

O1

Preocclusion

In this chapter we consider another case of multiple unrelated languages undergoing a shared development along the course of the life cycle of phonological processes, where a variable phonetic phenomenon was recruited to signal metrical structure – specifically, the presence of a distinctively weight-bearing sonorant consonant. The phenomenon in question, generally referred to as ‘preocclusion’, is the realization of a long sonorant (usually a nasal, more rarely a lateral) as a sequence of a stop and a sonorant, such as *dl* for *ll* or *bm* for *mm*. The sound change is attested in northern Europe in at least four separate cases: West Nordic, Sámi, Manx, and Cornish. Preocclusion presents an excellent case study of ‘drift’ because, with only a few exceptions, the four cases are generally considered to have arisen independently, with no role for language contact.

In section O1.1 I offer a brief typological overview of preocclusion, paying particular attention to its interaction with distinctive quantity. In the following sections O1.2 to O1.5, I will present the four case studies, showing how the development in each individual language is compatible with the theory of the life cycle. The nature of the development of preocclusion as drift is discussed in the concluding section O1.6.

O1.1 A General Overview of Preocclusion

This section provides a very brief cross-linguistic overview of sonorant preocclusion, with a focus on demonstrating that at least in some languages it should be tied specifically to consonant quantity or duration.

O1.1.1 A Brief Typological Survey of Preocclusion

Preocclusion is most frequent with nasals and laterals. Overall, there is a tendency towards an implicational relationship: preocclusion of laterals usually implies preocclusion of nasals, but not vice versa. However, it is not without exception: we will see in section O1.2 that some North Germanic varieties historically showed preocclusion of laterals but not nasals.

Preocclusion is sometimes considered under the umbrella of a wider phenomenon that Durvasula (2009) refers to as ‘partially nasal’ stops, which also includes complex segments otherwise referred to as ‘prenasalized stops’ or ‘postoralized nasals’. The specific pattern where oral closure precedes the nasal portion is often referred to as ‘prestopping’ (e. g. in much of the literature on Australian languages) or ‘prelosion’ (Blust 1997). I will use ‘preocclusion’ throughout for consistency.

The distribution of preocclusion in the world’s languages, at least in the present state of knowledge, seemingly shows a pronounced areal signal. Strong concentrations of languages showing this phenomenon occur in at least the following areas:

- South America, where preocclusion is often part of a wider set of processes involving partially nasal stops such as ‘prenasalization’ and ‘postoralization’ (Storto & Demolin 2012, Stanton 2018, Wetzels & Nevins 2018);
- Australia, where preocclusion of both nasals and laterals is widely distributed, perhaps with a bias towards the central and southern parts of the continent (Evans 1995, Butcher 2006, Fletcher & Butcher 2014, Round 2014, 2023);
- Insular South-East Asia, where nasal prestopping (apparently independently) occurs in multiple Austronesian varieties (e. g. Blust 1997, Jardine et al. 2015);
- Mainland South-East Asia, especially Austroasiatic. Preocclusion of nasal codas is common in Aslian languages on the Malay peninsula (Matisoff 2003, Burenhult 2005: 25), but also in other branches, such as Katuic and Bahnaric (Sidwell & Rau 2015). It is not immediately obvious whether this should be considered part of the same zone as the insular Austronesian languages.¹

The status and patterning of preocclusion across these languages show extensive variation along dimensions relevant for our purposes. For example, in the study of Australian languages there is a widely agreed distinction between ‘non-contrastive’ and ‘contrastive’ preocclusion (Harvey et al. 2015): the latter is often described as a variable, allophonic process that produces relatively short

¹ Blust (1997) also reports nasal preocclusion in Chamic, a branch of Austronesian spoken on the mainland that has undergone extensive phonological convergence with the languages of mainland South-East Asia.

oral closures, whereas the former is obligatory and usually results in what is phonologically a sequence of a stop and sonorant (cf. Harvey et al. 2019, Round 2023). By and large, this distinction likely maps to the difference between pre- and post-stabilization stages of the life cycle.

The precise behaviour of preocclusion is closely tied up with the phonetic and phonological patterns of the languages. For example, in the South American languages preoccluded nasals are just one kind of partially nasal stops, and their patterning interacts closely with vowel nasalization and processes such as nasal harmony. In Austronesian languages, nasal harmony is also common, and vowel nasalization is also clearly implicated in the patterning of preocclusion. On the other hand, contrastive (and indeed allophonic) vowel nasalization is vanishingly rare in Australia (but see Carignan et al. 2023), and is not especially prominent in Austroasiatic languages. On the other hand, sub-Saharan Africa, where both vowel nasality and prenasalized stops show a degree of areality (on vowels, cf. Clements & Rialland 2007), does not seem to be rich in this phenomenon.

Much work clearly remains to be done on the typology of preocclusion; in the next section, I will briefly consider what we know about its phonetic rationale.

O1.1.2 The Phonetic Motivation of Preocclusion

The basic mechanism of preocclusion is quite clear in the case of the nasals. Just as preaspiration arises due to a misalignment of two independent gestures (oral closure and glottal spreading), nasal preocclusion is an artefact of gestural timing. The production of a nasal involves simultaneous oral closure and lowering of the velum to ensure nasal airflow. Since the two articulations are independent, tight gestural coupling cannot be guaranteed. Indeed, synchronizing the two gestures is quite difficult, precisely because of the lack of strong mechanical coupling between the two, and because the dynamics of velum movements are different from those of oral articulation (e. g. Moll & Daniloff 1971).

There are two possible outcomes of a misalignment of the velopharyngeal opening and oral closure. Early timing of velum lowering results in nasal airflow beginning prior to oral closure, producing anticipatory nasalization. Conversely, late timing of the velum opening results in an oral closure preceding the construction of the nasal – that is to say preocclusion.

Just as with preaspiration, we observe systematic differences among languages in the timing of this misalignment. Some languages appear to prefer earlier velar closure and anticipatory nasalization; in others, late velar closure and consequent preocclusion are strongly preferred. In some cases, these coarticulatory artefacts of timing resist phonologization, with the result that

nasalization *resp.* preocclusion may occur, as mechanical consequences of the timing, but remain outwith cognitive control. Solé (1992, 1995) argues that this pattern of early velum lowering obtains in Spanish, and Carignan et al. (2021) suggest that this is the stage that German is currently at. Late velum lowering has been observed as a systematic tendency in Australian languages (Butcher 1999, Butcher & Loakes 2008). That being said, accidental mistiming of this kind can be observed in other languages, too, as we shall see imminently.

Under the life cycle model, either kind of effect can undergo phonologization to become a phonetic rule. This is arguably the case in (American) English, where the behaviour of anticipatory nasalization has been extensively studied. In a systematic review, Krämer (2017) concludes that it certainly cannot be considered a mechanical effect, but equally it is still largely acknowledged that it has not achieved the stabilization stage as seen in languages with contrastive vowel nasalization such as French (Cohn 1993). Similarly, a phonetic rule of preocclusion is likely what we observe in many of the cases noted in section O1.1.1.

What motivates the phonologization of preocclusion? There are several proposals in the literature relating to the origin and motivation of partially nasal stops, which I cannot review in detail here. Two are largely irrelevant to our concerns. One, referred to as ‘shielding’ (e. g. Anderson 1976, Steriade 1993, Stanton 2018, Wetzels & Nevins 2018), usually has to do with the interaction of contrastive nasality in consonants and vowels: for instance, preocclusion might occur in a nasal following an oral vowel, in order to enhance the vowel’s oral specification and maintain the contrast. In the languages on which we focus, phonological vowel nasalization is either entirely unattested (Sámi and, as far as can be gathered, Cornish) or, to the best of our understanding, irrelevant to preocclusion even when attested (North Germanic and Manx). A second phenomenon, ‘venting’, creates partially nasal stops as realization of voiced stops, as a ‘hypervoicing’ enhancement mechanism (Iverson & Salmons 1996), but it usually creates prenasalized stops, not preoccluded nasals.²

It has been argued, notably by Butcher (1999), Fletcher & Butcher (2014), and Butcher & Loakes (2008), that preocclusion can be viewed as enhancement of place contrasts. This is particularly relevant to Australian languages, notable for their ‘long, thin’ phonological inventories with unusually rich systems of place contrasts especially among coronals (Fletcher & Butcher 2014). The reasoning aims to explain not merely the occurrence of preocclusion but the characteristic late timing of velar opening *tout court*. As Butcher (2006) explains, the kind

² Wetzels & Nevins (2018) cite Nikak as a language that has both nasal venting and preoccluded coda nasals, but they argue that the preoccluded segments are phonologically nasals, not hypervoiced oral stops.

of early timing that creates anticipatory nasalization degrades cues to place contrasts, because nasalization dampens formant amplitudes and indeed creates anti-formants just before the oral closure, obscuring the formant transitions that play a key role in signalling the following consonant's place of articulation (cf. on VC formant transitions Tabain, Breen & Butcher 2004). The late timing of the velum opening prevents anticipatory nasalization, maintaining the place cues, but at the cost of raising the chance of preocclusion.

This argument is highly plausible, but Round (2014) argues that it does not fully extend to the preocclusion of laterals, which is also attested in Australian languages. Although Butcher & Loakes (2008) and Keyser & Stevens (2006) suggest that it may play a similar role, the stopping of laterals does not easily submit to the same account based on gestural mistiming. Instead, Round (2014) points out, if lateral pre-stopping does enhance anything, it is manner rather than place (a connection also noted by Steriade 1993).

Without denying that place enhancement might at least partly motivate nasal preocclusion, Round (2014) argues that a key component in the phonologization of pre-stopping is increased duration. He notes that across Australian languages, pre-stopped sonorants are often found in positions where other languages show increased durations. In particular, vowel length or stress are often associated with 'fortition' or 'lenition' effects on the following consonants (Fletcher & Butcher 2014, Round, Dockum & Ryder 2022), where fortition might include increased duration, 'tense' quality, or preocclusion. Round's (2014) argument is that increased duration of the sonorant increases the likelihood of an accidental mistiming that creates a sufficiently perceptible oral closure. Once this articulatorily motivated change occurs in nasals, laterals can 'follow suit' due to a tendency for gestural organization in sonorants to follow a common 'template' – a variety of rule generalization.

Thus, the thrust of Round's (2014) argument is that increased duration of the sonorant promotes the likelihood of 'accidental' preocclusion, at least in the case of nasals. This is plausible (even though, as Round [2014] emphasizes, this proposition should be tested experimentally). Indeed, under conditions of increased duration it appears that preocclusion can occur even in languages where it is not systematic. Figure 01.1 shows an example from an elicited corpus of South Welsh (Iosad 2019), a language that is not generally recognized as showing preocclusion. Indeed, according to Ball & Williams (2001: 37) Welsh shows relatively early velar opening, and thus anticipatory nasalization. Nevertheless, this token of [ˈhɒn i] *honni* 'claim' – crucially, with a distinctively

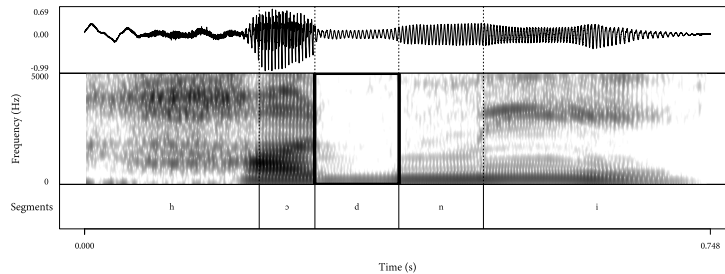


Figure O1.1 Nasal preocclusion in Welsh

long nasal after a short stressed vowel (cf. section O1.4 on Cornish) clearly shows a period of (voiced) oral closure followed by the nasal.³

I suggest, therefore, that since increased duration also increases the likelihood of preocclusion, it is plausible that preocclusion can be recruited to enhance a phonological contrast between short and long nasals (and perhaps sonorants more broadly), possibly acting in concert with a place distinction. In the following sections I will show that a role for duration can be identified in all four of the languages under discussion: North Germanic (section O1.2), Sámi (section O1.3), Cornish (section O1.4), and Manx (section O1.5).

O1.2 Preocclusion in North Germanic

In North Germanic, preocclusion is primarily a West Nordic phenomenon. It is found in Insular Nordic: in addition to Icelandic and Faroese, Jakobsen (1897: 146) identifies its vestiges in Norn. On the mainland, its focus is in the southwest, in an area that largely corresponds to the traditional grouping of ‘Western Norwegian *a*-dialects’⁴ that covers the traditional counties of Rogaland, Hordaland, Vest-Agder and the region of Sogn; however, to an extent it spills over east of the main mountain range, into Valdres and Hallingdal where the dialects are fundamentally of an Eastern Norwegian type. In Norwegian dialectology, the change is often referred to as ‘segmentation’ («segmentasjon» or «segmente-

³ The audio file is available at <https://osf.io/zet7h/>.

⁴ The division between *a*- and *e*-dialects refers to the outcome of Old Norse final *-a* in disyllables, which is preserved in the former and reduced, usually to schwa, or apocopated in the latter.

ring»), covering the changes **nn ll mm > dn dl bm*.⁵ Stop-sonorant clusters of a similar kind can also continue Old Norse clusters rather than long consonants: *dl* can also reflect **rl*, *dn* can come from **rn*, and *bm* from **fn*. This latter phenomenon is sometimes called ‘differentiation’ («differensiasjon»).

Unlike preaspiration, preocclusion presents few documentation difficulties: the facts are relatively well understood. Therefore, I will not aim to provide a comprehensive overview, and will focus on the analysis within the framework of the life cycle.

O1.2.1 Preocclusion and Assimilation

Before considering preocclusion across Western Nordic vernaculars, we need to briefly discuss the how this phenomenon relates to some associated assimilatory and dissimilatory changes. Specifically, in dialects with both preocclusion and ‘differentiation’ the clusters *dl dn* correspond historically to both long sonorants *ll nn* and clusters *rl rn*. A priori, there are two possible scenarios for this outcome: either two separate sound changes of preocclusion (the traditional ‘segmentation’) affecting long sonorants and some kind of dissimilation or ‘stopping’ affecting **r* before a non-rhotic sonorant, converging on the same output; or assimilation of the clusters to long sonorants, followed by preocclusion of both original and secondary **ll nn*. The latter scenario is supported by the fact that the relevant assimilations do occur in dialects without preocclusion.

