Look Both Ways: Outward-looking allomorphy in Icelandic participles

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Abstract

Icelandic passive and perfect participles are formed using one of two primary suffixes, *-ð* for weak verbs and *-in* for strong verbs. These suffixes are followed by adjectival inflections. A special class of weak verbs exhibits a 'mixed' declension, in which the weak suffix is used before adjectival inflections that begin with a vowel, and the strong suffix is used in other contexts. This shows that participle formation in the mixed declension is sensitive to the phonology of an 'outside' affix, looking away from the stem. This has repercussions for the theory of morphology, since models have been developed which deny the possibility of such 'outward'-looking phonological sensitivity.

Icelandic exhibits outward-looking allomorphy in its passive participles. Participles are regularly formed from verb stems according to two major paradigms, the strong (suffix {-(ɪ)n}, with stem vowel change) and weak ({-ð}). In the passive, they appear with agreement endings from the adjectival paradigm when there is a structurally case-marked subject to agree with, and they can also be used adjectivally (hence can appear in any case).

(1) a. bera 'carry' (strong): bor-in (FSG.NOM), bor-in-s (MSG.GEN), bor-n-ir (MPL.NOM)
b. bora 'drill' (weak): bora-ð (FSG.NOM), bora-ð-s (MSG.GEN), bora-ð-ir (MPL.NOM)

The outward-sensitive effect is seen in a lexically restricted set of verbs which are inflectionally weak but show a vowel change in the stem; an example is *berja* 'beat'. Their finite inflections are from the weak verb paradigm, but in the participle, these verbs take a 'mixed' declension, showing either the strong {-(ɪ)n} or the weak {-ð} suffix. Specifically, they take the weak ending if a vowel-initial agreement affix follows, and the strong ending otherwise, as illustrated below.

(2) a. Han var bar-**in**-n.
he was beat-PTCPL-MSGNOM
'He was beaten' (consonant-initial agreement ending)
b. Hún var bar-**in**.
she was beat-PTCPL-FSGNOM
'She was beaten' (no overt agreement ending)

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c. Við vorum bar-**ð**-ir.
we *were.*1PL *beat*-PTCPL-MPLNOM
'We (group of males) were beaten' (vowel-initial agreement ending)

Like English, Icelandic uses a participle for the perfect ('has beaten'), but in the perfect, no agreement suffix follows the participial suffix, which is {-ið} in strong and mixed verbs.

(3) Hann hefur bar-**ið** mig.
he *has* *beat*-PTCPL *me.*ACC
'He has beaten me'

The outward-sensitive effect is only seen when a participle is inflected for agreement, as happens in the passive (and when participles are used adjectivally).

The existence of such outward-looking allomorphy has been a matter of discussion (Bobaljik 2000, Carstairs-McCarthy 2001, Adger et al. 2003). It has ramifications for the theory of lexical insertion, as it bears on when phonological information becomes available for allomorph selection, and to what extent this is governed by word structure.

The suggestion, developed in some detail in Bobaljik (2000), that phonologically sensitive allomorphy can be sensitive only to phonological information which is closer to the stem supports a model in which phonological information is available at each step of lexical insertion, but in which each selection is irreversible.

The proposal for lexical insertion in Bye and Svenonius (2010; in press), Svenonius (2012) is somewhat different. There, selection of allomorphs occurs one phase at a time, and within each round of lexical access, there is a strict separation of syntactic and phonological information. Syntactic information can be used to select allomorphs, but it can also leave options open, in the case of underspecification. The phonological component may act to choose from among those options left open by the syntax. The Icelandic facts support the latter model over the former.

In this paper, I step through the empirical facts before presenting the formal analysis. In §2, I lay out the facts of Icelandic adjectival agreement morphology, to establish that the system is rich and systematic. This is important because it forestalls an alternative where each participle+agreement ending is separately listed. In §2, I present the facts for inflected participles of weak verbs, and in §3, I do the same for strong verbs. Finally, in §4, the mixed declension is described, and it is shown that it has both the strong and weak forms available to it, and that the selection is made by phonology. Importantly, part of the phonological environment is determined by the outer agreement affix, as already sketched above.

1 Adjectival agreement morphology

First, consider the regular 'strong' paradigm for adjectival agreement. The agreement suffixes are set off with a hyphen and boldfaced.

