

Chapter Five

More on codas

5.1 Introduction

In the previous chapter we concentrated on some basic properties of the syllabic organisation of language, that is on a level of organisation above and beyond the skeletal and melodic structure. This additional level of representation is necessary in order to formulate observations and generalisations which it would be very difficult or impossible to state otherwise. One point has been stressed repeatedly: syllabic organisation is not restricted to a mere division of segmental strings into chunks called onsets, rhymes, nuclei and codas. We have seen cases where syllabic units do not correspond to any segmental material, such as empty onsets or empty nuclei, which shows that syllabic organisation, while connected with the skeletal and melodic levels, comprises a fundamentally self-contained structure. The traditional notion of **syllabification**, i.e. the exhaustive division or compartmentation of a word into segments needs to be revised. In the past this was a relatively simple mechanical procedure whereby each segment was assigned to some syllabic unit with nothing left unsyllabified. While the need to incorporate melodic units into syllabic constituents is not controversial, we maintain that there may be syllabic units which are not directly manifested through segmental material. In other words, syllabification is an operation which involves the phonological structure of the language rather than just sequences of segments of phonetically transcribed words.

In what follows we shall continue to explore the syllabic structure of words. We will concentrate on cases where the phonological facts require that syllabification should depart from melodic sequences which are directly accessible for inspection. In particular, we will focus our attention on rhymal complements, i.e. codas. As we have seen, these are sounds like the sonorants [l] and [n] in words like *pilfer* [ˈpɪlfə] and *pundit* [ˈpʌndɪt] respectively, where they are followed by obstruents in the onsets of the following syllable. Additionally, nasals are homorganic with onset obstruents in a variety of languages, while the absence of homorganicity indicates that the nasal is not in the coda but rather in the onset and is followed by an empty nucleus, as in the English words *wronged* [rɒŋd] or *damsel* [ˈdæmzəl]. Rhymal complements followed by an onset obstruent can be called true codas since there is little, if any, disagreement among phonologists as to the syllabic status of such consonants. This stands in sharp contrast to the interpretations suggested for consonants appearing in word-final position. It is to such consonants that we now turn.

Traditional syllabification has no problems with the final consonants in *lad* [læd] and in *land* [lænd]: they are assigned to the coda, if only because there is nothing else they could be assigned to. This view identifies word-final consonants with the syllabic constituent *coda*. If we accept this we are forced to recognise three-consonant codas, e.g. *lands* [lændz], *next* [nekst], four-consonant codas as in *sixths* [sɪksθs], and even an occasional five-consonant coda as in the Shakespearean (*thou*) *triumphst* [ˈtraɪəmpfst]. Other languages will likewise oblige in supplying long sequences: in Polish, words ending in three, four or even five consonants are not unusual, e.g.: *łapsk* [ˈwapsk] ‘paw, gen. pl.’, *ostrz* [ɔstʃ] ‘sharpen, imper.’, *łgarstw* [ˈwgarstf] ‘falsehood, gen. pl.’, *następstw* [ˈnastɛmpstf] ‘consequence, gen. pl.’ etc. We will see presently that a theory which identifies word-chunks with syllabic constituents is seriously flawed. We begin by comparing the consonants that can appear in what is unquestionably a true coda position, i.e. before a following onset obstruent, with those that occur word-finally. Modern Irish furnishes the data for this.

5.2 Word-final consonants in Irish

In Irish the true coda position can be occupied by a sonorant as in [1a] or by a voiceless spirant [1b]. Consider the examples:

[1]

- | | | |
|----|-----------------------------------|------------------------------|
| a. | timpeall [tʰi:mpəl] ‘round’ | iompair [ʰumpərʲ] ‘carry’ |
| | sláinte [slɑ:nʲtʰə] ‘health’ | pionta [pʲuntə] ‘pint’ |
| | ancaire [ʰaŋkərʲə] ‘anchor’ | ionga [ʰuŋgə] ‘nail’ |
| | ordóg [orˈdo:g] ‘thumb’ | garda [gɑ:rdə] ‘policeman’ |
| | tarcaisne [tarkəʃnʲə] ‘contempt’ | díoltas [dʲi:ltəs] ‘revenge’ |
| b. | aspal [ˈaspəl] ‘apostle’ | báisteach [ˈbɑ:ʃtʰəx] ‘rain’ |
| | treascair [ˈtraskərʲ] ‘overthrow’ | seachtain [ˈʃaxtənʲ] ‘week’ |
| | sneachta [ʃnʲaxtə] ‘snow’ | |

Single intervocalic consonants are assigned to the onset of the following syllable, e.g. in *fada* [ˈfadə] ‘long’ and *míle* [mʲi:lʲə] ‘thousand’ [d] and [l] begin the second syllable. This means that word-internal codas are restricted to sonorants [1a] and voiceless spirants [1b]. The non-appearance of voiced spirants in the coda position may be due to the fact that the voiced spirants [z] and [ɣ] have a very limited distribution in the language, while [v] is probably best treated as a semivowel (it is often in free variation with [w]). However, plosive consonants are widespread in the language but they never appear in codas, i.e. *[ɑptə], *[blaktə], are not well-formed Irish words. It is very clear, then, that Irish specifically limits the range of melodies that can appear in the coda by barring plosives from that position.