Direct evidence from the philological record is not especially extensive, and can be difficult to interpret (Hægstad 1916, Røsstad 2011). As far as mainland varieties go, the most parsimonious account compatible with both historical and present-day data (Berg 2017, Berg et al. 2018, Røsstad 2019) is that **rl* may very well have developed to *dl* after having merged with original **ll*, but the change of **rn* to *dn* is distinct from, and precedes, the preocclusion of **nn*.

On the other hand, dialects differ in the relationship of preocclusion to the relatively late progressive assimilations of **ld* to *ll* and **nd* to *nn*. Most Western Nordic varieties, including the insular languages and most Western Norwegian dialects, maintain these clusters, but progressive assimilation – the usual outcome in Eastern Norwegian – is found in some areas in the south and along the coast (e. g. Hoff 1978: 143). For the most part, the outcomes of these assimilations do not take part in preocclusion. However, some dialects, which we consider in detail in section O1.2.5, do show forms like *kvedl* for ON *kveldr* ‘evening’.

⁵ Strictly speaking, ‘segmentation’ can also be used to describe other kinds of consonant epenthesis and excrescence, such as **kn > kn*, **sl > stl*, **mr > mbr* (Christiansen 1946, Seip 1955: 183–186).

A final assimilatory development worth mentioning is the reflex *dd* of original **rl ll*, now restricted to a relatively small area of eastern Agder and western Telemark, but formerly found further eastward (Bakken 2001, Røsstad 2011). This is generally agreed to be a further development from intermediate **dl*.

O1.2.2 Preocclusion in Norwegian

Preocclusion shows especially extensive variation in Norway. The development in laterals is fairly straightforward: in varieties with preocclusion, Old Norse **rl* and **ll* are reflected as *dl*, giving forms such as *kadl* for ON *karl* ‘man’ and *kadla* for ON *kalla* ‘call.INF’. This occurs in all contexts except before a consonant, where the lateral can be retained unchanged: *fjedd* ‘mountain’ or *fjedl* from ON *fjell*, but *fjelltopp* ‘mountain top’ (Ross 1909, Sandøy 1990, Røsstad 2011).

The two developments – from **rl* to *dl* and from **ll* to *dl* – generally have the same dialectal distribution, and early sources do not give conclusive evidence that would allow us to disentangle them. For these reasons, Røsstad (2011) Berg (2017) conclude that **rl* most likely assimilated to **ll*, with both original and secondary **ll* undergoing preocclusion. In terms of dating, reliable evidence for *dl* does not occur until the sixteenth century, but **dd* outcomes are sporadically attested as early as the late fifteenth century: this suggests that lateral preocclusion must be placed before this earlier date. The *terminus post quem* is the assimilation of **rl* to *ll*, for which the earliest Norwegian examples in written sources date to the late thirteenth century (Røsstad 2011).

Kusmenko (2008: 182–183) argues for a much earlier date for preocclusion. He claims that it does not apply to **ll nn* that arose from **ðl ðn* in items like *bryllaup* ‘wedding’, *klenning* ‘clothes’ from *bruð(h)laup*, *kleðning*. This **ð*-assimilation dates to the ninth or tenth century, which leads Kusmenko (2008) to conclude that preocclusion must have been completed by this much earlier date. However, the dialect material in the standard dictionary *Norsk ordbok*⁶ abundantly shows that preocclusion did apply in Norwegian vernaculars in this context: for instance, under *bryllaup* it attests forms like *brudlaup* (Hardanger), *brydlaup* (Hordaland), *brudlop* (Sunnhordland), and *bruddaup* (Telemark and Setesdal). In principle, in many of these cases the **ðl ðn* sequences cross morpheme boundaries (for *bryllaup* ‘wedding’ cf. *brud* ‘bride’), so the *dl dn* outcomes could be due to analogy (or, synchronically, cyclicity). However, we also find preoccluded (and palatalized; see section O1.2.7 below) outcomes in items where this is not plausible: one example is *mellom* ‘between’ (**miðlum*),

⁶ <https://alfa.norsk-ordbok.no/no>, accessed 29th September 2024.

where *dl* *dd* *ll* are all common. All this suggests that *ll* arising from **ðl* was after all subject to developments affecting **ll* from other sources, and *ð*-assimilation does not have to postdate preocclusion. Thus, a date around the fourteenth century – if not somewhat earlier, as suggested by Sandøy (2005b) – can be supported.

The pattern of preocclusion in nasals is more complex. Original **nn* usually undergoes preocclusion after an Old Norse heavy nucleus (long vowel or diphthong): *steidn* ‘stone’ (ON *steinn*), *hudn* ‘bear cub’ (ON *húnn*), in contrast to *finna* ‘find.INF’ (ON *finna*). This distribution is found in the northern part of the preocclusion area, especially towards the coast in Hordaland. Areas located further inland, such as Sogn and Valdres, generally lack this change, although there are historical traces in onomastic material. The fact that this pattern is sensitive to Old Norse length rather than the new quantity system (section 5.1.2) provides evidence for a relatively early date.

The change of **rn* to *dn* is independent of the preocclusion of original long nasals: the former, but not the latter, is found in the dialects of Valdres and Hallingdal (Berg et al. 2018). As with laterals, it is blocked before a consonant within a word: *hòdn* ‘horn’ but *hònnskjei* ‘horn spoon’ from ON *horn*, *hornskeið*; *kodn* ‘corn’ but *konnstæur* ‘corn drying pole’ from *korn*, *kornstaurr* (Ross 1909: 123, Hoff 1978). These examples also show that where **rn* was unaffected by preocclusion, it could undergo further developments, such as assimilation to *nn* or retroflexion to [ŋ]. This change to *dn* is observed after original short vowels as well as heavy nuclei, unlike preocclusion of **nn*.

Preocclusion in **rn* also occurs after unstressed syllables. This is most visible in nominal inflection, where **rn* clusters arise in definite plural forms such as ON *hest-ar-nir* ‘horse-NOM.PL-DEF’. Preocclusion here occurs in the north-eastern periphery of the area, notably Valdres and Hallingdal (e. g. Venås 1977).⁷ It is also found in Sogn (further west, within the ‘core’ preocclusion zone) and in Ryfylke, north-eastern Rogaland. In the rest of the preocclusion area, the *r* is lost, giving forms such as *hestan* for **hestarnir*. In monosyllabic plurals, however, where the **rn* follows the stressed vowel, preocclusion is normal also elsewhere: Hordaland *klö-r* ‘claw-PL’, definite *klödna* (Ross 1909: 123).

Preocclusion is most extensively distributed across contexts in the north-west of the preoccluding area, in the north of Sunnhordland and in Nordhordland (collectively also described as ‘Outer Hordaland’), including the so-called *strilemål*, the varieties of the rural hinterland of Bergen, a Hanseatic city with a distinctive urban dialect (Torp 2011); a detailed description of one such dialect is provided

⁷ In some of these varieties, the outcome of preocclusion was traditionally *tn* rather than *dn*, only after unstressed syllables in parts of Hallingdal such as Gol or across the board in outermost Valdres.

by Rundhovde (1964). In this area, we find, first, preocclusion of all original **nn* clusters, including after a short vowel (*fidna* from *finna*); and second, preocclusion of **mm*, as in *skjebma* ‘ruin, spoil.INF’ from ON *skemma*. Quite distinctive is preocclusion of original short **m*, as in *kobma* ‘come.INF’ (ON *koma*): the expected reflex of a short vowel before **m* under the new quantity in Western Nordic is a long vowel (*koma* in Icelandic and Faroese), but such forms must represent a development from **komma*, a characteristically Eastern Nordic form that must have come in via the dialect of Bergen. The same area also shows preocclusion of long laterals derived from *ld* clusters, as in *kvedl* ‘evening’ (ON *kveldr*). However, long nasals from **nd mb* escape preocclusion: *lann* ‘land’, *lamm* ‘lamb’ (not **ladn*, *labm*).

Importantly, according to Rundhovde (1964: 114, 117–118), preocclusion in this region is phonetically different from the rest of the area: she describes the stop as relatively short, and forms such as *kodn*, *fadl*, *skabm* as monosyllabic. The usual outcome elsewhere is that the sonorant is syllabic (Sandøy 1990: 77). A telling example comes from Bømlo in Sunnhordland, just to the south of the ‘extended preocclusion’ isogloss: according to Hamre (1945), the vowel preceding the cluster in words such as *kadl*, *kodn* is long, clearly suggesting syllabifications such as [ˈka:.d]. Similar developments occur in Ryfylke (Thorson 1930: 9), both with clusters stemming from preocclusion as in *kadl* and with other rising-sonority ones such as *løgn* ‘lie’ (cf. Old Swedish *lyghn*) and *ravn* ‘raven’ (ON *hrafn*).

In dialects that maintain the dative (including those of Voss, Hardanger, and Nordhordland), the initial **nn* of the feminine definite article undergoes preocclusion after original long vowels and diphthongs: *brūd'ne* for *brú-nni* ‘bridge.DAT.SG-DEF’ (Ross 1909: 126), [øidne] for *ey-nni* ‘island.DAT.SG-DEF’ (Sandøy 2003: 93, 110). Preocclusion is absent from the article in other contexts, as in *bo^uk-e-ne* ‘book-DAT.SG-DEF’.

To summarize the Norwegian pattern, the most widespread kind of preocclusion affects long laterals (whether original or from ON **rl*). In a small zone, it was productive in some form at a sufficiently late stage to affect **ll* arising from **ld* clusters. Stop-nasal clusters appear first to have arisen in **rn* sequences, in a smaller area compared to lateral preocclusion; in a subset of dialects where this occurred, the stock of these clusters was further enlarged by preocclusion of long nasals after a long vowel, and in a yet smaller subset it was even further extended by preocclusion of all long nasals (including labials).

01.2.3 Preocclusion in Icelandic

The patterns of preocclusion in Icelandic are fundamentally similar to those of the mainland dialects, but the better preservation of inflectional morphology gives a more detailed perspective on the distribution of the process and especially its interaction with morphology.

Original **rl* and **ll*, at least within a morpheme, are reflected in present-day Icelandic as [tl]: [ˈfatla] *falla* ‘fall.INF’, [ˈkʰatla] *karla* ‘man.GEN.PL’. As on the mainland, it may be historically due to an early assimilation of **rl* to **ll* followed by preocclusion, with spellings such as <iall> for *jarl* ‘earl’ attested in the thirteenth century (Kristján Árnason 2005: 354). Lateral preocclusion occurs both within a morpheme (as in unsuffixed [ˈfatl] *fall* ‘fall.ACC.SG’) and across some morpheme boundaries (as in [ˈhau̯tla] *hálla* ‘slippery.GEN.PL’, cf. unsuffixed [ˈhau̯:l] *hál* ‘slippery.NOM.SG.F’, with the suffix *-ra*).

Lateral preocclusion occurs word-finally and before a vowel, but can be blocked by a following consonant. This effect is general in inflectional paradigms: [ˈfjatl] *ffall* ‘mountain.NOM.SG’, [ˈfjatla] *ffalla* ‘GEN.PL’ but [fjals] *ffalls* ‘GEN.SG’. It is also cyclically transmitted, notably in compounding: contrast words such as [ˈfjatltalyr] *ffalldalur* ‘mountain valley’ (*dalur* ‘valley’) with no genitive linker and [ˈfjalstintyr] *ffallstindur* ‘mountain peak’ (*tindur* ‘peak’).

As a consequence of the early merger of **rl* and **ll*, historical **rl* clusters generally show the same behaviour. Synchronically, [rl] sequences that arise from other rules are subject to [t]-insertion (rather than occlusion of the [r]). This insertion rule is restricted to Level 1 constructs. In particular, it applies to [rl] sequences arising via syncope in inflectional paradigms (a stem-level process); there do not appear to be many examples of Level 1 derivation with [l]-initial suffixes.

- (1) a. [ˈfɛ:ri:l] *feril* ‘career.ACC.SG’
 b. [ˈfɛrtli] *ferli* ‘career.DAT.SG’

This [t]-insertion is not active the word level: it fails under Level 2 suffixation and in compounding:

- (2) a. [ˈaũ(*t)lɛyʏr] *árlegur* ‘annual.NOM.SG.M’
 b. [ˈøɾ(*t)liʏtl] *örlitill* ‘tiny.NOM.SG.M’

Preocclusion of long [l] does not apply in borrowings (as in *pilla* ‘pill’, *bolla* ‘bun’), and also the productive gemination-based pattern of nickname formation, as in *Tolli* from *Þórhallur*, *Halli* from *Haraldur*.

Again as in the mainland varieties, historical **rn* is reflected as [tn] across the board, including after short vowels and unstressed syllables: [ˈpatn] *barn*

‘child’, [ˈpauːtatnɪr] *bát-ar-nir* ‘boat.NOM.PL.DEF’. Similarly to **rl* clusters, there is [t] insertion in Level 1 constructs, but not at the word level:

- (3) a. [ˈpɔːrɪn] *borin-n* ‘born.NOM.SG.M’
 b. [ˈpɔːrtɪr] *born-ir* ‘born.NOM.PL.M’
 c. [ˈcɛːra] *ger-a* ‘do.INF’
 d. [ˈcœrtɪŋkʏr] *gjör-ning-ur* ‘action, performance’
 e. [ˈspar(*t)neitɪn] *spar-neitinn* ‘energy efficient’

It should further be pointed out here that word-level [t]-insertion is not specific to clusters where [l n] are preceded by [r]: it also occurs after [s], as in [ˈvɪstna] *visna* ‘wither.INF’ (from *visinn* ‘withered’).⁸

The most complex pattern is observed in the preocclusion of historical **nn*. The basic pattern is identical to the majority pattern on the mainland: preocclusion occurs after an Old Norse long vowel or diphthong, but not after a short vowel: hence [ˈsteitn] *steinn* ‘stone.NOM.SG’, [ˈkraitn] *grænn* ‘green.NOM.SG.M’ (normalized ON *grónn* < PGmc *grōniz*), [ˈprutn] *brúnn* ‘brown.NOM.SG’ but [ˈfɪnːa] *finna* ‘find.INF’, [kʰɪnːɪr] *kunnur* ‘known.NOM.SG.M’. Since Old Norse quantity is reflected in the quality rather than quantity of the present-day vowels following the rise of the new quantity system (Anderson 1969, Küspert 1988), the status of the synchronic generalization is unclear: as discussed by Orešnik (1973), preocclusion is triggered after diphthongs, [ɛ] (albeit with some exceptions and vacillations), [i], and [u], which do not seem to either form a featural class or behave as a class elsewhere in the phonology of the language.

