a back rounded vowel ([ou, ɔ,
229 u]). Some are illustrated in (8); the u-umlauting status of the affix morph is here flagged with a
230 superscript "u":[2]

231

232 (8) a. *app* [ahp-Ø] 'app (NOM.SG)'

233   *öpp* [œhp-Øᵘ] 'id. (NOM.PL)'

234 b. *smarta* [ˈsmar̥t-a] 'fashionable (F.ACC.SG)'

235   *smört* [smœr̥t-Øᵘ] 'id. (F.NOM.SG)'

236 c. *gat* [kaːt-Ø] 'hole (NOM.SG)'

___

2 Many speakers instead treat the adjective *smart* 'fashionable; smartly dressed' in (8b) as indeclinable and unaffixed (i.e. [smar̥t] in all genders, cases and numbers).

237   *götótt* [ˈkœːt-ouhtᵘ-ar] 'full of holes (F.NOM.PL)'

238

239   Cases like (8), which are acquired just as early and robustly as those in (7) (Aðalsteinsson &
240   Konráðsson 2009), reveal that u-umlaut can be triggered by some non-overt, non-segmental
241   property. This might be a floating feature bundle [-back, +round] (Klein 1995, Gibson & Ringen
242   2000), which docks onto /a/ but leaves other vowels intact; alternatively, it might be a diacritic
243   triggering some morphophonological operation (Rögnvaldsson 1981, Þorgeirsson 2012, Ingason
244   2016).

245   Conversely, several morphs contain [ʏ] but do not trigger u-umlaut. For some of these,
246   standard generative analyses attribute this to either domain restrictions or opaque interaction with
247   another phonological process. Thus Kiparsky (1984) explains the absence of u-umlaut in definite
248   forms like DAT.SG *hvalnum* /kʰval-Ø#n-ʏm/ → [ˈkʰvalnʏm] 'the whale' (cf. indefinite DAT.PL *hvölum*
249   /kʰval-ʏm/ → [ˈkʰvœːlʏm] 'whales') by confining u-umlaut to the lexical stratum, cliticization of
250   the definite article being post-lexical. The absence of u-umlaut morpheme-internally (*kaktus*
251   [ˈkʰaxtʏs] 'cactus') is attributed to blocking in non-derived environments (Rögnvaldsson 1981,
252   Kiparsky 1984). The ubiquitous (M.)NOM.SG suffix morph [-ʏr], which does not trigger u-umlaut, is
253   analyzed as reflecting /-r/ and a synchronic epenthesis process (e.g. NOM.SG *hvalur* /kʰval-r/ →
254   [ˈkʰvaːl-ʏr]; Orešnik 1972, Anderson 1974, Rögnvaldsson 1981, Kiparsky 1984, Itô 1988,
255   Indriðason 1994, Þráinsson 2017). This requires stipulating an opaque (counter-feeding)
256   interaction between u-umlaut and epenthesis, e.g. by ordering the former before the latter.

257   However, several non-triggering affixes with [ʏ] elude such explanations. For instance,
258   adjective-forming *-ug* /-ʏɣ/ 'soiled with, covered in' is analogous to *-ótt* /-ouhtᵘ/ 'full of' in (8c) in
259   terms of productivity and semantic field, but fails to trigger u-umlaut except in lexicalized items
260   with idiosyncratic semantics (e.g. F.NOM.PL *sandugar* [ˈsant-ʏɣ-ar] 'all covered in sand' vs.
261   *söndugar* [ˈsœnt-ʏɣ-ar] 'sandy [e.g. hills]'; Árnason 1992, Indriðason 1994). The recent colloquial
262   hypocoristic *-us* /-ʏs/ also does not trigger u-umlaut (e.g. *Hrafnus* [ˈr̥apn-ʏs] from the man's name
263   *Hrafn*; Ingason 2013). Such facts invite the possibility that all u-umlaut is triggered by a covert
264   property of individual affix morphs or morphological constructions, never by vowel-to-vowel
265   assimilation (Árnason 1985, 1992, 2011, Klein 1995, Markússon 2012, Þorgeirsson 2012, Ingason
266   2016).