(4) The strong agreement paradigm for adjectives, exemplified by *ríka* 'rich'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	riːk-**ʏr**	riːk	rik-**t** [rixt]	riːk-**ɪr**	riːk-**ar**	riːk
ACC	riːk-**an**	riːk-**a**	rik-**t** [rixt]	riːk-**a**	riːk-**ar**	riːk
DAT	riːk-**ʏm**	riːk-**rɪ**	riːk-**ʏ**	riːk-**ʏm**	riːk-**ʏm**	riːk-**ʏm**
GEN	rik-**s** [rixs]	riːk-**rar**	rik-**s** [rixs]	riːk-**ra**	riːk-**ra**	riːk-**ra**

This paradigm exhibits some system-wide syncretisms in Icelandic. One is the absence of gender distinctions in the plural of oblique cases (dative and genitive). Another is the absence of nominative-accusative distinctions in the neuter, and in the feminine plural. These syncretisms are independent of morphological exponence and are seen throughout Icelandic, e.g. in the nominative, the number 'two' has three plural forms, *tveir–tvær–tvö*, for masculine, feminine, and neuter respectively. However, the genitive is invariably *tveggja*, and the dative is variably *tveim* or *tveimur*, with no gender distinctions being made. In the accusative, there is a distinct form for the masculine, *tvo*, but the feminine and neuter use the same form as in the nominative. For neuter, this is part of a system-wide syncretism in both singular and plural, and for feminine, this is a system-wide syncretism in the plural only.

This means that we can simplify the table slightly.

(5) The strong agreement paradigm for adjectives, showing systematic syncretisms

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	ri:k-**ʏr**	ri:k	rik-**t**	ri:k-**ɪr**	ri:k-**ar**	ri:k
ACC	ri:k-**an**	ri:k-**a**		ri:k-**a**		
DAT	ri:k-**ʏm**	ri:k-**rɪ**	ri:k-**ʏ**	ri:k-**ʏm**		
GEN	rik-**s**	ri:k-**rar**	rik-**s**	ri:k-**ra**		

The similarity of the masculine singular dative {ʏm} and the plural dative {ʏm} can be taken to be more or less accidental, since it is not typical of the Icelandic system (e.g. the masculine dative singular is usually /ɪ/ or ∅ with strong nouns and /a/ with weak nouns and adjectives, while the dative plural is /ʏm/ with strong nouns and /ʏ/ with weak adjectives).

The identity of the masculine genitive singular and the neuter genitive singular is widespread in Icelandic but it is not clear that it can be characterized as system-wide, since there are strong masculine nouns with a genitive singular in {ar} (e.g. *hlutar* 'thing' gen) which is not seen in the neuter paradigm (though it is in the feminine). However, the neuter and masculine singular genitive do not seem to be different anywhere in the adjectival paradigms (not for strong nor weak declensions), nor for quantifiers, pronouns, and other agreeing elements, so we might want to merge the {s} cells to show that they have the same status as the other system-wide syncretisms; the *-ar*-taking masculine nouns would be specified as taking a marked (feminine) form of the genitive singular, and neuter nouns would have to be prevented from being so marked.

(6) The strong agreement paradigm for adjectives, assuming systematic syncretism of masculine and neuter genitive singular

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	ri:k	ri:k-**ʏr**	rik-**t**	ri:k-**ar**	ri:k-**ɪr**	ri:k
ACC	ri:k-**a**	ri:k-**an**			ri:k-**a**	
DAT	ri:k-**rɪ**	ri:k-**ʏm**	ri:k-**ʏ**	ri:k-**ʏm**		
GEN	ri:k-**rar**	rik-**s**		ri:k-**ra**		

This means there are sixteen exponents of strong adjectival agreement, including two distinct {ʏm}'s and two exponents which do not show up as overt suffixes here (feminine singular nominative and the neuter plural nominative/accusative).

The masculine nominative singular agreement suffix is historically /r/, with the /ʏ/ epenthetic. There is some reason to think that that might be true synchronically as well (cf. Kiparsky 1984; 1993). For example, a 'real' /ʏ/ in a suffix triggers umlaut in the

stem, but the epenthetic /ʏ/ does not. To see this, first consider the distribution of umlaut in the adjectival paradigm.[1]

(7) Umlaut, exemplified by *langur* 'long, tall'

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	**lœyŋk**	lauŋk-ʏr	lauŋ̊-**t**	lauŋkar	lauŋkɪr	**lœyŋk**
ACC	lauŋk-a	lauŋk-an			lauŋk-a	
DAT	lauŋk-rɪ	**lœyŋk-ʏm**	**lœyːŋk-ʏ**	**lœyŋk-ʏm**		
GEN	lauŋk-rar	lauŋ-**s**		lauŋk-ra		

The paradigm shows umlaut of /a/ [au] to /ø/ [œy] wherever the following syllable contains /ʏ/ (mid central round, contrasting with (mid) back round /ɔ/ and low (central) round /ø/), except the masculine singular nominative in the second column. There is also umlaut in the feminine nominative singular and in the neuter nominative and accusative plural. This is an exponent of agreement which is only visible, in the form of umlaut, when there is an /a/ in the stem, and is found elsewhere in Icelandic. We can assume that it represents a round autosegment, which is suffixed like the other exponents but fails to be realized unless the closest vowel to its left is the maximally underspecified /a/. If it is /a/, then the autosegment combines with it to give /ʏ/ in unstressed syllables, /ø/ in stressed syllables. I will henceforth abbreviate it as a raised small [ʏ]; it is different from /ʏ/ in not having a root node, and this defect is what allows it to linearize across a stem-final consonant. In practice I will include it in representations only when its effects can be seen in the form of umlaut, though it may be assumed to be present wherever the strong adjectival paradigm calls for neuter plural nonoblique or feminine singular nominative.