Nasal preocclusion does not occur after unstressed vowels ([ˈhɪːmɪn] *himinn* ‘heaven’), in contrast to the preocclusion of laterals. As in the other cases, this preocclusion is blocked before a consonant in Level 1 inflection: [ˈsteins] *steins* ‘stone.GEN.SG’, [ˈpruŋt] *brúnt* ‘brown.NOM.SG.N’.

Unlike mainland East Nordic, in Icelandic preocclusion of historical **nn* fails after long vowels and diphthongs across a morpheme boundary. This context occurs primarily in definite suffix, which has the allomorphs *-nni* (for the dative singular feminine) and *-nna* (for the genitive plural) postvocally; in this suffix, preocclusion does not occur even when the ‘original long vowel or diphthong’ condition is met: [ˈaunːɪ] *á-nni* ‘river.DAT.SG.DEF’, [ˈprunːa] *brú-nna* ‘bridge.GEN.SG.DEF’ from *á*, *brú* (contrast [ˈprutna] *brún-na* ‘brown.GEN.PL’). In this respect, Icelandic differs from the mainland, where preocclusion occurred in these contexts.

⁸ But not in [sr] clusters, cf. [ˈvisra] *vis-ra* ‘wise-GEN.PL’.

In present-day Icelandic, [tl] and [tn] clusters that do not participate in alternations that cue their origin in /r/ sequences can be realized with [rtl] and [rtn] instead: [k^hartl] or [k^hatɫ] for *karl* ‘man’, [partn] or [patn] for *barn* ‘child’.

O1.2.4 Preocclusion in Faroese

Patterns of preocclusion in Faroese are quite similar to those of Icelandic and mainland dialects, but also show dimensions of variation absent from both. The description here follows Höskuldur Thráinsson et al. (2012).

Laterals behave in essentially the same way as in the other Western Nordic dialects. Both original **rl* and **ll* are reflected with a preceding |lenis| stop (hence [tl] in most varieties of Faroese but with variable voicing in Suðuroy): [k^hatɫɔɪ] *kallur* ‘man’ (ON *karl*), [fjatɫɪ] *fall-ið* ‘mountain-DEF’, [k^hatɫə] *kalla* ‘call-INF’. Due to morphological developments, there are very few reliable alternations involving this occlusion: Table O1.1 illustrates this with the reflex of ON *heill* ‘whole’.

Language	NOM.SG.M	NOM.SG.F	NOM.SG.N
Icelandic	[he̞it̪]	[he̞i:l]	[he̞it̪]
	<i>heill</i>	<i>heil</i>	<i>heilt</i>
Faroese	[hæi:lɔɪ]	[hæi:l]	[hæi:t]
	<i>heilur</i>	<i>heil</i>	<i>heilt</i>

Table O1.1 Preocclusion alternations in Icelandic and Faroese laterals

Similarly, since the morphological genitive is moribund in present-day Faroese, the language lacks a regular correspondent to the Icelandic paradigm [fjatɫ] ~ [fjals] *fall* ~ *falls* ‘mountain.NOM ~ GEN’, although this alternation remains the prescribed standard in these cases. Preocclusion is blocked in all internal codas irrespective of the cyclic structure: both fossilized genitives such as *fjalsmegin* ‘along the mountainside’ and linker-less compounds such as *fallsíða* ‘mountainside’ have [l] rather than [tl]. Lateral preocclusion also sustains exceptions, for instance in failing to apply in borrowings (*pillari* ‘pill’, *ball* ‘dance’).

As for nasals, historical **rn* is for the most part reflected as *dn*: [pjœtn] *björn* ‘bear’, [t^hetnə] *terna* ‘tern’. However, this does not apply to secondary **rn* clusters arising in syncope or morpheme concatenation: [famɫɪ] *farn-ir* ‘gone.NOM.PL.M’ from *farin*, [hamə] *harðna* ‘harden-INF’ from [hæa:lɔɪ] *harður* ‘hard’. Indeed, [ɫn] is found tautomorphemically as well, as in [t^hɛmə]

terna ‘maidservant’. As the examples given here show, Faroese lacks [t]-insertion before both [l] and [n]. Further, *r*-final suffixes also do not show occlusion before *n* in the definite clitic; instead, the *r* is deleted: [‘høntənɪr] *hund-ar-nir* ‘dog-NOM.PL-DEF’. All this suggests that preocclusion in *r* + consonant clusters is not a productive process in Faroese: original **rn* and **rl* have been lexicalized as *dn* and *dl*, leaving *rn* and *rl* from other sources (syncope, morpheme concatenation, and borrowings) free to be retained in surface representations.

Historical **nn*, as usual, shows the most complex pattern. As in most other Western Nordic varieties, it is reflected as *nn* after an original short vowel: [‘fɪnːv] *finna* ‘find.INF’. Preocclusion does occur after a heavy syllable, but due to morphological restructuring the distribution of **nn* is significantly more restricted than it historically was: similarly to the laterals in Table O1.1, paradigms such as *seinn* ‘late.NOM.SG.M’ ~ *seint* ‘late.NOM.SG.N’ have been restructured to Faroese *seinur* ~ *seint*. Almost the only example where a preoccluded cluster participates in alternations because it arises across a morpheme boundary is the item [‘sai̯tnɪ] *sein-ni* ‘later’, but it is clearly exceptional in present-day Faroese: normally a heteromorphemic /nr/ cluster is retained (cf. *klænri* ‘thinner’), and indeed *seinri* is also possible for *seinni*. However, preocclusion of a long nasal does occur in the dative singular definite suffix *-(n)ni*:⁹ [‘oi̯tnɪ] *oy-nni* ‘island.DAT.SG-DEF’, cf. *konu-ni* ‘woman.DAT.SG-DEF’ without preocclusion after an unstressed vowel.

As the examples *seinni* ‘later’ and *oynni* ‘island.DAT.SG-DEF’ demonstrate, long nasals are preoccluded after the reflexes of Old Norse diphthongs (ON *seinni*, *eynni*). In most varieties of Faroese, unusually in the Western Norse context, this process is restricted to just the diphthongs. Only in Suðuroy do we find preocclusion after the reflexes of Old Norse long monophthongs, as in [‘ɔdnɪ] *ánni* ‘river.DAT.SG-DEF’, [‘fiydni] *frúnni* ‘lady.DAT.SG-DEF’, [‘kʰv̥iðni] *kvínni* ‘pen.DAT.SG-DEF’, [‘kʰiðni] *krónni* ‘pub.DAT.SG-DEF’ to *á, frúgv, kvíggj, krógv*. In this respect, Suðuroy agrees with the mainland.

O1.2.5 The Life Cycle of Preocclusion in North Germanic

In this section I will summarize the development of preocclusion of laterals and nasals in North Germanic in view of the diatopic variation in the patterns; I will argue that, as expected, the spatial distribution of the relevant phenomena reflects the temporal progress of rule generalization. I will then turn to its status in the grammar, and argue that it has gone through successive stages of domain narrowing to become a stem-level rule. I defer discussion of the early stages

⁹ As with other genitive suffixes, the similar genitive plural morpheme *-nna* is rare

of its life cycle, namely its phonetic origins, to section O1.2.7. For reference Figure O1.2 shows the main isoglosses in mainland Norway and key locations mentioned in the discussion, building on the maps in Chapman (1962), Sandøy (1990), Røsstad (2011).

First, we turn to laterals. Their development is relatively straightforward. It is generally recognized that **rl* merges with **ll* in most relevant areas, which then undergoes preocclusion after both stressed and unstressed syllables, so Icelandic [ˈkʰatʰ] *karl* ‘man’, [ˈfjatʰ] *ffall* ‘mountain’, [ˈkaːmatʰ] *gamal-l* ‘old-NOM.SG.M’ (see the discussion in Røsstad 2011). In parts of Agder and Western Telemark, the product of preocclusion further developed into a |lenis| geminate stop *dd*.

Preocclusion of **rl* clusters has gone through the entirety of the life cycle in most Western Nordic varieties, and is not a live process any more: underlying /rl/ surfaces unchanged quite freely in both Faroese and Norwegian varieties. Common examples in Norwegian are loans such as *perle* ‘pearl’ and morphologically complex forms such as *farleg* ‘dangerous’ (from *fare* with the suffix *-leg*). Similarly, in Faroese we find *rl* in borrowings (*perla* ‘pearl’), compounds (*farlag* ‘trace’) and in forms derived by syncope (*ferl-i* ‘inkling-DAT.SG’). In Icelandic, these clusters undergo [t]-insertion rather than preocclusion, as I discuss below in this section.

As for **ll*, we have seen that relevant synchronic alternations are quite sporadic in Faroese and Norwegian due to morphological restructuring. However, the evidence from compounds in particular shows a lack of cyclic overapplication in word-level constructs: both Faroese and preoccluding varieties of Norwegian show [l] rather than [tl] before a consonant in compounds such as Norwegian *ffelltopp* ‘mountain top’ and Faroese *ffallsíða* ‘mountainside’. This suggests that the rule did not apply at the stem level in these languages.

The situation is somewhat more complex in Icelandic. It has better preserved Old Norse morphology, and preocclusion-related alternations of long laterals do occur in the language. I will now demonstrate that in Icelandic, unlike Faroese and Norwegian, they have undergone domain narrowing and belong at the stem level.

On the surface, the alternation is between [tl] and [l]. In the absence of cyclic effects, the distribution is as follows: [tl] surfaces prevocally and word-finally, while [l] is found in ‘true’ coda position, i. e. in the presence of a following consonant across a syllable boundary. This description covers alternations such as [ˈfjatʰ] *ffall* ‘mountain.NOM.SG’ ~ [ˈfja]s *ffalls* ‘mountain.GEN.SG’ and [ˈfytʰvr] *fullur* ‘full.NOM.SG.M’ ~ [ˈfytʰt] *fullt* ‘full.NOM.SG.N’.

Two set of facts support the stem-level affiliation of the pattern. First, the contexts for the alternation clearly behave as Level 1 constructs for the purposes of other processes, such as preaspiration and coda stop spirantization, which is



Figure O1.2 Preocclusion isoglosses in mainland Western Nordic

demonstrably stem-level in Modern Icelandic (see section 5.9.7 and Þorsteinn G. Indriðason [1994], Iosad [submitted] for details): compare *fullur* ~ *fullt* and [ˈtœhkʏr] *dökkur* ‘dark.NOM.SG.M’ ~ [ˈtœxt] *dökkt* ‘dark.NOM.SG.N’. Second, as we noted, preocclusion overapplies in Level 2 constructs such as compounds ([ˈfjatltaɪr] *fjaldalur* ‘mountain valley’).

The stem-level affiliation of /l:/ preocclusion is further suggested by the fact that there are exceptions to this process, most obviously in borrowings ([ˈpʰɪl:a] *pilla* ‘pill’), but also in nicknames such as *Halli* for *Haraldur*, which can be considered word-level constructs.

Domain narrowing to the stem level also accounts for the behaviour of heteromorphemic *ll* sequences. Laterals in Level 1 codas can alternate with preoccluded clusters that straddle an onset or a word-final coda. However, not all later-

als undergo this alternation: ['kyl̥t] *gul-t* 'yellow-NOM.SG.N' but ['kyl̥r] *gul-ur* 'yellow-NOM.SG.M' vs. ['fu̯t̥] *fúl-t* 'foul-NOM.SG.N' but ['fu̯r̥] *fúl-l* 'foul-NOM.SG.M'. It is challenging if not impossible to predict whether the [tl] cluster occurs in the nominative (Orešnik 1973). It is also not possible to derive the cluster by a regular phonological process. The literature on Icelandic phonology often treats the vowel of the regular suffix (as in *gulur*) as epenthetic (e. g. Gibson & Ringen 2000), which might suggest that forms such as *fúll* could be derived from underlying /ful-r/; however, see Sandstedt (2018: 174) for a summary of the reasons this cannot be correct. Therefore, the appearance of preocclusion in the relevant cells of the paradigm is not due to phonological computation, but is rather morphologically driven, likely as an instance of stem allomorphy.

As for underlying /rl/ (and indeed /rn/), the evidence suggests that these clusters are subject to a rule of [t]-insertion. This rule must be affiliated to the stem level, because it interacts transparently with other stem-level processes, notably syncope and Level 1 affixation, and underapplies in Level 2 constructs. Synchronically, this process is not identical to what happens in the preocclusion of what are, at face value, long laterals (or /ll/ clusters). As we noted, the [tl] (and indeed [tn]) clusters that historically derive from *rl and *rn often surface as [rtl] and [rtn] in present-day Icelandic. It is sometimes claimed that these are spelling pronunciations, but Kristján Árnason (2005: 355) instead reconstructs *rl and *rn as the immediate outcomes of what is traditionally considered preocclusion (he refers to the process as dissimilation, cf. the traditional Norwegian notion of 'segmentation'), from which [rtl] and [rtn] can be derived by the independently required rule insertion. However, if that were true, one would expect historically preoccluded *nn and *ll to have [rtl] and [rtn] realizations as well, which does not seem to be the case. Instead, I suggest that in Icelandic, as in Faroese, historically tautomorphemic *rl and *rn clusters became lexicalized as [tl] and [tn], due to lack of support via alternations. This made it possible for secondary [rl] and [rn] clusters to surface, first unchanged (a situation preserved in Faroese) and later with [t]-insertion (which also occurs in other [Cl] and [Cn] contexts). Since [rtl] and [rtn] clusters (clearly derived from /rl/ and /rn/ synchronically) sometimes undergo deletion of the [r], this would create ambiguity with regard to the underlying representation of historical *rl and *rn items such as *karl* ['kʰat̥l] and *barn* ['pat̥n]. In the absence of alternations, they are consistent with both /kʰat̥l/ and /pat̥n/ surfacing faithfully and with /kʰar̥l/ and /par̥n/ with [t]-insertion and [r]-deletion. (By contrast, ll items such as *sæll* 'happy' or *fall*, in which the preoccluded cluster alternates with a single lateral, cannot derive from /rl/.) Surface representations such as ['kʰart̥l] then become possible by [t]-insertion from underlying /rl/.