267   A further problem for assimilation analyses of u-umlaut is how to delimit targets to just /a/,
268   which raises to mid in the rounding/fronting process. If u-umlaut involves spreading of [+round]

and [-back], with a concomitant change of [+low] to [-low], why does it not also target /ɛ/ or /ɔ/, which already carry a subset of those features (Árnason 2011:245)?[3] In classical generative accounts, this was a trivial issue, as the natural class targeted by the umlaut rule could be arbitrarily limited to [+low] vowels. Constraint-based analyses must resort to more questionable solutions, such as invoking special constraints requiring an underlyingly round or front vowel to be faithful in all its (other) features, leaving only back unrounded /a/ unprotected (Gibson & Ringen 2000; cf. also Klein 1995).

Where an umlaut-triggering affix is preceded by multiple /a/ vowels, u-umlaut tends to feed a historical process of unstressed vowel reduction, whereby [œ] raises to [ʏ] which itself serves as an umlaut trigger, as seen in (9a)–(9b) (Anderson 1974, Rögnvaldsson 1981). The raising is subject to lexical and morphological idiosyncrasies, however (Orešnik 1977, Árnason 1985, 1992), yielding numerous exceptions and some variation, illustrated in (9c)–(9d). The fact that (un-raised) [œ] does not pass on its umlaut-induced frontness and rounding (e.g. *[ˈsœːlœt-ʏm], *[ˈpœːnœn-ʏm]) makes it an "icy target" in the nomenclature of Jurgec (2011).[4]

(9)   a.   *markaðast* [ˈmaɾk̥-að-ast-Ø] 'most marked (N.NOM.SG)'

            mörkuðust [ˈmœɾk̥-ʏð-ʏst-Øᵘ] 'id. (N.NOM.PL)'

       b.   *safnari* [ˈsapn-ar-ɪ] 'collector (NOM.SG)'

            söfnurum [ˈsœpn-ʏr-ʏm] 'id. (DAT.PL)'

       c.   *salat* [ˈsaːlat-Ø] 'salad (NOM.SG)'

            salötum [ˈsaːlœt-ʏm] 'id. (DAT.PL)'

       d.   *banani* [ˈpaːnan-ɪ] 'banana (NOM.SG)'

            banönum [ˈpaːnœn-ʏm] ~ *bönunum* [ˈpœːnʏn-ʏm] 'id. (DAT.PL)'

In suffixes, [a] generally alternates with (umlaut-triggering) [ʏ], as in (9a)–(9b) (Klein 1995, Gibson & Ringen 2000). However, some suffixes instead display [œ] (*gargan* [ˈkark-an-Ø] 'loud instrument', NOM.PL *gargön* [ˈkark-œn-Øᵘ], from /kark-/ 'shriek'). Furthermore, in some suffixes the "umlauted" alternant with [ʏ] has unexpectedly wide distribution. The productive nominalizer

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3 The [a]~[œ] alternation is thus a case of saltation (Hayes & White 2015); as purely phonological patterns, saltatory alternations are difficult to learn and diachronically unstable (White 2014, Smolek & Kapatsinski 2018).
4 Non-standard spellings like *bönönum* are occasionally encountered, but may reflect [ˈpœːnʏnʏm] (Thráinsson 2011).

[-an]~[-ʏn] (NOM.SG *söfnun* [ˈsœpn-ʏn-Øᵘ] 'collection', NOM.PL *safnanir* [ˈsapn-an-ɪr]) appears as [-ʏn] even before GEN.SG /-ar/ (GEN.SG *söfnunar* [ˈsœpn-ʏn-ar]), even though the latter never triggers u-umlaut otherwise (cf. NOM.SG *höfn* [hœpn-Øᵘ] 'harbour', GEN.SG *hafnar* [ˈhapn-ar], NOM.PL *hafnir* [ˈhapn-ɪr]). Morpheme-internally, whether [CaCaC-] alternates with [CaCœC-] or [CœCʏC-] before umlaut-triggering suffixes is unpredictable, and occasionally variable as in (9d), but seems influenced by how "affix-like" the stem-final consonant is (Hansson 2013). Attempts to explain the surface patterns with reference to metrical structure (e.g. restricting u-umlaut to foot-internal contexts; McCormick 1982, Árnason 1992), which may in turn be sensitive to morphological constituency, have been only partially successful (see e.g. Klein 1995 for criticisms).