Epenthetic vowels can also be seen when a root ends in a cluster which cannot be syllabified as a coda, such as /ɣr/ in *fagur* 'beautiful'.

(8) Epenthetic vowel in absence of V-initial suffix, exemplified by *fagur* 'beautiful'

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	**føːɣʏr-**[ʏ]	**faːɣʏr**	**faːɣʏr̥-t**	faɣr-ar	faɣr-ɪr	**føːɣʏr-**[ʏ]
ACC	faɣr-a	faɣr-an			faɣr-a	
DAT	**faːɣʏr-rɪ**	føɣr-ʏm	føɣr-ʏ	føɣr-ʏm		
GEN	**faːɣʏr-rar**	**faːɣʏr̥-s**		**faːɣʏr-ra**		

The masculine singular nominative {-r} here presumably forms part of the coda but is deleted at the surface since /r/ in the coda of an unstressed syllable does not show contrastive length. If the suffix were phonologically /ʏr/, we would expect */føɣʏrʏr/.

In the suffixes which start with /r/, the /r/ assimilates to a preceding sonorant. This can be seen for /l/ in the adjective *gammall* 'old' (which also has a disappearing vowel, but one which gets a low feature for independent reasons and surfaces as /a/, or /ʏ/ where affected by umlaut).[2]

(9) Assimilation of /r/-initial suffixes to preceding /l/, exemplified by *gamall* 'old'

[1] The representations here include some details which may be considered phonetic rather than phonemic, for example /a/ before /ŋ/ is systematically [au], and /ö/ before /ŋ/ is [œy]; also, the voicelessness of [ŋ̊] before the syllable-final /t/.

[2] underlying /ll/ regularly surfaces as /tl/, as indicated here; I assume that it is not a surface phonetic effect since it does not apply to hypocoristics, e.g. *Tolli* /tolːɪ/ not */totlɪ/.

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	gøːmʏl-[ʏ]	gaːmat-**l**	gaːmal̥-t	gaml-ar	gaml-ɪr	gøːmʏl-[ʏ]
ACC	gaml-a	gaml-an			gaml-a	
DAT	gaːmat-**lɪ**	gøml-ʏm	gøml-ʏ	gøml-ʏm		
GEN	gaːmat-**lar**	gaːmal-s		gaːmat-**la**		

Here it can be seen that all the suffixes which otherwise start with /r/ start with /l/ after the /l/ of the root.

It will also be important later on to know that this happens with adjectives that end in /n/. As can be seen below, the /r/-initial suffixes assimilate to a preceding /n/.[3]

(10) Assimilation of /r/-initial suffixes to preceding /n/, exemplified by *seinn* 'late'

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	sɛɪːn	sɛɪt-**n**	sɛɪm-t	sɛɪːn-ar	sɛɪːn-ɪr	sɛɪːn
ACC	sɛɪːn-a	sɛɪːn-an			sɛɪːn-a	
DAT	sɛɪt-**nɪ**	sɛɪːn-ʏm	sɛɪːn-ʏ	sɛɪːn-ʏm		
GEN	sɛɪt-**nar**	sɛɪm-s		sɛɪt-**na**		

Again, if the vowel in masculine singular nominative forms like *ríkur* /riːkʏr/ is epenthetic, then the suffix is {-r} and the assimilation can be described as regularly applying in *seinn* /sɛɪːtn/.

Thus, we have the following exponents for strong adjectival agreement in Icelandic, with ʀ being the underspecified /r/ which assimilates to a preceding sonorant.[4]

(11) Exponents of strong adjectival agreement

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	[ʏ]	ʀ	t	ar	ɪr	[ʏ]
ACC	a	an			a	
DAT	ʀɪ	ʏm	ʏ	ʏm		
GEN	ʀar	s		ʀa		

Compare some of the chief exponents for case and number on strong nouns (unlike adjectives, there are many declension classes of strong nouns).

(12) Representative suffixes for strong nouns

	F SG	**M** SG	**N** SG	**F** PL	**M** PL	**N** PL
NOM	[**ʏ**]	**ʀ**	[ʏ]	**ar**	ar	[**ʏ**]
ACC	[ʏ]	a			**a**	
DAT	[ʏ]	ɪ	ɪ	**ʏm**		
GEN	ar	**s**		a		

Six suffixes appear to be the same in both paradigms: in the singular, the masculine and feminine singular nominative, and the syncretized masculine/neuter singular genitive; in the plural, the feminine non-oblique, the masculine accusative, and the oblique dative.

It could reasonably be asked whether these exponents can be decomposed further. There are two likely candidates. The first involves the assimilating /ʀ/; if it were parsed out as a separate part of the adjectival morphology, that would allow the unification of the nominal and adjectival exponents of the feminine singular genitive and of the plural

[3]Underlying /nn/ regularly surfaces as /tn/ after 'tense' vowels, including diphthongs; I assume this is the same process as the one which turns /ll/ into /tl/.