Finally, it should be noted that [rn] and [rl] pronunciations for historical *rn rl* were still attested in the mid twentieth century as a recessive feature in the south-east, in Austur-Skaftafellsýsla and Suður-Múlasýsla (Björn Guðfinnsson 1964: 69–80), yielding to [rtn] and [rtl]. The most straightforward explanation for this pattern is to treat it as an archaism, with neither **rn* nor **rl* undergoing the processes of preocclusion and assimilation to **ll* respectively, with superimposed [t]-insertion.

Turning now to nasals, their development, Table O1.2 summarizes their development, building especially on Chapman (1962) and Sandøy (1985, 2003). To capture all relevant parameters of variation, I use VX to refer to a long vowel or diphthong, VV to signify a historical diphthong, \bar{V} for a long vowel, and \check{V} for a short vowel; the + sign stands for a morpheme boundary. The notation **rn / PL* refers to **rn* clusters found after unstressed syllables in definite plural forms.

Variety	<i>*rn</i>	<i>*rn / PL</i>	<i>*VXnn</i>	<i>*VV+nn</i>	<i>*\bar{V}+nn</i>	<i>*\check{V}nn</i>	<i>*mm</i>
Hallingdal	✓	✓					
SW Norwegian	✓	∅	✓	✓	✓		
Outer Hordaland	⊙	∅	⊙	⊙	⊙	⊙	⊙
Suðuroy	✓	∅	⊙	✓	✓		
Faroese	✓	∅	⊙	✓			
Icelandic	✓	✓	✓				
SE Icelandic			✓				

Table O1.2 *Historical nasal preocclusion in Western Nordic*

Authors such as Chapman (1962) and Berg (2017) are clearly correct to reject the idea that preocclusion in **rn* and **nn* is the same process. Dialects such as Hallingdal (and Valdres) show the former but not the latter; conversely, south-eastern Icelandic varieties retain **rn* but show preocclusion of **nn*.

Considering first the development of **rn*, a ‘stop +n’ reflex after an unstressed syllable in the plural definite forms is found in two peripheral varieties on the opposite edges of the relevant area: ON *hest-ar-nir* ‘horse.NOM.PL.DEF’ is reflected as [ˈhestatnir] in Icelandic and as *hestadn* in Hallingdal, Valdres, and Sogn. In principle, one could imagine that preocclusion after an unstressed syllable could be the original change, spreading later by rule generalization to stressed syllables, but failing to reach Iceland and the north-eastern periphery of the area. However, *dn* for **rn* in definite plural forms is also found in Ryfylke, a much more central area within the preoccluding zone. Critically, original **rn*

is almost never retained unchanged in this particular context:¹⁰ it undergoes either preocclusion or the deletion of the first consonant. This suggests that the best reconstruction is rather preocclusion across the board in both stressed and unstressed contexts, followed by loss of the stop in *dn* clusters after unstressed syllables in Faroese and most of south-western Norwegian. The latter change did not spread to some areas, including both edge regions such as Iceland and the north-eastern periphery (Valdres, Hallingdal, and Sogn), as well as Ryfylke.

With respect to the preocclusion of **nn*, the basic sequence of events is likely that outlined by Chapman (1962: 99–100). The original change, found over the largest area, is preocclusion after a long vowel or diphthong, both within a morpheme and when the cluster straddles a morpheme boundary. This change covers the entirety of the area, including south-western Norway, Iceland, and the Faroes. Sandøy (1985: 78) suggests that Outer Hordaland Norwegian and Faroese lacked preocclusion in contexts where the **nn* crossed a morpheme boundary, as in ON *steinn* ‘stone.NOM.SG’, ON *brúnn* ‘brown.NOM.SG.M’. However, I suggest this is rather a consequence of morphological restructuring, which has simply removed the relevant contexts from the paradigm. The existence of (obsolescent) preocclusion in Faroese *sein-ni* ‘later’ confirms that it did occur in such contexts.

The most complicated developments are those seen when original long **nn* follows a heavy nucleus across a morpheme boundary. First, the difference between the mainland and Suðuroy patterns on the one hand (after both long vowels and diphthongs) and the rest of Faroese on the other hand (after diphthongs only) shows that preocclusion must have proceeded in two rounds, starting with diphthongs and later spreading to long vowels by rule generalization.

Sandøy (2003, 2005a) offers a sociolinguistic interpretation of the data. In his approach, the somewhat complicated patterns of Insular Nordic are conditioned not structurally, but rather by the nature of social contact. Specifically, he envisages the differences between Icelandic, Faroese, and the majority pattern as arising due to imperfect learning in the course of contact between closely related languages, primarily driven by adults. I suggest that this is wide of the mark: although there are no sociohistorical obstacles to this scenario, it implies diffusion rather than transmission in terms of Labov (2007), and would be more likely to result in simplification, rather than the proliferation of complexity. Instead, I propose that the life cycle provides the key to a structural account of the observed variation.

¹⁰ In some contexts, **rn* sequences are retained in definite forms, usually when the *r* belongs to the root rather than the plural morpheme, cf. in Hamre *mōrna*, *brōrna*, *dōterna*, *systerna* to ON *móðr-nar* ‘mother.PL-DEF’, *bróðr-nir* ‘brother.PL-DEF’, *dótr-nar* ‘daughter.PL-DEF’ *systr-nar* ‘sister.PL-DEF’ (Rundhovde 1964: 118).

I suggest that the variation is primarily a consequence of *domain narrowing*. The distribution of preocclusion rules in the synchronic grammar is shown in Table O1.3.

Icelandic nasal preocclusion is clearly a stem-level rule. Exactly the same arguments apply as above for **ll*: it is triggered in constructs whose behaviour is not predictable from otherwise regular phonology. Nasal preocclusion also fails in definite forms such as *á-nni* ‘river.DAT.SG-DEF’, because this process is restricted to the stem level, and the definite article attaches at the word level.

In Faroese and Norwegian, preocclusion did not undergo domain narrowing to the same extent, and remained confined to the word level, at least in the case of the laterals. The number of examples is limited because of morphological restructuring, but the evidence from compounds is suggestive. In the case of **nn*, almost the only evidence comes from the item *seinni* ‘later’: there are no items where the conditions for preocclusion (preceding long vowel or diphthong followed by *nn*) are met tautomorphemically, meaning that conclusive arguments from compounding are impossible to make. In Faroese, the existence of preoccluded forms of *seinni* suggests that **nn* preocclusion did occur at the stem level. In Norwegian, the evidence is weak: the comparative *seinni* has been levelled out in favour of *sein-are* (Sandøy 2005a), whilst forms such as *staidn* ‘stone’ reflecting ON *steinn* can be produced at either the stem or the word level. We have seen that **rn* preocclusion could apply transparently in compounds in some Norwegian dialects (*hønnskei* ‘horn spoon’ alongside *hòdn* ‘horn’), but **rn* and **nn* preocclusion are separate processes. Nevertheless, given the otherwise close parallelism of Faroese and Norwegian, I will tentatively suggest that **nn* preocclusion *did* spread to the stem level also on the mainland.

As for the definite article suffix, it is subject to preocclusion in both Suðuroy Faroese and Norwegian. This is a more conservative stage of the life cycle, where the rule remains active at the word level. The rest of Faroese represents an intermediate stage, in which domain narrowing has affected preocclusion after long vowels, but not after diphthongs. Icelandic, then, is the progressive variety, where domain narrowing has also progressed to diphthongs.

Language	Word level VX__	Word level V:__	Stem level
Faroese	✓		<i>nn?</i>
Western Norwegian	✓	✓	<i>nn?</i>
Suðuroy Faroese	✓	✓	<i>nn?</i>
Icelandic			✓

Table O1.3 *Synchronic preocclusion in Western Nordic*

In fact, there is some evidence that preocclusion in some varieties of Icelandic has undergone complete lexicalization. In the standard system, [tl] and [tn] clusters are the output of stem-level assimilation processes in which the initial consonant of suffixes such as /ra/ 'GEN.PL' is assimilated to the preceding sonorant; before other suffixes, the final sonorant surfaces unchanged: *sæll* 'happy.NOM.SG.M', *sælla* 'GEN.PL' with [tl] vs. *sæl* 'NOM.SG.F', *sælir* 'NOM.PL.M' with [l] (for the form of the suffixes, cf. *gulur* 'yellow.NOM.SG.M', *gulra* 'GEN.PL'). In many present-day colloquial varieties, the preoccluded forms surface as *sællra*, *sællri* 'happier' (Stefán Einarsson 1945: 55, Orešnik 1973: 237), suggesting that preoccluded clusters are now underlying: this blocks the stem-level assimilation and brings these adjectives into line with items such as *fullur* 'full' (GEN.PL *fullra*, comparative *fullri* with [tl]) in almost all aspects other than that still-exceptional NOM.SG.M forms.

O1.2.6 Simplification and Domain Widening in Western Nordic

The dialects of Outer Hordaland present an interesting case study in the life cycle. As seen in Table O1.2, they appear to be the most progressive of the entire Western Nordic area, with preocclusion covering the largest set of contexts/items. The preocclusion of **nn* after short vowels (and of **mm*, with which it is almost perfectly coextensive), as well as of **ll* from **ld*, form the characteristic 'concentric' pattern suggesting that especially Nordhordland was the 'radiation centre' of the relevant innovations. Unsurprisingly, this is the scenario suggested by Chapman (1962). However, he acknowledges that the most likely sociohistorical mechanism for such a pattern involves the prosperous and influential city of Bergen – and yet the Bergen urban variety is not characterized by these features. Torp (2011) suggests, in fact, that the rise of special properties of the rural dialects in the Bergen hinterland (known as *strilemål*), including this extensive preocclusion, could have been motivated precisely by *resistance* to urban influence.

The detailed description of a representative variety by Rundhovde (1964) gives some insight into the life cycle of preocclusion in this area. First, it is clearly a word-level (if not postlexical) process: preocclusion applies in the definite article after both long vowels and diphthongs, including in items such as *bý^dn* 'town.DEF', *snø^dn* 'snow.DEF' (ON *býrinn*, *snærinn*, present-day Norwegian *byen*, *snøen*). This is unlike everywhere else in Western Nordic, where final **-nn* after an unstressed vowel was shortened rather than preoccluded.¹¹ It also occurs in the *definite* forms of masculine *n*-final nouns, even though in indefinite

¹¹ In contrast to **ll* in forms such as *mikill* 'big', *gamall* 'old', which are preoccluded in Icelandic.

forms these nouns lack preocclusion (as they do in Faroese): Hamre *stein* for ON *steinn* (as in Faroese *steinur*), but *stei^dn* for ON *stein-n-inn* ‘stone-NOM.SG-DEF’. Second, as we have noted earlier, preocclusion in these dialects is described as phonetically ‘weaker’, and thus different from the rest of south-western Norwegian. How can we explain these facts?

Crucially, the zone in question is located at the northern periphery of the preocclusion area, abutting dialects of the north-western type. In that zone, which older **rn* and **nn* merge as *nn* (and ultimately **ɲn*, see section O1.2.7 below), not *dn*. Sandøy (1990) suggests that Outer Hordaland originally belonged with the north-western dialects, with **rn* undergoing assimilation rather than preocclusion, but then came under the influence of dialects to the south and east.

This hypothesis, I suggest, also holds the key to the greater scope of preocclusion in Outer Hordaland. First, if preocclusion spread to these dialects secondarily, after it had developed in the rest of south-western Norwegian, this explains why it would also affect contexts that originally did not meet the conditions for occlusion, such as original **ld* (as in *kveldr* ‘evening’), which elsewhere changed to *ll* only after lateral preocclusion

Second, Outer Hordaland preocclusion is a simpler, across-the-board pattern compared to the intricate developments in Insular and south-western varieties. This might explain its generalization to *all* instances of long **nn* (as in *fidna* from *finna* ‘to find’) and long **mm*, without the complicated segmental and morphological conditioning we see elsewhere. Even more intriguingly, we can interpret its spread to forms of the definite article in forms like *bydn*, *steidn* for standard Norwegian *byen*, *steinen*. It is not motivated historically, but can be accounted for if preocclusion was introduced as a word-level process at a late stage, after the incorporation of the article into the word.

If this scenario is correct, Outer Hordaland preocclusion makes a much better candidate for a simplifying development that arose by Labovian diffusion via L2 learning, *contra* Sandøy (2005a). Furthermore, if the above supposition that **nn* preocclusion did undergo domain narrowing to the stem level in Norwegian is correct, then the Hordaland developments exemplify ‘domain widening’, in which the life cycle is apparently ‘reversed’. Such cases are rare, but where they have been identified, it was precisely diffusion (adult imperfect learning) that was the mechanism involved, as in New Orleans English (Labov 2007, Bermúdez-Otero & Trousdale 2012). The Western Nordic case thus has considerable typological interest.