In Old Icelandic, the umlaut trigger *u* was a back vowel [ʊ], and the umlauted outcome *ǫ* (ModIce *ö*) was similarly back [ɔ]; u-umlaut was thus mere rounding assimilation among back vowels (and/or docking of a floating [+round] feature onto a back stem vowel). The analysis of Modern Icelandic u-umlaut as a still-phonological assimilation process rests on the fortuitous fact that both OIce [ʊ] and [ɔ] have shifted to front vowels: [ʏ] and [œ], respectively. U-umlaut can thus now be viewed as assimilation in both rounding and frontness. However, the historical shift of [ɔ] to [œ] (and of [o] to [ɔ], taking its place) predated that of [ʊ] to [ʏ] by several centuries (Markússon 2012); in the intervening period, u-umlaut must therefore have involved a *back* rounded suffix vowel [ʊ] causing a preceding /a/ to become *front* rounded [œ] (rather than back rounded [ɔ]), for no obvious reason. This lends support to the view that u-umlaut had ceased to involve phonological assimilation already in medieval Icelandic (cf. Iverson 1978). The strikingly productive and resilient character of u-umlaut alternations in Modern Icelandic is not in itself a diagnostic of phonological as opposed to morpho(phono)logical status, as is often claimed (e.g. Thráinsson 2017).

Treating u-umlaut as a fundamentally morphophonological phenomenon, rather than a vowel-to-vowel assimilation process, does not mean that it is not constrained by phonological factors. For instance, whether a given affix can trigger u-umlaut onto a preceding stem is governed by locality restrictions that are phonological rather than morphosyntactic in nature (Ingason 2016; see Harðarson 2016 for a similar point about Icelandic i-umlaut). For instance, the adjectivizer *-(i)sk* has two allomorphs, /-isk/ and /-sk/, which are sometimes in free variation (e.g. NOM.SG *assamíska* [ˈasːam-isk-a] ~ *assamska* [ˈasːam-sk-a] 'Assamese [language]'); while the former blocks u-umlaut, the latter is transparent to it (ACC.SG *assamísku* [ˈasːam-isk-ʏ] ~ *assömsku* [ˈasːœm-sk-ʏ]; Ingason 2016). This may suggest that selection and/or generation of the umlauted stem shape is computed within the phonological module as such (rather than logically prior to it, as in most current treatments of contextual allomorphy; e.g. Embick 2010, Bonet & Harbour 2012, Paster 2016).

4.   Summary

In some ways, i-umlaut in German and u-umlaut in Icelandic represent opposite ends of a spectrum. German i-umlaut is highly morphologized and lexicalized, requiring umlaut-triggering affixes (and/or umlaut-prone stems) to be tagged with diacritics or floating features. However, it has also been found to be a productive process in some contexts. Icelandic i-umlaut is similar in character, though less productive and harder to distinguish from other stem alternations. By contrast, Icelandic u-umlaut is often taken to involve an active phonological assimilation process, whereby a front rounded suffix vowel transmits its rounding and frontness to a preceding /a/. As we saw above, however, a purely assimilation-based analysis is problematic; Icelandic u-umlaut is morphologically conditioned to a greater degree than is usually acknowledged.

Recent debates around umlaut in these two languages have focussed on the phonological and/or morphological nature of the phenomenon, on the phonological features involved, on locality relations between the umlaut trigger and target, on the interaction of umlaut with other phonological processes, and on its interaction with inflectional and derivational morphology. Umlaut phenomena in languages like German and Icelandic therefore continue to provide an important basis for theoretical discussions on the phonology-morphology interface.

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