[4]Perhaps simply a normal /r/, once the exact conditions on assimilation are understood.

genitive; it might ultimately lead to a simpler analysis of the feminine singular dative. The other candidate is also /ʀ/ or /r/, but approached from the right edge; a number of non-oblique non-neuter forms in the nominal paradigm show a final /ʀ/ or /r/. Müller (2005) parses this out and argues that it is a separate exponent of [-obl].

For my purposes, a more conservative assumption is better suited to the presentation. I will make a few assumption about ϕ-features and case features. In particular, I will assume that they are privative, so that singular is the absence of plural. Taking neuter to be the unmarked gender in Icelandic, and taking feminine to be the most highly marked, I will assume that neuter is the absence of any gender specification, masculine is the presence of a feature M, and feminine is the presence of both M and F (there are reasons to think this is not quite right for Icelandic, but it is close enough for present purposes). Finally, case can also be handled this way, as developed in Caha (2009), but there so little case syncretism here that I will only use it for the nominative-accusative syncretism, taking nominative to be the absence of accusative.

Given these assumptions, the exponents of strong adjectival agreement in Icelandic can be represented as follows, assuming Halle's Subset Principle and a feature decomposition where singular is the absence of plural and neuter is the absence of gender.

(13)

Adjectives			(some) Strong Nouns		
Plurals			Plurals		
{-a}	⇔	<Acc,Pl,M>	{-a}	⇔	<Acc,Pl,M>
{-ym}	⇔	<Dat,Pl>	{-ym}	⇔	<Dat,Pl>
{-ʀa}	⇔	<Gen,Pl>	{-a}	⇔	<Gen,Pl>
{-ar}	⇔	<Pl,F,M>	{-ar}	⇔	<Pl,M>
{-ɪr}	⇔	<Pl,M>			
{[ʏ]}	⇔	<Pl>	{[ʏ]}	⇔	<Pl>
Nonplurals			Nonplurals		
{-ʀar}	⇔	<Gen,F>	{-ar}	⇔	<Gen,F>
{-s}	⇔	<Gen>	{-s}	⇔	<Gen>
{-ʀɪ}	⇔	<Dat,F>			
{ʏ}	⇔	<Dat>			
{-a}	⇔	<Acc,F>			
{[ʏ]}	⇔	<F>	{[ʏ]}	⇔	<F>
{-ym}	⇔	<Dat>	{-ɪ}	⇔	<Dat>
{-an}	⇔	<Acc,M>	{-a}	⇔	<Acc,M>
{-ʀ}	⇔	<M>	{-ʀ}	⇔	<M>
{t}	⇔	< >	{[ʏ]}	⇔	< >

2 Weak verb participles

For weak verbs, it can be seen that the paradigm is nearly identical to that of the adjectives. The only possible deviation is in the neuter singular nominative and accusative, marked with an asterisk here to draw attention to it. I return to this point immediately after (15).

(14) The paradigm for weak verb participles, exemplified by *smyrja* 'smear, butter, lubricate'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	smʏr-ð-**ʏr**	smʏr-ð	smʏr-**t***	smʏr-ð-**ɪr**	smʏr-ð-**ar**	smʏr-ð
ACC	smʏr-ð-**an**	smʏr-ð-**a**	smʏr-**t***	smʏr-ð-**a**	smʏr-ð-**ar**	smʏr-ð
DAT	smʏr-ð-**ʏm**	smʏr-ð-**ri**	smʏr-ð-**ʏ**	smʏr-ð-**ʏm**	smʏr-ð-**ʏm**	smʏr-ð-**ʏm**
GEN	smʏr-ð-**s**	smʏr-ð-**rar**	smʏr-ð-**s**	smʏr-ð-**ra**	smʏr-ð-**ra**	smʏr-ð-**ra**

The participial ending /ð/ assimilates to a preceding consonant, surfacing as /d/ (e.g. daɪm-d- 'judged') or /t/ (e.g. rɛɪs-t- 'raised'). These also show the completely regular paradigm of adjectival suffixes as shown above.

(15) Weak verb participle with assimilation, exemplified by *dæma* 'judge'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	daɪm-d-ʏr	daɪm-d	daɪm-t	daɪm-d-ɪr	daɪm-d-ar	daɪm-d
ACC	daɪm-d-an	daɪm-d-a	daɪm-t	daɪm-d-a	daɪm-d-ar	daɪm-d
DAT	daɪm-d-ʏm	daɪm-d-rɪ	daɪm-d-ʏ	daɪm-d-ʏm	daɪm-d-ʏm	daɪm-d-ʏm
GEN	daɪm-d-s	daɪm-d-rar	daɪm-d-s	daɪm-d-ra	daɪm-d-ra	daɪm-d-ra

For the neuter singular nominative and accusative, the surface form can be derived by plausible phonological processes. The regular agreement suffix /t/ might be added to the regular participial suffix /ð/, and then //ðt// might change to /t/, by phonological processes of assimilation and word-final degemination, or cluster simplification.[5]

Some weak verbs have a vowel before the participial ending (umlaut spreads leftward, with unstressed /a/ going to /ʏ/ and stressed /a/ to /ø/).