To summarize, the development of preocclusion across varieties of Western Nordic accords well with the theory of the life cycle; indeed, I have argued that a combination of the life cycle and sociolinguistic typology provides a superior

account of the attested developments. One consequence of the scenario I have explored is that the life cycle of preocclusion is most advanced not in Outer Hordaland varieties, but rather in Iceland. The scenario I have proposed upholds the general idea that the Western Nordic speech community was sufficiently cohesive at the time for innovations such as preocclusion to spread across an area stretching from Iceland to the valleys of Hallingdal, Valdres, and Setesdal. This should not, of course, be surprising: preocclusion clearly predates at least one other innovation that spread across most of North Germanic, namely the great quantity shift (because it is sensitive to length before the quantity shift). However, it does not support the notion that it was necessarily Norway that was the focus of innovation. Just as with preaspiration, some of the most progressive developments (such as domain narrowing) are, in fact, concentrated in Iceland, further underscoring the problematic nature of the often-made claim that Icelandic is especially conservative. I will leave the further exploration of the consequences of this idea to future research; in the next section, I will conclude the investigation of North Germanic preocclusion by considering its phonetic origins and the link to metrical structure.

O1.2.7 Preocclusion and quantity

The idea that preocclusion is related to quantity is very widely recognized in the literature, at least in the case of the historically long sonorants **ll* (which subsumes earlier **rl*) and **nn* (but not obviously **rn*). This is made all the more likely by the fact that other Nordic vernaculars undergo similar changes in which the original distinction in length is reflected by a qualitative distinction. One especially common response in this case is palatalization, in which **nn* and **ll* (and often clusters that they merge with) are reflected as palatals *ɲɲ* *ʎʎ* (IPA [ɲɲ ʎʎ]). Thus, historical **nn* (and usually also **nd*, although see Heide [2004] for exceptions in Northern Norwegian) is generally reflected as [ɲ] in Northern Norwegian, ‘central’ dialects (Trøndelag and adjacent areas to the south and east, including Härjedalen), most Finland Swedish dialects, and in most varieties of Danish (usually with further developments in the latter). Palatal reflexes of **ll* (usually including **ld*) are also found in Northern and Trøndelag Norwegian.

This general tendency to ‘convert’ quantity distinctions in sonorants into place distinctions is something of a *locus communis*: Heide (2010) provides an excellent overview of the literature on this point; see further the discussion in Torp (2011). In this view, palatalization and preocclusion represent the qualitative outcome of this rephonologization of quantity, in which the ‘stronger’ member of the contrast undergoes a change (perhaps a kind of fortition), whilst the ‘weaker’ pole remains unchanged. The other conceivable path for such a

rephonologization is change in the weaker member: just such an explanation is defended by Heide (2010) for the rise of the retroflex flap [ɾ] (the so-called ‘thick *l*’) as the reflex of Old Norse single **l* in word-medial position. Particularly persuasive is Heide’s (2010) point that ‘thick *l*’ is a ‘central Scandinavian’ phenomenon focused on eastern Norway and central Sweden, which is in almost perfect complementary distribution with ‘strengthening’ developments affecting long sonorants – palatalization and preocclusion – in surrounding peripheral regions (see also Bandle 1973: 46, Kusmenko 1997).

So far, this suggests that North Germanic preocclusion is of the purely quantity-enhancing type found in Australia (Round 2014), in line with the hypothesis that moraic quantity drives many of the changes discussed in this book. However, one alternative account of preocclusion noted in section O1.1.2 links it to the enhancement of place contrasts, rather than quantity. Since there is evidence that the distinction between geminate *nn ll* and singleton *n l* involved not only quantity but also place in North Germanic, we might consider the possibility that West Nordic preocclusion arose to enhance place distinctions.

It is generally accepted that in Old Norse the quantity distinction between singleton **n l* and **nn ll* was accompanied by a place distinction, with short members of the contrast likely being apical and long ones realized as laminal (Noreen 1923: 42). This is supported by multiple lines of evidence, not least the palatalization to [ʎ ɲ] observed in Norwegian. Since it is likely that the stops themselves were laminal,¹² could we interpret preocclusion as enhancing the place (specifically, the laminal specification) of the sonorant rather than its quantity?

I suggest the answer is no. Preocclusion quite precisely occurs in contexts where consonant quantity was distinctive and fails where it was neutralized, but its distribution is not isomorphic to that of laminal sonorants. The crucial context here is a word-internal coda. Historically long and historically short sonorants could both occur in this position, both in inflection (ON *fúlt* ‘foul.N’ and *fullt* ‘full.N’) and in compounding. It is usually agreed that in this context the quantity distinction was neutralized in favour of the short member of the contrast (Heide 2010).¹³ However, in certain circumstances the place distinction was maintained under these conditions. Laminal (‘long’) but not apical (‘short’) sonorants trigger consonant excrescence, most notably the insertion of *t* before *s*: normalized Old Norse *fullz* ‘full.GEN.SG.M’, *mannz* ‘man.GEN.SG’ (to *fullr*,

¹² For example, Noreen (1923) notes that [l n] were laminal before a coronal stop, and could indeed be written <ll nn> in those positions, which suggests that stops triggered place assimilation. Stefán Einarsson (1928–1929) discusses the pattern of lateral devoicing before *t* in Icelandic in similar terms.

¹³ This is, of course, straightforwardly predicted by a moraic analysis: in *fullt*, the sonorant has a lexical mora; in *fúlt*, it is predicted to acquire a mora by position.

maðr, accusative *mann*) but *fúls* ‘foul.GEN.SG.M’, *mans* ‘woman.GEN.SG’ (to *fúll*, *man*); cf. Seip (1955: 185) on this phenomenon on the mainland.

Preocclusion, as we have seen, always fails in the internal coda context (except when due to later domain narrowing). Thus, preoccluded sonorants occur where sonorants were distinctively long, not where they were laminal. I conclude that North Germanic preocclusion belongs to the quality-enhancing type, as proposed by Steriade (1993). This gives us an insight into its phonetic origins and the mechanism of phonologization. The pool of variation in the realization of original **nn* can easily have included something like prestopped nasals due to patterns of gestural alignment and misalignment; see especially Garmann (2010), and Røstad (2019) for a critical overview of the proposals in the specialist literature.

This kind of preocclusion could be recruited to enhance distinctive quantity, initially as an ‘allophonic’ phenomenon such as a phonetic rule (perhaps similar to the ‘light’ preocclusion still attested in Nordhordland, but likely of a variable nature similar to that found in Australian languages). Since the long sonorants were distinctively laminal, the oral closures produced by this process could eventually be identified with the laminal oral stops existing in the language.

Given the existence of phonological rules manipulating moraic quantity, preocclusion could undergo stabilization to produce the segmental stops found in the present-day languages, as a cue to the presence of a moraic coda. Furthermore, at least in the case of the nasal, the existence of *dn* sequences that arose from **rn* may have ‘primed’ this development (Kiparsky 1995), serving as a kind of perceptual magnet (cf. Blevins 2017) and further heightening the possibility of stabilization.

The mechanism of the **rn > dn* change itself (which we know to have occurred independently from, and probably prior to, nasal preocclusion) is somewhat more mysterious (Røstad 2011) and I cannot address it here in much detail. It is possible, as Kristján Árnason (1990) and Torp (2011) have argued, that it should be seen as part of a general West Nordic tendency that has been described as a conspiracy in favour of stops over continuants in syllable codas. In this view, the changes we have been discussing are of a piece with the fact that Old Norse |lenis| fricatives often correspond to present-day stops in syllable codas, especially before a sonorant, in items such as ON *hrafn* ‘raven’, *nafn* ‘name’, *sigla* ‘sail.INF’, *tafl* ‘board’, but also in items such as *tolg* ‘tallow’, *sorg* ‘grief’. On the other hand, odd as the **r > d* change before a nasal or lateral might appear, there are some parallels even within Germanic: Bandle (1973: 45) cites examples of both **rl* and **rn* being reflected as *dl resp. dn* in

High German dialects in Austria and Switzerland.¹⁴ This suggests some kind of phonetic rather than systemic motivation is possible. I leave the more detailed exploration of this issue for future work. In the next section, we will consider the patterning and development of preocclusion in the Sámi languages.

O1.3 Preocclusion in the Sámi Languages

Preocclusion is another feature mentioned by Wagner (1964) as being shared between the North Germanic and the Sámi languages. The Sámi languages show two major structural differences in the scope of preocclusion compared to North Germanic. First, it is limited to nasals: there are no preoccluded laterals in Sámi. Second, nasal preocclusion in Sámi generally covers all places of articulation – coronal, labial, palatal, and velar – even if the latter two are rare. In this section we will first consider the origin and functioning of preoccluded nasals across Sámi, then discuss their phonetic realization, and finally consider its origin as a quantity-enhancing phenomenon.

O1.3.1 Nasal preocclusion and the quantity system in Sámi

As with preaspiration (Chapter 7), our starting point is the consonant gradation system with a four-way distinction between weak- and strong grade singleton and geminate nasals. Preocclusion is a distinctly western phenomenon, characteristic of most varieties of Northern Sámi, Lule, Pite, Ume, and South Sámi. It did not spread to any of the eastern varieties Inari, Skolt, Akkala, Kildin, or Ter, or to the Northern Sámi varieties classified as Sea Sámi (Sammallahti 1998: 10–11).

Most of the languages in question have undergone the Q2 merger, so that strong-grade singleton nasals and weak-grade geminates have identical reflexes. There is an additional factor determining what those reflexes are: whether the onset of preceding syllable contains a nasal. Even in varieties with preocclusion, this preceding nasal blocks the process. The pattern can be summarized as follows (Korhonen 1981, Sammallahti 1998).

- A three-way contrast is consistently maintained between three quantities of the nasal.¹⁵ The following Aanaar Sámi forms (Bye, Toivonen & Sagulin

¹⁴ Admittedly, Kümmel (2007: 157) does not cite any cases other than these two.

¹⁵ As discussed in section 7.3.2, Kola Sámi varieties can neutralize the Q2 ~ Q3 distinction in nasals, and only have a two-way contrast.

2009) provide an example. The following description is simplified,¹⁶ but broadly we can set up the following categories:

- Q1** short nasals, corresponding to the weak grade of original singletons: SaaI ['manee] *mane* 'egg.GEN.SG' < PSaa **moñēn*;
 - Q2** long nasals, corresponding to the strong grade of singletons (SaaI ['man:ee] *mane* 'egg.NOM.SG' < PSaa **moñē*) and the weak grade of geminates (SaaI ['lan:ee] *lane* 'prison.GEN.SG' < PSaa **laññēn*);
 - Q3** overlong nasals, corresponding to the strong grade of geminates (SaaI ['lan:ne] *lanne* 'prison.NOM.SG' < PSaa **laññē*).
- For varieties with preocclusion, the examples come from Northern Sámi. When preocclusion is not blocked, primarily in words with non-nasal onsets, the categories are as follows:
 - Q1** short nasals, corresponding to the weak grade of singletons: SaaN *suona* 'sinew.GEN.SG', *jieŋa* 'ice.GEN.SG' < PSaa **sōñen*, **jēñen*;
 - Q2** preocclusion resulting in clusters of a nasal preceded by a *voiceless* stop, corresponding to the strong grade of singletons (SaaN *suotna* 'sinew.NOM.SG', *jiekŋa* 'ice.GEN.SG' < PSaa **sōñe*, **jēñe*) and weak grade of geminates (SaaN *botni* 'bottom.GEN.SG' < PSaa **poññēn*);
 - Q3** Preocclusion resulting in clusters of a nasal preceded by a *voiced* stop: SaaN *bodni* 'bottom.NOM.SG' < **poññē*.¹⁷
 - Preocclusion is sometimes blocked. This happens regularly when the onset of the preceding syllable contains a nasal, but occasionally in other items. In this case, the reflexes are essentially similar to those in non-preoccluding languages:
 - Q1** short nasals (SaaN *mani* 'egg.GEN.SG' < PSaa **moñēn*);
 - Q2** long nasals from strong-grade singletons (*manni* 'egg.NOM.SG') and weak-grade geminates; the latter type is rare, but cf., for example, *hañŋá* 'mallard.GEN.SG' < PSaa *(h)*eññān*¹⁸ and also newer borrowings such as *beanna* 'pen.GEN.SG', *lumma* 'pocket.GEN.SG' (Norwegian *penn*, *lomme*);
 - Q3** overlong nasals from strong-grade geminates (*hañ'ŋá* 'mallard.NOM.SG', *bean'na* 'pen.NOM.SG').

¹⁶ Specifically, we ignore special developments found in words with long vowels (see Bye, Toivonen & Sagulin 2009).

¹⁷ This word can be reconstructed as such for Proto-Sámi (and indeed this is done by Lehtiranta 1989: 104), but it is a borrowing from Germanic (ON *botn*), so the stop might be original (so Sammallahti 1998: 194). We will revisit the issue of original stop-nasal clusters later, but in preoccluding varieties the item is both widespread and representative of the patterns.

¹⁸ Here, the preocclusion fails after onset **h* rather than a nasal, which suggests an explanation involving rhinoglottophilia.

Preocclusion occurs both in original geminates and in Q3 nasals resulting from ‘strengthening’/‘lengthening’ of original singletons before long vowels, as in *bodnját* ‘be twisted’ (PSaa **poń-āšē-*), cf. *botni-t* ‘twist.INF’, weak grade *bon-á-n* ‘twist.PRS.1SG’ (**pońe-*); such preocclusion can also be blocked by a preceding nasal (SaaN *njun’nis* ‘endowed with a good sense of smell’, from *njunni* ‘nose’, weak grade *njuni*).

In South Sámi, nasals, like other segments, lack a Q2/Q3 distinction, so there is only one kind of preoccluded nasal, corresponding to original geminates (SaaS *betnie* ‘bottom’ < PSaa **poñnē*, SaaN *bodni*) and to original short nasals lengthened after a short vowel (SaaS *utnedh* ‘have, use’ < PSaa **eñē*, SaaN *atnit*), but not to unlengthened Q2 strong-grade singletons (SaaS *baenie* ‘tooth’ < PSaa **pāñē*, SaaN *bátni*).

The situation in Ume Sámi, as documented by Larsson (2012: 106–108), is rather complicated, but fundamentally there is a divide between the more western dialects that agree with South Sámi in lacking preocclusion of unlengthened nasals after a long vowel and more eastern ones tending to show it, like the more northerly varieties.