(16) Weak verb participles with theme vowel, exemplified by *kalla* 'call'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	katla-ð-ʏr	køtlʏ-ð	katla-ð	katla-ð-ɪr	katla-ð-ar	køtlʏ-ð
ACC	katla-ð-an	katla-ð-a	katla-ð	katla-ð-a	katla-ð-ar	køtlʏ-ð
DAT	køtlʏ-ð-ʏm	katla-ð-rɪ	køtlʏ-ð-ʏ	køtlʏ-ð-ʏm	køtlʏ-ð-ʏm	køtlʏ-ð-ʏm
GEN	katla-ð-s	katla-ð-rar	katla-ð-s	katla-ð-ra	katla-ð-ra	katla-ð-ra

Here, the presence of the preceding vowel might be responsible for the fact that //ðt// in the neuter singular nominative and accusative surfaces as /ð/ rather than as /t/.

3 Strong verb participles

For the strong verbs, the participial ending is /n/ when a vowel-initial agreement suffix follows, /ɪ/ otherwise. The assimilation of /r/-initial suffixes noted above occurs here as well.

(17) The paradigm for strong verb participles, exemplified by *flýja* 'flee'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	fluː-ɪn-**n**	fluː-ɪn	fluː-ɪ**ð**$^{!}$	fluː-n-**ɪr**	fluː-n-**ar**	fluː-ɪn
ACC	fluː-ɪn-**n***	fluː-n-**a**	fluː-ɪ**ð**$^{!}$	fluː-n-**a**	fluː-n-**ar**	fluː-ɪn
DAT	fluː-n-**ʏm**	fluː-ɪn-**nɪ**	fluː-n-**ʏ**	fluː-n-**ʏm**	fluː-n-**ʏm**	fluː-n-**ʏm**
GEN	fluː-ɪn-**s**	fluː-ɪn-**nar**	fluː-ɪn-**s**	fluː-ɪn-**na**	fluː-ɪn-**na**	fluː-ɪn-**na**

[5] It is difficult to find an underived adjective ending in a cluster of C+ð; the adjective *miður* 'middle' has the neuter singular nominative and accusative form *mitt*.

The alternation between /n/ and /ɱ/ could be outward-sensitive selection of listed allomorphs (which I will suggest below is necessary anyway for a different alternation), but given the alternations already noted for 'old' and 'beautiful' they could also involve phonological processes, for example the /ɪ/ could underlyingly be a rootless vocalic segment which is filled in or deleted depending on later syllabification. Rögnvaldsson (1986), rather than positing allomorphy or a rootless vowel, proposes that a general rule deletes unaccented vowels before inflectional endings beginning in vowels. This rule can also be seen at work in some other environments, for example Icelandic has *hamar* 'hammer' in the nominative singular, and *hamars* in the genitive singular, but dative singular *hamri* and nominative plural *hamrar*. It can also be seen in the paradigm in (9) above for the adjective *gamall* 'old.' In either case, I will suggest below that deleting the /ɪ/ is in some sense phonologically 'costly,' and when the phonology can avoid doing so and still preserve a satisfying syllable structure, it does.

The /ɱ/ shows up in the masculine singular nominative and accusative. Given that the vowel in the masculine singular nominative /riːkʏr/ was found to be epenthetic, the masculine singular nominative /n/ here is simply an assimilated /r/. However, the masculine singular accusative agreement suffix (marked with an asterisk) also shows up as /n/ here, rather than as /an/ like in the adjectival paradigm and on the weak verbs. I assume it is a distinct allomorph (see Rögnvaldsson 1986:94f for discussion of the conditioning of this alternation in more phonological terms). In fact, in the next section I will suggest that masculine singular accusative *-inn* is a portmanteau, which raises the possibility that the nominative counterpart is, too.

The neuter singular nominative and accusative, marked with a raised exclamation point above, are not expected if the regular adjectival /t/ is added to the regular strong conjugation /ɱ/. There doesn't seem to be a phonological motivation for the assimilation of /n/ to a following /t/ (compare the /n/-final adjective *seint* 'late,' or the noun *sjónmennt* 'visual arts education'). Thus /ɪð/ must be an allomorph of the participle which is used with strong verbs in neuter singular nominative and accusative contexts, i.e. the most featurally unmarked contexts. It can be considered to be a portmanteau, eliminating the need for the neuter singular /t/ (though if the /t/ were added it would assimilate, as in the weak verbs with a-themes, illustrated in (16) above with *kallað*). The form in /ɪð/ is also the form used with strong verbs when the perfect appears with auxiliary 'have,' e.g. *hefur flúið* 'has flown.'

4 The mixed declension

There is a class of weak verbs (I count about three dozen in Friðjónsson (1989:appendix B) with *-ja* themes and a vowel change in the past and participle (e.g. *smyrja∼smurði, smurið* 'smear, butter', *hrekja∼hrakti, hrakið* 'drive away'). The paradigm for their adjectival participles is a combination of the regular weak paradigm with /ð/ and the regular strong paradigm with /ɱ/. The verb class is phonologically homogenous. They all have /i/ or /e/ in the infinitive and present, normally followed by a single consonant plus /j/. However there is no simple exceptionless phonological generalization characterizing the mixed declension class; for example, vowel-changing *spyrja* 'ask' and *segja* 'say' are weak, despite having the phonological characteristics of mixed-declension verbs, and *fela* 'hide' is mixed, despite lacking the /j/.

(18) The paradigm for mixed participles, exemplified by *berja* 'beat'

	M SG	**F** SG	**N** SG	**M** PL	**F** PL	**N** PL
NOM	baːr-ɪm-n	baːr-ɪn	baːr-ɪð	bar-ð-**ɪr**	bar-ð-**ar**	baːr-ɪn
ACC	baːr-ɪm-n	bar-ð-**a**	baːr-ɪð	bar-ð-**a**	bar-ð-**ar**	baːr-ɪn
DAT	bør-ð-**ʏm**	baːr-ɪn-**nɪ**	bør-ð-**u**	bør-ð-**ʏm**	bør-ð-**ʏm**	bør-ð-**ʏm**
GEN	baːr-ɪn-**s**	baːr-ɪn-**nar**	baːr-ɪn-**s**	baːr-ɪn-**na**	baːr-ɪn-**na**	baːr-ɪn-**na**

Here we can see that the weak allomorph /ð/ is used if and only if the agreement suffix is vowel-initial. The strong allomorph /ɪn/ is used when the suffix is consonant-initial and where there is no overt suffix. I discuss the special cases in the nominative and accusative singular of masculine and neuter forms below. First, consider what it means for these forms to be phonologically conditioned.

The OT model of phonology is based on generating alternatives and comparing them, with adjudication by an interplay of constraints encoding certain markedness (avoid what is marked) and faithfulness (stay true to the input) tendencies. On such a model, an input form like /ɪn/ followed by a vowel can be assumed to violate a constraint against sequences of unstressed vowels (a marked situation). In a strong verb form, this is what causes the vowel /ɪ/ to be deleted. But deletion is not free; it is costly in the sense that it violates a faithfulness constraint. In a mixed declension form, I suggest, the /ð/ form is also an option, and does not require any deletion nor any sequence of unstressed vowels. Thus, when a vowel follows, the /ð/ is preferred over the /ɪn/.

On the other hand, when a consonant follows the participial ending, then the vowel in /ɪn/ is an advantage for syllabification. Weak verbs do not have this option and so make do with heavy clusters (as in *daimds*) or assimilate (*daimt*) or epenthesize (*daimdur*). But each of these is costly—heavy clusters violate a markedness constraint, and assimilation and epenthesis violate faithfulness constraints. The mixed declension verbs can avoid these expenses by choosing the participial suffix which already has a vowel in in, namely /ɪn/.

Thus I propose that in the mixed declension, both participial endings are part of the input to phonology, and phonological well-formedness determines which is selected.

Rögnvaldsson (1986) proposes an alternative which avoids reference in these situations to outward-sensitive allomorphy. Rögnvaldsson's proposal is that there is only one underlying form of the participial ending, namely /ɪn/. He also makes a proposal about /ɪn/ which I have already essentially adopted, namely that the /ɪ/ deletes in a late phonological process, after syllabification. Subsequent to this deletion, Rögnvaldsson proposes, there is another phonological process by which the sonority (and nasality) of /n/ is lost immediately after a sonorant (Rögnvaldsson 1986:95).

As Rögnvaldsson notes, this later process cannot be strictly phonological, since it does not apply to strong verbs, which manifest the sequence /rn/ as can be seen in, for example, *farnir* 'travelled MPL.NOM' (**farðir*). Thus, the analysis avoids outward-sensitive allomorphy at a cost: There must be a morphologically conditioned phonological rule applying quite late, after syllabification. I suggest, in keeping with much recent work (see Bye and Svenonius 2010; in press for references), that there are no phonological rules or constraints which are specifically keyed to morphemes or morphological features, and that apparent cases are really cases of lexical listing, i.e. contextual allomorphy, or else phonological underspecification. Phonological underspecification is not sufficient here because there is no independently motivated phonological distinction between strong participial forms like *farnir* 'travelled MPL.NOM' and *barðir* 'beaten MPL.NOM.' Given that contextual allomorphy has to be accommodated anyway, for phonologically unnatural alternations, an account in terms of contextual allomorphy (of *-in* versus *-ð*) is the

most parsimonious assumption. But it is also the only one which upholds a strict separation of phonological and syntactic information, in keeping with the observed divide between the two.