In addition, preocclusion occurs in the strong grade of clusters where the first component is a glide or liquid and the second component is a nasal. The outcomes differ somewhat across the languages. For instance, in Northern Sámi this process results in a ‘voiced stop + nasal’ cluster, corresponding to Q3 postvocalic nasals: SaaN *suorbma* ‘finger’, *geaidnu* ‘way’, *čalbmi* ‘eye’ (PSaa **sōrme*, **kējnō*, **čēlmē*). In the weak grade, the reflex depends on the preceding sonorant. After a glide or *l*, we find a non-preoccluded nasal, similar to the Q1 reflex of a single nasal, but unlike Q1 nasals it is long (*geainnu* ‘way.GEN.SG’, *čalmmi* ‘eye.GEN.SG’); after the rhotic, we find the Q2 ‘voiceless stop + nasal’ outcome instead (*suorpma* ‘finger.GEN.SG’). This pattern makes such clusters somewhat unusual, in that the strong grade of consonant clusters usually involves lengthening of the first rather than the second component. Weak-grade forms with lengthened sonorants in Northern Sámi such as *geainnu*, *čalmmi*, on the other hand, reflect the more general tendency for ‘compensatory’ lengthening of the second consonant in a weak-grade consonant cluster, which is not specific to clusters where the second consonant is a nasal (Sammallahti 1998: 197, 2012).

O1.3.2 The Phonetic Realization of Preocclusion

So far we have treated preocclusion as resulting in sequences of an oral stop and a nasal. There are, however, significant differences in the realization of these clusters across the Sámi languages. The differences primarily, but not

only, involve laryngeal activity associated with the non-nasal portion of the stop, specifically voicing and glottal closure.

In Northern Sámi, Sammallahti (1998: 51) describes the Q3 preoccluded nasals (spelled <bm dn dnj gŋ>) as pronounced with a voiced oral stop: the voicing is said to prevail throughout the closure in allegro forms, but to fade in lento pronunciations, possibly with a glottal closure as a result: the precise transcription given for the lento form of [ˈpodni:] *bodni* ‘bottom’ is <poð̥(̥)ni> (a ‘half-long’ voiced stop, followed by a syllable boundary, followed by an ‘undershort’ voiceless closure). This is the same transcription given for the voiced geminates that occur as the strong-grade reflexes of nasal-singleton stop clusters (such as *loddi* ‘bird’ <PSaa **lontē*). The Q2 preoccluded nasals (spelled <pm tn tnj kŋ>) are said to have simple voiceless stops.

However, this state of affairs appears not to hold in most present-day varieties of Northern Sámi: as Sammallahti (1998) describes it, in Q3 nasals the (voiced) oral stop is replaced by a nasal followed by a glottal stop, resulting in transcriptions such as <poñ̥(̥)ni> for *bodni*. (Note the reference to the possibility of glottal closure in the ‘older’ pronunciations.) Bals Baal, Odden & Rice (2006, 2012) agree with this account and describe the Q3 clusters in Guovdageaidnu as long nasals with medial glottalization and Q2 clusters Bals Baal, Odden & Rice (2006, 2012) as short, preglottalized nasals. This change from oral to glottal closure appears to be relatively recent, since it can be observed in apparent time.

In those Northern Sámi dialects where duration distinctions play a less central role in expressing the Q2 ~ Q3 contrast (section 7.3.4), preoccluded nasals show behaviour parallel to other consonant clusters (Sammallahti 2019: 143–144), with the grade contrast realized in various ways on the preceding nucleus.

Glottalization also occurs in some dialects when preoccluded nasals are the second member of a cluster; however, the difference between Q3 and Q2 resides less in the nature of the cluster and more in other cues. In particular, in Q3 an excrescent vowel occurs after [r] and [l]: hence *bárdni* ‘child’, transcribed as <pār̥(̥)ni> by Sammallahti (1998) and as [baareʔni] by Bals Baal, Odden & Rice (2006), but <pār̥t̥ni>, [baarʔni] in Q2. After glides, there is no epenthetic vowel in Q3 and no preocclusion in Q2 in this context. Instead, the nasals in the strong grade are similar to how they occur in the weak grade after liquids: strong grade [iwʔni:] *ivdni* ‘colour.NOM.SG’, weak grade [iw̥n:i:] *ivnni* ‘colour.GEN.SG’.

Another feature used to make the Q2/Q3 contrast in preoccluded nasals is quantity. An example is the description of Pite Sámi by Wilbur (2014). Here, preocclusion results in clusters of an unreleased oral stop followed by the nasal. The difference between Q2 and Q3 clusters is in the duration of the oral closure: [pɔt:nī̯] *báddne* ‘bottom.NOM.SG’, weak grade [ˈpɔtnī̯] *báddne*

‘bottom.GEN.SG’. This pattern – articulatory enhancement of the first member of a strong-grade cluster – is fairly general for consonant clusters in the Sámi languages. In Pite Sámi, this relationship between strong- and weak-grade clusters is especially pronounced because it lacks the excrescent vowel: we find it not just in the outcomes of preocclusion but also in cases such as [par:ka] *barrga* ‘work.NOM.SG’, weak grade [parka] *barga* ‘work.GEN.SG’ (contrast, for instance, Northern Sámi [paragu] ~ [parkku]). In clusters, the system in Pite Sámi is also relatively simple, because the distinction between two kinds of preoccluded clusters does not exist in this context. As a result, words such as *bárdna* ‘bear’, where preocclusion occurs in both Q2 and Q3, lack consonant gradation (*bierdna* ‘bear.GEN.SG’, contrast SaaN *bierdna*, *biertna*).¹⁹

Similar dimensions of variation are observed in Lule Sámi. Like Northern Sámi, it shows a Q2/Q3 distinction after vowels. The transcriptions in Grundström’s (1946–1954) dictionary generally imply a system similar to the ‘conservative’ Northern Sámi system, with voiced oral closure in Q3 and the corresponding voiceless stop in Q2, perhaps with a slightly greater closure duration in the former: cf. transcriptions such as <pöddnē>, <pöd^pnē> in Q3 vs. <pötnē> in Q2 of *báddne* ‘bottom’ (Grundström 1946–1954: 7658 s. v. *pádnē*); cf. <pätⁿnē> in the Q2 of *bádne* ‘tooth’. Morén (2007) also documents this for the Divtasvuodna variety of Lule Sámi. A distinction expressed by both voicing and duration is also noted for Ume Sámi by Lehtiranta (1992: 53).

Unlike Northern Sámi, Lule Sámi is described as lacking preocclusion after a sonorant in the strong grade; instead, such clusters are realized with the excrescent vowel highly characteristic of the language. However, in the *weak* grade after [r] at least we find *preaspiration* of the sonorant. This yields paradigms such as <pàr^rnē>, weak grade <pàr^rnē> for *bárnne* ‘child’, *bárne* (cf. SaaN *bárdni*, *bártni*) in Grundström (1946–1954: p. 695, s. v. *par^rnē*). Sammallahti (1998: 196) attributes this latter change to Lule and Pite Sámi in addition to the Torne group of Northern Sámi dialects. The pattern agrees well with the hypothesis by Morén (2007) that Q2 clusters in Lule Sámi are generally associated with voicelessness or glottal spreading.

The dialect of Gällivare described by Collinder (1938) also belongs to this area, and shows the system just described. It is noted (p. 22) that the voiced stops in Q3 clusters are usually released. Interestingly, in Q2 clusters, where the stop is voiceless, Collinder (1938: 14, 95) describes a pattern of allophony for one of his speakers as follows: after short (and half-long) nuclei, the stop is short

¹⁹ After glides and [l], where preocclusion makes the difference between Q2 and Q3, the alternation occurs as expected: *vuäjdnet* ‘see.INF’, *vuojnáv* ‘see.PR.S.SG’, cf. SaaN *oaidnit*, *oainán*; *báldne* ‘tuft of grass’, weak grade *bálne*, SaaN *boldni*, *bolnni*.

and accompanied by glottal closure, or half-long and then with no glottalization; after a long vowel, short preglottalized stops are obligatory.

In South Sámi, which does not distinguish Q2 and Q3 preoccluded clusters, the usual realization is voiceless oral stops, but Bergsland (1946: 59) notes that some speakers show a pattern of ‘glottal replacement’, in which any of the oral stops can be realized as [ʔ] instead. There is no preocclusion (or other similar phenomena) after sonorants in South Sámi: *tjelmie* ‘eye’.

01.3.3 The Development and Life Cycle of Preocclusion in Sámi

Just as with preaspiration, the development of preocclusion in the Sámi languages is very clearly tied in with the quantity system and consonant gradation. Indeed, the development trajectories of the two phenomena are very largely parallel. The distribution of the most important patterns is shown in Table O1.4. The columns show if preocclusion is found in the strong and weak grades of original geminates, in the strong grade of original singletons, if there is a general Q2 merger in the nasals, and if preocclusion occurs in strong- and weak-grade sonorant-nasal clusters.

One very clear similarity between the two is that both preocclusion and preaspiration must have occurred first in the geminate series, with a second ‘wave’ affecting strong-grade singletons later. This reconstruction is necessary because geminates, but not singletons, are preoccluded in South and (western) Ume Sámi. As in the case of preaspiration, Proto-Sámi singleton nasals do have preoccluded reflexes in the south, but only as a result of the general gemination after a short vowel, as in SaaS *lâtnodh* ‘to change’ (**lonnō-* < PSaa **lonō-*, SaaN *lotnut*). Where original singletons and geminates remain distinct – after a long vowel – there is no preocclusion of singletons (SaaS *saemie* ‘Sámi person’ < PSaa **sāmē*, contrast *ietnie* ‘mother’ < PSaa **ēnnē*).

Language	ñn > Tn	ñn > Tn	ñ > Tn	Q2 merger	n > Tn / Š_	n > Tn / Š_
SaaN	✓	✓	✓	✓	✓	✓
SaaL	✓	✓	✓	✓		⊗?
SaaP	✓	✓	✓	✓	✓	✓
SaaU	✓	✓			⊗	
SaaS	✓					

Table O1.4 Preocclusion patterns across the Sámi languages

The preocclusion of geminates is unlikely to be Common Sámi (in contrast to preaspiration of geminates, section 7.3), because there is no evidence for it in Eastern Sámi. The fact that it also affects ‘secondary’ geminates in the southern languages further suggests that has to be placed (at least in these varieties) in the relative chronology following the gemination after short vowel specific to them.

The preocclusion of strong-grade singletons must then be considered a second innovation, arising later by rule generalization. This is securely attested in Northern, Lule, and Pite Sámi (bearing in mind that some Pite varieties take part in the southern gemination). However, as we noted, original singletons do not undergo preocclusion in South Sámi. In Ume Sámi, western dialects such as Northern Tärna and Mountain Sorsele show *quantitative* gradation rather than qualitative alternations involving preocclusion (Sammallahti 1998: 195, Larsson 2012: 107–108, 120–121): strong-grade <liämmä> ‘broth.NOM.SG’, weak-grade <liämán> ‘broth.GEN.SG’ (PSaa *lēmę, SaaN *liepma*, *liema*). Bye (2001: 131) posits a second round of ‘singleton fortition’ to account for this gradation. This is surely correct, and this lengthening represents a plausible precursor to the preocclusion of strong-grade singletons that eventually resulted in the Q2 merger in the more northerly varieties. Just as with preaspiration, we can posit the following sequence of innovations radiating from a north-westerly centre southwards:

- Preocclusion of geminate nasals, which failed to penetrate very far into the east (stopping in the Sea Sámi zone of Northern Sámi), and which also did not reach the southern languages until after they underwent consonant gemination after a short vowel;
- Lengthening (‘fortition’) of strong-grade singletons, which reached south as far as all of Ume Sámi, but did not affect South Sámi. As we noted earlier, this may be part of the general fortition of strong singletons to Q2, which also affected the eastern Sámi varieties;
- Preocclusion of long (strong-grade singleton) nasals, which reached eastern, but not western varieties of Ume Sámi.

Note that these developments are quite parallel to our posited trajectory of the development of preaspiration, which is surely not a coincidence. In particular, just like preaspiration, the pattern of preocclusion shows that the Q2 merger does not occur systematically without a precursor sound change that ‘pushes’ the strong-grade singletons towards the reflexes of weak-grade geminates. In both cases, western varieties of Ume Sámi described by Moosberg (1925) represent the missing link where the fortition of singletons has occurred, but the Ć-ĆC merger is incomplete.

The fact that we can actually trace lengthening as an intermediate stage between original nasals and preoccluded stops provides the most direct evidence for Sámi preocclusion as a quantity-enhancing phenomenon in terms of section 01.1. This is, of course, also highly plausible given that the original preocclusion targeted long consonants in the first place.

Just as with preaspiration, we can reconstruct preocclusion as arising from gestural mistiming that undergoes phonologization as a cue to the contrast between short and long nasals. The role of gestural mistiming is further confirmed by the fact that preocclusion regularly fails when the onset of the word starts with a nasal, in cases such as SaaN *manni* ‘egg’, *namma* ‘name’: the coarticulatory nasalization that would plausibly persist on the vowel would also make an ‘accidental’ oral closure much less likely, blocking preocclusion in such items. This pattern has robust typological parallels, for instance in Austronesian languages (Tanjung Raden Jambi Malay in Durvasula [2009: 225]) and in Australia (Carignan et al. 2023).

One further factor that may have ‘primed’ the phonologization and subsequent stabilization of oral stops before nasals is the prior existence of stop-nasal clusters in the language. These are, admittedly, rare, but can be reconstructed for Proto-Sámi because they have different reflexes from original nasals in the eastern languages: PSaa **tōkŋe* ‘to patch, sew’, merging with original nasals in the west (SaaN *duogŋat*, SaaS *doengedh*) but retaining a consonant cluster in some eastern languages, as in SaaI *tuovŋâđ* (contrast *jiŋâ* ‘ice’ with original nasal), SaaK *tūvŋeđ* (but *jīŋŋ* ‘ice’). The word for ‘bottom’ (SaaN *bodni*) might also belong here (it is a Germanic borrowing, cf. ON *botn*), but since it is reflected with a nasal in the east (SaaI *ponne*, SaaSk *pâ’nn*, SaaK *pâ’nn*) it is likely best reconstructed with a nasal (via a form such as Norwegian *bunn*) instead. This ‘priming’ effect could be compared to the existence of *dn* from *rn* in the North Germanic varieties prior to nasal preocclusion.