Turning now to the special cases, the neuter singular nominative and accusative and the masculine singular accusative, the special strong allomorphs are used. I lay these out in the table below for four types of verb: strong (*bera* 'carry'), mixed (*berja* 'beat'), weak with no theme vowel (*spyrja* 'ask'), and weak with a theme vowel (*bora* 'drill'). To illustrate all the possibilities, I use one consistently vowel-initial suffix, the masculine plural nominative; one suffix which is vowel-initial except in special cases, the masculine accusative singular; one suffix which is underlyingly consonant-initial but assimilates and has special forms; and one consistently consonant-initial suffix.

(19)

	MPL.NOM	MSG.ACC	NSG.NOM	FSG.DAT
	-ir	-an	-t	-ri
Strong	bornɪr	boːrɪmn	boːrɪð	boːrɪmnɪ
Mixed	barðɪr	baːrɪmn	baːrɪð	baːrɪmnɪ
Weak-j	spʏrðɪr	spʏrðan	spʏrt	spʏrðrɪ
Weak-a	boːraðɪr	boːraðan	boːrað	boːraðrɪ

The leftmost (ir) and rightmost (ri) columns of forms have regular adjectival agreement endings, with the mixed declension taking *-ð* before a vowel and *-in* before a consonant as already described. The two forms in the middle are regular in the weak declension, but have special forms in the strong declension, and in each case the mixed declension is identical to the strong declension.

The generalization here, I suggest, is that if there is a special portmanteau form replacing both the participial suffix and the agreement ending, then the mixed forms choose that.

Taking the masculine singular accusative first, the regular ending would be /an/, but this is never found after the strong participial ending /ɪ/; instead of */ɪan/, the form /ɪmn/ is found, both with strong verbs and with mixed declension verbs. This special form could be derived from /ɪ/ by positing a special allomorph of the accusative, for example /n/, used after /ɪ/. But this would introduce a loop into the statement of allomorphy for the mixed declension, since it chooses /ɪ/ before consonants and /ð/ before vowels. Assume instead that the masculine singular accusative suffix /ɪmn/ is a portmanteau, spelling out both the participial suffix and the agreement ending. Since it is not used with weak verbs, it can be assumed that it, like /ɪ/, is specially marked with a feature for the strong declension. Like /ɪ/, it is an option for the mixed declension. The question then is, why does the mixed declension select /ɪmn/ over /ðan/? One possibility is that there is a general bias favoring portmanteau over multiple suffixes, when both are available. A general principle favoring portmanteaux over sequences of morphemes is well-motivated and is known under a variety of names such as 'minimize exponence,' 'biggest wins,' and so on (see e.g. Siddiqi 2009, Muriungi 2009). However, it must not be formulated to prefer *-inn* over *-ð-an* in the weak declension. Svenonius (2012) argues that the preference for portmanteaux is exerted by phonology, rather than syntax, and that assumption seems to fit well with the facts here, since in the rest of the mixed declension paradigm, the choice of allomorphy is based on phonological factors.

The simplest formal treatment appears to be the following. First, assume that the two participial allomorphs are distinguished by a conjugation class feature, for example *in* has a feature [+STRONG] while *-ð* has the specification [−STRONG]. These are features

of the exponents, rather than features of structures that they spell out. Assuming that stems in inflecting languages can have features which 'select' for classes of affixes (see e.g. Alexiadou and Müller 2008), we can assume that strong stems select for endings with the feature [+STRONG] and weak stems select for endings with the feature [−STRONG]. Mixed declension stems have no selectional preferences, so morphology provides both options, leaving it to phonology to choose.

The portmanteau *-inn* is marked with [+STRONG], so is not an option for weak stems. But for the mixed declension, it is one of the options, and so it will compete with the combinations *-ð-an* and *in-an* in the phonological component. There, the general preference for portmanteaux will favor *-inn*. A formal model for this kind of competition is developed in Svenonius (2012), where the preference for portmanteaux follows from a constraint punishing unneeded structure, called *STRUCT ('star structure').

Consider the neuter suffix in this same light. The regular ending for the weak paradigm would be /ð/+/t/, which surfaces as /ð/ after a vowel (as in the a-stem form *borað*), or as an assimilated coronal stop after a consonant (as in the j-stem form *spurt*). If the strong form were regularly built up of /ɪn/+/t/, it would be */ɪnt/, but this is not found; instead we see /ɪð/. As noted above, I take this to be a portmanteau, and like *-inn* it must be marked [+STRONG] to prevent it from occurring with weak verbs. As with *-inn*, it will be an option for mixed verbs, and then phonology will prefer it to the other options, which each violate some constraint; both *-in-t* and *-ið-t* violate *STRUCT, and also create coda clusters. All of these markedness violations are avoided by *-ið*.

5 Conclusion

I have argued here that the correct form of the inflected participle in mixed-declension verbs requires the phonological form of the outer affix (the agreement ending) to be taken into consideration. The two allomorphs of the participle (weak /ð/ and strong /ɪn/) are in competition just in the mixed case, along with a couple of portmanteau forms, and the choice is made by the phonology.