In terms of the life cycle, initially this preocclusion would be a phonetic rule, a language-specific pattern of the realization of what are phonologically nasals, likely similar to the ‘non-contrastive’ preocclusion found in some Australian languages. It is not clear whether such a stage is attested in any of the documented Sámi languages. In the attested languages, preocclusion appears to have undergone *stabilization* and acts as a segment involved in the phonology; for moraic analyses that make this explicit, cf. Bye (2001) and Bals Baal, Odden & Rice (2012) for Northern Sámi. A segmental status for the oral stops created by preocclusion may also be suggested by Collinder’s (1938) report that they are consistently released in Gällivare, excluding the interpretation of these sequences as ‘prestopped nasals’ or ‘stops with nasal release’.

I will not discuss the diachrony of the distinction between Q2 and Q3 preoccluded clusters in too much detail. As we have seen, it can be implemented using a variety of means: in some languages (such as Pite and Ume Sámi) it seems to be primarily one of quantity, whilst in ‘traditional’ Northern Sámi it appears to be driven more by laryngeal properties of the oral closure. The quantity-based system is plausibly diachronically prior to the voicing-based one. One reason to think this is its wide geographic spread. It is certainly found in the southern periphery, in Ume and Pite Sámi. On the eastern edge of the preoccluding area, we have seen that the Northern Sámi dialects in the Deatnu valley region do not show a qualitative difference between Q2 and Q3 preoccluded clusters, but instead a quantity contrast transphologized onto the vowels. This is parallel to the similar realization of Q2 and Q3 preaspirated stops, which has always been a quantitative pattern, suggesting that quantity was the main distinction also in the case of the nasals. If this is correct, the voicing-based system seems to be an innovation with a distribution mostly limited to an inner zone around Western Finnmark. However, it does not seem possible to determine if stabilization of the preoccluded stops preceded or followed the rise of the Q2/Q3 distinction.

In present-day Western Finnmark Sámi, the oral closures have been replaced by glottal ones. It seems highly likely that this is a typical example of sound change motivated by the weakness of place cues in the oral stop, due especially to the lack of oral release before a nasal. Notably, coda stops in other positions are generally described as released in the Sámi languages: the complementary distribution between glottaling before nasals and maintenance before other consonants suggests the presence of release is a key factor. As we have seen, variable preglottalization of stops produced by preocclusion is reported from other varieties, such as Gällivare Lule Sámi and some South Sámi dialects: it is therefore possible to view the rise of phonologically glottalized nasals in Western Finnmark Northern Sámi as stabilization of the phonetic rule of preglottalization, which has a wider distribution within the family.

The developments in consonant clusters are also clearly special and would benefit from more detailed documentation; I leave them aside here.

In conclusion, the development of preocclusion in the Sámi languages can be understood in terms of the life cycle starting with the enhancement of a quantity contrast. It is parallel, on the one hand, to the life cycle of stop preaspiration in these languages, which I argued in Chapter 7 to have undergone a similar trajectory, and on the other hand to preocclusion of nasals in Western Nordic, another quantity-enhancing system. Just like preaspiration, preocclusion in the Sámi languages can be understood as a north-western innovation that is implemented in at least two stages of rule generalization and stabilization, with the pattern clearly visible in its diatopic distribution.

O1.4 Preocclusion in Cornish

Like Sámi, but unlike North Germanic and Manx, Cornish preocclusion is restricted to nasals, specifically coronal [n] and labial [m]. It is attested in texts overwhelmingly from the Late Cornish period that began in the sixteenth century: it is absent from the written record in the Middle Cornish, the period of the bulk of the literary texts. The literature on the topic is quite extensive. Alongside general overviews of the language (George 2009, Williams 2011), dedicated discussion can be found in Williams (1998) and Chapter 2 of Chaudhri (2007). The topic is also treated in some detail in literature whose primary aim is to establish a norm for revived Cornish, such as Dunbar & George (1997), Williams (2006, 2016); it is unfortunately often marred by disagreements that are less accessible to the non-specialist.

The essential pattern of preocclusion in Cornish is that historically long **nn* and **mm* undergo preocclusion after a stressed syllable. Since stress in Cornish is overwhelmingly penultimate, this means that preocclusion occurs either in monosyllables (as in <pedn> for Proto-Brythonic **penno-* ‘head’, <cabm> for **kambo-* ‘crooked’) or word-medially after a stressed penult (<bedna> for **benneth* ‘blessing’, ultimately from Latin *benedictiō*). It can be spelled in a variety of ways: <dn> and <bm> are of course common, but spellings with various ‘supporting’ vowels, such as <(d)den>, <dne>, and so on are not uncommon, especially in final position. In principle, such spellings could suggest the presence of epenthetic vowels or the syllabic status of the consonant, but they could also reflect the influence of English spelling conventions. Some very late examples (Chaudhri 2007: 67) do suggest epenthesis, as in <(pow)tooben> ‘hot (country)’ for expected *tubm* from **tumbo-* ‘hot’ (Welsh *twm*, Breton *tomm*).

In the later language, preoccluded nasals are reflected as long |lenis| stops, especially in disyllables, as in *obba* for earlier *omma* ‘here’; cf. the Setesdal Norwegian pattern of Norse **ll* in section O1.2.2. According to Williams (2006: 70), preocclusion can occur before a following [j] (as in Late Cornish <vargidniaz> ‘bargain.PST.3SG’ from *barginya*), but is blocked by a following stop: hence *men-ta* ‘wish-PRS.2SG’ despite *medn* ‘wish.PRS.3SG’

It is widely recognized that the patterning of preocclusion is closely tied to the distribution of vowel and consonant length. There is widespread agreement that at least early Middle Cornish showed the pattern attested in the rest of Brythonic, known, following Jackson (1953), as the ‘new quantity system’ (for more details, see Iosad [2017a,b] and Hannahs [2013].) The essence of this pattern, which is found in South Welsh and in most varieties of Breton, is that the length of stressed vowels is determined by the historical nature of the following consonant. Table O1.5 exemplifies this using Proto-Brythonic

and Middle Welsh forms. In Proto-Brythonic, stress fell on the penultimate syllable (as in **séno*s ‘old.NOM.SG.M’ and **pénno*s ‘head’). Under the new quantity system, vowel quantity inherited from Proto-Celtic was lost (or rather transformed into qualitative distinctions), and length became contingent on syllable structure: stressed vowels were lengthened if the following syllable was open, but not if it was closed, hence **séno*s but **pénno*s. Vowels in prestressed syllables were almost uniformly short (Schrijver 1995, 1998–2000). Following the loss of final syllables, stress shifted onto the previously pretonic (short) syllable. In most varieties of Welsh and Breton (and, it is assumed in the literature, Cornish) such newly stressed vowels are reflected as long, in conditions largely mirroring those in original penults (now final stressed syllables); this assumed length is shown in Table O1.5 for clarity.

The distinction between originally short and long consonants has a qualitative reflex in the stops (short stops undergo lenition, long ones do not, cf. section 6.4.2), but not, for the most part, in nasals. Cornish preocclusion is one exception to this generalization: it occurs in items in which earlier **nn* and **mm* followed a stressed vowel. Under the new quantity system, such a vowel is required to be short. This has occasioned much discussion regarding the phonemic status of consonant and vowel quantity in Brythonic (cf. for more discussion Iosad 2017a). In particular, since singleton **m* is reflected as *v* in all the Brythonic languages, surface *m* can only be preceded by a short vowel in most of the native lexicon. However, in Cornish the stock of distinctively short instances of **m* was replenished by French and English borrowings such as <lym> ‘lime’, <reem> ‘rhyme’, <rōme> ‘room’ (Chaudhri 2007: 32). These do not occur with preocclusion, suggesting that the historical length of **mm* persisted in the later language.

Consonant length	Final syllables		Penultimate syllables	
	Nasals	Stops	Nasals	Stops
Short	<i>*séno-</i> ‘old’	<i>*kátu-</i> ‘battle’	<i>*laweníjo-</i> ‘happiness’	<i>*katów-</i> ‘battle.PL’
	<i>hēn</i>	<i>cād</i>	<i>llewénydd</i>	<i>cādeu</i>
Long or cluster	<i>*k^vénno-</i> ‘head’	<i>*brátto-</i> ‘cloak’	<i>*lannérko-</i> ‘clearing’	<i>*ati-sék^v-</i> > <i>*adhéb-</i>
	<i>pěnn</i>	<i>brätt</i>	<i>llännerch</i>	<i>ätteb</i>

Table O1.5 *The new quantity system in Brythonic*

Cornish preocclusion, even of historical **nn* and **mm*, does not occur after unstressed vowels. We do not find forms such as ***colodn*, ***steređn* for *colon* ‘heart’, *steren* ‘star’, even though the consonants were historically long: this is seen both in cognate forms (Welsh *calonn-au* ‘heart-PL’) and in Cornish where the length was maintained after the stressed vowel, eventually yielding preocclusion (with Late Cornish plurals such as <colodnow>, <sterradnou>). This suggests that, as in the other Brythonic languages, the consonant quality distinctions were neutralized after an unstressed vowel prior to preocclusion, perhaps reflecting the impossibility of bimoraic unstressed syllables.

It is not known when this neutralization occurred in Cornish. The Welsh poetic tradition maintained a prohibition against rhyming historically singleton and geminate nasals after an unstressed vowel, as in *calon* ‘heart’ (**calonn-*) ~ *afon* ‘river’ (**abon-*), known as the ‘*trwm ac ysgafn*’ (“heavy and light”) rule’. According to Sims-Williams (2016: 212–213), the earliest examples of the rule being violated date to the ninth century, suggesting the phonological change occurred by that time, likely in connection with the retraction of the stress onto the penultimate syllable. Cornish shared the latter innovation with Welsh, so it is possible that the neutralization could also occur around this time, but it is, of course, not guaranteed.

As for the position after a stressed vowel, it is widely agreed that historically long *nn* and *mm* (expected to be preceded by a short vowel) underwent preocclusion, whilst historically short *n* and *m* (expected to be preceded by a long vowel), in items such as *enev* ‘soul’ or *lowena* ‘joy’ did not. In Late Cornish, non-preoccluded historical singletons are often (but not necessarily) spelled with doubled graphemes (Dunbar & George 1997: 57, Williams 2006: 71), as in <hinneth> for earlier *henath* ‘generation’. As Late Cornish spelling was strongly influenced by English conventions, this does not have to indicate that the nasals themselves were long (as they are in Welsh in this position),²⁰ but it most certainly suggests that the preceding vowels had shortened by this stage.

Thus, the shortening of stressed vowels in penultimate syllables represents a *terminus ante quem* for preocclusion. The dating of this change remains contentious. According to Williams (1998, 2006), it was part of a wider-rang-

²⁰ In Welsh, vowels in penultimate syllables are short (and followed by long consonants) in all contexts in North Welsh. In South Welsh, where the quantity system is most similar to Cornish, penultimate stressed vowels are short before historical geminates, with the exception of [ə], which is always short even in contexts where other vowels are long, as in [ˈlɑdːan] *llydan* ‘wide’. However, there is some evidence that the lengthening of consonants after short stressed penults in South Welsh is quite late, so that the historical distinction between **n* in *mynydd* ‘mountain’ (**monijo-*) and **nn* in *cynnes* ‘warm’ (**kon-tess-*) was maintained well into the Modern Welsh period (Wmffre 2003).

ing ‘Prosodic Shift’, under which all distinctively long vowels in penultimate stressed syllables were shortened across the board: an item such as Middle Cornish *lowene* ‘happiness’ is reconstructed as **lowéne*, via pre-Prosodic-Shift **lowéne* (with phonetic half-length of the stressed vowel), from pre-accent-shift **lawenijo-* (Middle Welsh *llewenydd*, Old Breton *louuinid*). Williams dates the Prosodic Shift, and consequent neutralization of vowel quantity distinctions in stressed penults, to the thirteenth century, before the Middle Cornish period. Since preocclusion is sensitive to pre-Prosodic-Shift quantity, he suggests that it occurred as part of the shift: preocclusion, according to Williams, was the device that allowed historical short **n* in *lowene* to maintain the contrast with earlier **nn* in *menna* ‘wish’ (> *medna*).

Williams’ account faces a number of strong objections. Most obviously, preocclusion is entirely absent from the Middle Cornish record:²¹ it is not until the mid sixteenth century that it occurs in the written evidence (such as Andrew Boorde’s *Boke of the Introduction of Knowledge* from 1542). Williams pre-empts this criticism by arguing that preocclusion was still quite ‘light’ phonetically in this period, and so was not reflected in spelling. This is difficult to falsify, but, of course, not impossible. Another objection is that preocclusion is widely reflected in Cornish place names in the west of the county, but is almost entirely absent from the east. A straightforward explanation for this is that this spread corresponds to the language’s geographical domain at the time preocclusion occurred (Dunbar & George 1997), but in the thirteenth century Cornish was spoken much further to the east than this zone; this forces Williams to postulate a dialect distinction; this is, again, not impossible but difficult to verify.

The strongest argument against Williams’ account is provided by evidence that historically short and long vowels in penults could in fact remain distinct in Middle Cornish. Just such evidence is provided by Bock & Bruch (2009), who show that some plausibly quantitative distinctions in penultimate syllables were not neutralized in Middle Cornish, because they have later (qualitative) reflexes. In particular, the Middle Cornish diphthong in <byw->, <bew-> ‘live’ has two reflexes in the early seventeenth century material collected by Edward Lhuyd: a front nucleus where it would be in an open stressed penult (Lhuyd’s <beua> ‘to live’) but a back nucleus before a consonant, where it would be short (<bounaz> ‘life’, Middle Cornish *bewnans*). According to Bock & Bruch (2009), this suggests a late Middle Cornish or early Late Cornish date for the neutralization of the quantity contrast in penults (see also Chaudhri 2007, Bock & Bruch 2010–2012), rather than an early ‘prosodic shift’.