This suggests that the cycle which is relevant for lexical insertion is larger than a single morpheme. This conclusion is welcome from the perspective of phase theory (Chomsky 2000; 2001, inter alia), in which the cycle is derived from the phase, and there is no reason to expect there to be additional cycles.

The conclusion is also important from the perspective of portmanteau morphemes, such as French *du* for *de+le* 'of the.' If the cycle forced lexical insertion at D, then replacement of *le* by *du* would require derivational backtracking. This case is discussed in some detail in Svenonius (2012), where it is suggested that the cycle must include both D and P in a single domain.

Some cases of apparently outward-sensitive allomorphy appear to violate even phase-based locality. Hannahs and Tallerman (2006) suggest that selection of the correct allomorph of the Welsh definite article requires reference to phonology of material outside the DP, even including for example a preceding verb. If case-marked DPs are phases (KPs, including functional Ps such as French *de*; cf. Svenonius 2004), then this would seem to go too far. Phase theory would predict, then, that allomorphy in the Welsh definite article should be amenable to an analysis involving postlexical phonology, something which I have argued here is not possible for the Icelandic participle.

References

Adger, David, Susanna Béjar, and Daniel Harbour. 2003. Directionality in allomorphy: A reply to Carstairs-McCarthy. *Transactions of the Philological Society* 101 2.

Alexiadou, Artemis and Gereon Müller. 2008. Class features as Probes. In *Inflectional Identity*, edited by Asaf Bachrach and Andrew Nevins, pp. 101–155. Oxford University Press, Oxford.

Bobaljik, Jonathan David. 2000. The ins and outs of contextual allomorphy. In *University of Maryland Working Papers in Linguistics*, edited by K.K. Grohmann and C. Struijke, vol. 10, pp. 35–71. University of Maryland, College Park, Md.

Bye, Patrik and Peter Svenonius. 2010. Exponence, phonology, and non-concatenative morphology. Ms. CASTL, University of Tromsø; available at ling.auf.net/lingbuzz/001099.

Bye, Patrik and Peter Svenonius. in press. Non-concatenative morphology as epiphenomenon. In *The Morphology and Phonology of Exponence: The State of the Art*, edited by Jochen Trommer, pp. 427–495. Oxford University Press, Oxford.

Caha, Pavel. 2009. *The Nanosyntax of Case*. Ph.D. thesis, University of Tromsø.

Carstairs-McCarthy, Andrew. 2001. Grammatically conditioned allomorphy, paradigmatic structure, and the ancestry constraint. *Transactions of the Philological Society* 99: 223–245.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by Step: Minimalist Essays in Honor of Howard Lasnik*, edited by Roger Martin, David Michaels, and Juan Uriagereka, pp. 89–155. MIT Press, Cambridge, Ma.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A Life in Language*, edited by Michael Kenstowicz, pp. 1–52. MIT Press, Cambridge, Ma.

Friðjónsson, Jón. 1989. *Samsettar myndir sagna*. Málvísindastofnun Háskóla Íslands, Reykjavík.

Hannahs, S. J. and Maggie Tallerman. 2006. At the interface: selection of the Welsh definite article. *Linguistics* 44 4: 781–816.

Kiparsky, Paul. 1984. On the lexical phonology of Icelandic. In *Nordic Prosody III: Papers from a Symposium*, edited by Claes-Christian Elert, Iréne Johansson, and Eva Strangert, pp. 135–164. Almqvist & Wiksell International for University of Umeå, Stockholm.

Kiparsky, Paul. 1993. Blocking in non-derived environments. In *Studies in Lexical Phonology*, edited by Sharon Hargus and Ellen M. Kaisse, pp. 277–313. Academic Press, New York. Vol. 4 of Phonetics and Phonology.

Müller, Gereon. 2005. Syncretism and iconicity in Icelandic noun declensions: A Distributed Morphology approach. *Yearbook of Morphology 2004* 2004: 229–271.

Muriungi, Peter Kinyua. 2009. The union spell-out mechanism. In *Tromsø Working Papers on Language and Linguistics: Nordlyd 36.1,* Special issue on Nanosyntax, edited by Peter Svenonius, Gillian Ramchand, Michal Starke, and Knut Tarald Taraldsen, pp. 191–205. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Rögnvaldsson, Eiríkur. 1986. *Íslensk orðhlutafræði: Kennslukver handa nemendum á háskólastigi*. Háskóla Íslands, Reykjavík.

Siddiqi, Daniel. 2009. *Syntax within the Word: Economy, Allomorphy, and Argument*

Selection in Distributed Morphology. John Benjamins.

Svenonius, Peter. 2004. On the edge. In *Peripheries: Syntactic Edges and their Effects*, edited by David Adger, Cécile de Cat, and George Tsoulas, pp. 261–287. Kluwer, Dordrecht.

Svenonius, Peter. 2012. Spanning. Ms. University of Tromsø, available at ling.auf.net/lingBuzz/001501.