²¹ There are three occurrence of *bedneth* ‘blessing’ in the Middle Cornish *Beumans Meriasek*, but they were introduced by a later copyist (Chaudhri 2007: 56).

In any case, as Chaudhri (2007) cogently argues, nothing in the data *requires* preocclusion to be associated with the neutralization of quantity contrasts in vowels. Although this is a convenient coincidence, by far the simplest account of the pattern is that preocclusion simply affected all historical **nn* and **mm* sequences that had not been shortened by the relevant date. Under this analysis, we do not need to posit any changes to consonant quantity from Late Brythonic that are not well motivated or find parallels in the rest of Brythonic. Specifically, distinctively long **nn* and **mm* were shortened after (post-accent-shift) unstressed vowels (in parallel to Welsh and Breton). Furthermore, preocclusion is absent when a historical long nasal occurs in an internal coda (as in *menta* ‘wish.PRS.2SG’), precisely where quantity contrasts are neutralized.²² On this basis, preocclusion can be straightforwardly dated to the late sixteenth or early seventeenth century in the transition from Middle to Late Cornish (which, incidentally, agrees with the simple interpretation of the place name evidence).

Of course, if Cornish preocclusion simply reflects earlier length, its phonetic explanation is also straightforward. As far as we can see, by Late Cornish preocclusion would have undergone stabilization, judging by the (admittedly slender) evidence for the possibility of epenthesis into the final stop-nasal cluster, as well as perhaps by the possibility of the further development to a long stop. Typologically, Cornish preocclusion is not especially different from many other cases we have considered.

In the next section, we consider the development of preocclusion in the Gaelic languages, specifically in Manx.

O1.5 Preocclusion in Manx

The records of Manx show a pervasive process of preocclusion affecting nasals (of all three places of articulation), laterals, as well as, occasionally, clusters of *r* followed by a lateral or coronal nasal: for instance, Broderick (1985: 29–30) lists examples such as <k’a[bⁿ]m> for *cam* ‘crooked’ (OIr *camm*), <le[dⁿ]n> for *lane* ‘full’ (OIr *lán*), <lo[gⁿ]ŋ> for *lhong* ‘ship’ (OIr *long*). The evidence for preocclusion and its diachronic development in the language is marshalled in the recent comprehensive examination by Lewin (2020: 308–336, 2023), to

²² Indeed, the patterning of preocclusion in Cornish in terms of syllable structure quite precisely parallels the patterning of preaspiration in Modern Icelandic: before a sonorant, where an ambisyllabic parse is possible (Iosad submitted), Icelandic [fortis] stops and Cornish long nasals undergo fission (preaspiration as in [ˈɛhpli] *resp.* preocclusion as in *bargidnya* ‘bargain’), but in an internal coda (before a stop) they undergo complete neutralization (spirantization in Icelandic, shortening in Cornish).

which I refer the reader for the details. In this section, I summarize Lewin's most important findings.

Preocclusion is not consistently reflected in the written record: for the most part, we have to rely on field materials from the last century of traditional Manx (Rhys 1894, Marstrander 1932, Jackson 1955, Wagner 1958–1969, Broderick 1985), as well as the available recordings (Manx National Heritage 2003). Furthermore, there are at least two written texts from the nineteenth century that indicate preocclusion; however, Lewin (2023) notes that writers who were L1 speakers and those familiar with the traditional spelling norms (where preocclusion is not usually indicated) tended not to write it, suggesting it 'was not particularly salient to native Manx speakers'.

Given the difficult nature of the evidence and its paucity, it is impossible to confidently judge the precise nature of Manx preocclusion. It seems, however, that at least for some part of the period in question it remained very much a phonetic rule. It is highly variable: in the words where it occurs, it is generally an option alongside other possible pronunciations, including lengthening of the preceding vowel, lengthening of the sonorant, and even (in the case of laterals) with 'post-occlusion', as in [ʃu:l^d] for *shooyll* 'walk' (OIr *sibal*), shown in Lewin (2020: 310) alongside forms such as <ʃu:l'>, <s'u:l^d> recorded by Broderick (1984: 405 s. v. *shooyll*). Lewin (2023) argues that it remained synchronically productive until fairly late, because it is (rarely) recorded in contexts where it is unexpected, notably after a historically unstressed vowel, as in *jeeaghyn* 'looking' (verbal noun of Middle Irish *déchaid*): <d'zi^dn> alongside expected disyllabic forms such as <d'zi:γən>.

Lewin (2023) also shows that, *pace* Broderick (1985, 2018), preocclusion did not undergo stabilization in Manx and did not result in a phonological stop segment. The very variability of the phenomenon is one piece of evidence in favour of this proposition. Further, stops resulting from preocclusion do not behave like other intervocalic stops, in that they resist the intervocalic spirantization that is pervasive in the language: for MNHL MS 08307, one of the texts containing evidence for preocclusion, Lewin (2023) contrasts the presence of spirantization in original intervocalic stops (as in <ovvyr> for *obbyr* 'work', OIr *opar*) but not in preoccluded stops (never *<leavym> for <leabym> *lheim* 'jump', OIr *léimm*).

In terms of origin and distribution, the 'core' context for preocclusion of original nasals is word-finally after a stressed vowel. It is only occasionally found word-finally after an unstressed vowel, and there are only two examples in the entire corpus of preocclusion in intervocalic position (a situation that contrasts rather drastically with the North Germanic and Sámi cases, where intervocalic position is a favoured context). Lewin (2020), following an early

suggestion by Rhŷs (1894), reconstructs Manx preocclusion as arising first in the so-called |fortis| sonorants /N L m/. As we mentioned in section 6.6, these segments tend to behave as weight-bearing codas in the Gaelic languages. There is good evidence to suggest that they were originally long both word-finally and word-medially, a situation that persisted in Donegal Irish until the twentieth century (Sommerfelt 1922, Ó Baoill 1979, Wheatley & Iosad in preparation). Elsewhere, coda |fortis| sonorants have generally shortened, but the evidence collated by Lewin (2023) shows that this degemination happened intervocally before it affected coda sonorants. This is still the situation in South Argyll (so that *ceann* ‘head’ has long [N:], but *ceannaigh* ‘buy’ has short [N]), and is also implied by the relative chronology of developments elsewhere. The pattern in Manx can then be explained if preocclusion occurred at the stage represented by South Argyll dialects, resulting in preocclusion in *ceann* (Manx *kione*) but not in *ceannaigh* (Manx *kionnaghey*).

In the attested Manx material, preocclusion occurs not only in words such as *kione* ‘head’ representing original short vowels followed by a |fortis| sonorant (OIr *cenn*), but also in originally |lenis| sonorants, after both short (*ben* ‘woman’, OIr *ben*) and long (*lane* ‘full’, OIr *lán*) vowels.²³ Lewin (2023) suggests, very plausibly, that this is the result of a later spread of the process to the |lenis| category due to the merger of the two series of sonorants; the generalization may have occurred first after long vowels, to judge by the (very limited) written evidence.

Given these results, preocclusion in Manx presents a further case of preocclusion as the enhancement of quantity. The fact that its (original) distribution maps quite precisely onto the distribution of length at the reconstructed intermediate stage – present in coda position but not intervocally – confirms the historical link between the two. However, Manx preocclusion appears to never have undergone further stabilization, and remained at the phonetic rule stage. In this respect, it crucially differs from the cases such as North Germanic and Sámi in that it cannot be conclusively shown to be involved in the moraic phonology of the language. Even though preocclusion does appear to have arisen from greater phonetic duration, its distribution is restricted to the word-final codas of a stressed syllable. In this respect, it presents a close parallel to Arabana (Hercus 1972), or rather to pre-Arabana as reconstructed by Harvey et al. (2019): it occurs primarily as a marker of a particular kind of strong metrical *position* (a word-final stressed syllable) rather than a particular metrical *structure* (a heavy syllable). This hypothesis is consistent with the fact that it generalized to original

²³ Note that |fortis| consonants after original long vowels are generally rare in the Gaelic languages, and where they do occur, it is usually intervocally, where preocclusion is basically absent (as in [ˈgrɛ:nə] *graney* ‘ugly’, OIr *gránda*).

|lenis| sonorants, which were never associated with distinctive length. Combined with the fact that coda |fortis| sonorants are also associated with increased duration of the preceding vowel (allophonic, as in Manx or South Argyll Gaelic, or ultimately contrastive, as in Connacht and Munster Irish), preocclusion was never exclusively associated with a moraic coda: this, I suggest, could be a factor in it failing to undergo stabilization, unlike the cases of Northern Sámi and Germanic.

O1.6 Preocclusion as Parallel Drift

In this section we have considered cases of nasal (and occasionally lateral) preocclusion in four areas of northern Europe. Starting with an analysis of preocclusion as an occasional by-product of gestural misalignment, we have been able to trace its development, with reference to the life cycle, and offer a comprehensive account that is closely supported by the patterns of diatopic variation. Adopting a life-cycle perspective has allowed us to clearly pinpoint the nature of each successive step in the evolution of this phenomenon, and map it to the spatial distribution of the various patterns. In the process, I have offered some new interpretations of the data, especially in the case of Western Nordic.

In three of the varieties we considered (North Germanic, Sámi, and Cornish), preocclusion, especially nasal preocclusion, can be shown to act primarily as enhancing a phonological quantity contrast. In the fourth, Manx, I have endorsed the analysis by Lewin (2023), in which quantity also plays a role in the origin of preocclusion, despite it never having undergone stabilization. In this respect, preocclusion presents quite a close parallel to preaspiration, which we considered in Chapters 4 to 8. I have argued that both phenomena arose as artefacts of gestural mistiming, but their progression along the life cycle was helped by their utility for enhancing the contrast between phonologically short (non-weight-bearing) and long (moraic, weight-bearing) representations of following segments. The very fact that such a contrast is important is not trivial: it is a consequence of the metrical organization of the respective languages' phonologies.

Ultimately, then, the parallel development of preocclusion and preaspiration can be understood as an instance of drift as defined in section 3.4: an originally variable phenomenon follows a diachronic trajectory towards more categoricity, constrained by the overall phonological system. In the case of preocclusion, importantly, the parallels are almost certainly not due to language contact. Despite vague references to this possibility by scholars such as Wagner (1964),

and the recent more sustained attempt by R. W. McDonald (2021), a contact origin for the cases of preocclusion considered here is unlikely.

This is clearest in the case of Cornish, in which preocclusion dates to the early modern period: there is simply no plausible contact source for it at that time. The three other cases could, in principle, be connected. For instance, it could be posited that Manx preocclusion is related to the Western Nordic pattern, given the well-documented Norse presence on the island. That at least some Norse varieties in Britain and Ireland participated in preocclusion is assured, since both Orkney and Shetland Norn show (limited) evidence of the phenomenon. In terms of timing, written sources allow us to put Western Norse preocclusion to a thirteenth-century date. On the face of it, this is far too late to have a significant impact in the Irish Sea world. Of course, it is difficult to know how long the lag would have been between the phonologization of preocclusion and its appearance in the written sources. It may be significant, however, that Scottish Gaelic loans seem not to reflect any preocclusion: cf. *dreallaire* ‘loiterer’ (*drolla*), *fail* ‘parboil’ (*vella*), *palla* ‘ledge’ (*palr*), *sgal* ‘howl’ (*skjalla*), *sgillinn* ‘penny’ (*skillinr*), and *spàin* ‘spoon’ (*spánn*) from the list in Stewart (2004). Nor does preocclusion appear to show up in the place-name record: for example, neither **ll* nor **nn* are reflected with a stop component in the comprehensive survey of Lewis place names by Cox (2022).

Admittedly, many of the arguments against Norse contact influence on Gaelic that I adduce in section 8.4 do not apply in the case of the Isle of Man, which was in fact one of the most important centres of Norse political and cultural power in the Irish Sea region (R. A. McDonald 2021). Recently, R. W. McDonald (2021) has suggested that this context may have facilitated the transfer of several lexical and grammatical features, including preocclusion. We know little about the mechanism and circumstances of language shift from Norse to Gaelic on the Isle of Man, and indeed the degree to which Gaelic survived or was replaced there during the height of Norse political and cultural power remains contested (Fellows-Jensen 2015, Steinforth 2015: chap. VIII, Thomson 2015). Barnes (2004: 131) concludes that the evidence of runic inscriptions from the island suggests that Norse may have been under pressure from Gaelic already in the tenth century, with a cessation of contact with runic traditions in Scandinavia by the mid eleventh century and decline by the late twelfth (cf. also Page 1992). Even if Norse survived here until the late medieval period, it seems unlikely the mechanism was anything other than a relatively gradual language shift that did not result in significant transfer of pattern (cf. Lewin 2017). Given the substantial structural and chronological differences between the processes, I conclude that preocclusion in Manx is unlikely to be due to ‘Viking’ influence.

The two instances of preocclusion in Scandinavia—in Western Norse and Sámi—are not particularly similar structurally. Spatially, the heartland of Germanic preocclusion in south-western Norway and the islands is hardly associated with what we identified as the core area for Sámi preocclusion in the north-western zone (Pite, Lule, and western dialects of Northern Sámi). Dating arguments are difficult to make, especially for Sámi in the absence of written evidence. Note that preocclusion must have been a live rule in Sámi at the time of the southern gemination of single consonants after a short vowel. If that phenomenon is to be related to consonant gemination under the new quantity system in central Scandinavia, that gives a date later than the rise of preocclusion in Western Norse (which preceded the quantity shift); however, this does not give us a decisive *terminus post quem*. In the absence of a plausible scenario for how a late North Germanic feature such as preocclusion with a limited western distribution would connect with a potentially fairly late feature in Sámi, also with a limited distribution within the family, the only possible contact explanation would be some kind of substrate—a classic case of *ignōtum per ignōtius*. I conclude, then, that all four instances of preocclusion considered here were historically independent, and represent genuine cases of parallel drift in unrelated languages.

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