Plosives typically appear in initial and internal onsets [2a] and word-finally [2b], e.g.:

[2]

- | | | |
|----|----------------------------|-------------------------------|
| a. | bata [ˈbatə] ‘stick’ | cogar [kogər] ‘listen!’ |
| | tapa [tapə] ‘speed’ | gadaí [gɑˈdi:] ‘thief’ |
| | dúdóg [du:ˈdo:g] ‘stump’ | bábóg [bɑ:ˈbo:g] ‘doll’ |
| | cibé [kʲiˈbʲe:] ‘whatever’ | |
| b. | scuab [skuəb] ‘sweep’ | leib [lʲebʲ] ‘fool’ |
| | ciap [kʲap] ‘annoy’ | soip [sɪpʲ] ‘wisp, gen. sg.’ |
| | slat [slat] ‘rod’ | duit [dʲi:] ‘to you’ |
| | rud [rod] ‘thing’ | cuid [kʲi:] ‘share’ |
| | cnoc [knuk] ‘hill’ | mic [mʲikʲ] ‘son, pl.’ |
| | póg [po:g] ‘kiss’ | Nollaig [ˈnoləɡʲ] ‘Christmas’ |

Thus, with the exception of the distributionally restricted voiced spirants [z, ɣ], practically any consonant can appear word-finally in Irish. If word-final consonants were to be treated as codas, then we would end up with two different types of codas: word-internal ones where plosives are disallowed, and word-final ones where they appear without any particular restrictions. This conclusion is hardly acceptable: codas are syllabic units and should have nothing to do with the position they occupy within larger units such as words. Alternatively, we would need to have some special reason why word-internal and word-final codas should be different. Since plosives freely occur in onsets word-initially and word-internally, while they never occur in word-internal codas, we have to conclude that their appearance word-finally indicates that they are onsets rather than codas. We can then make a general observation about Irish plosives, namely that they can appear in onsets only. The tentative theoretical conclusion that we can draw at this stage is that - contrary to traditional views on syllabification - word-final consonants behave as if they were onsets; to be able to

make the claim that word-final consonants actually are onsets we need more arguments and more evidence.

Consider first word-final consonant sequences in Irish, which are limited to combinations of a sonorant and a plosive [3a], and of a fricative followed by a plosive [3b], e.g.:

[3]

a.	corp [korp] ‘body’	oscailt [ˈoʃkəlʲtʲ] ‘opening’
	bord [bo:rd] ‘table’	long [lu:ŋg] ‘ship’
	féachaint [ˈfiəxənʲtʲ] ‘looking’	stromp [stromp] ‘stiffen’
	páirc [pɑ:rkʲ] ‘field’	sagart [ˈsagərt] ‘priest’
b.	seift [ʃeftʲ] ‘resource’	Cáisc [kɑ:ʃkʲ] ‘Easter’
	post [post] ‘post’	bocht [boxt] ‘poor’
	pléasc [plʲiask] ‘explosion’	

If word-final consonant sequences were to be treated as codas, we would be forced into another peculiar observation about Irish: what is a coda word-finally, must be analysed as a combination of a coda and a following onset word-internally. Recall that in [1] above we offer examples of sonorants and spirants in word-internal coda position, where in every case such sonorants or spirants are followed by a voiceless plosive. This is exactly the situation we encounter in [3]; to make this clear let us juxtapose a few examples of the possible combinations in the two positions.

[4]

	medial	final
sonorant-plosive		
	torpa [ˈtorpə] ‘clod’	corp [korp] ‘body’
	gorta [ˈgortə] ‘famine’	gort [gort] ‘field’
	rialta [ˈriəltə] ‘regular’	oscailt [ˈoʃkəlʲtʲ] ‘opening’
	folca [ˈfɒlkə] ‘flood, pl.’	folc [fɒlk] ‘flood, sg.’
	garda [ˈgɑ:rdə] ‘policeman’	bord [bo:rd] ‘table’
	rangaigh [ˈraŋgəɟʲ] ‘classify’	long [lu:ŋg] ‘ship’
spirant-plosive		
	donachta [ˈdonəxtə] ‘badness, gen.’	donacht [ˈdonəxt] ‘badness’
	postaire [ˈpostəriə] ‘messenger’	post [post] ‘post’
	Cásca [ˈkɑ:skə] ‘Easter, gen.’	iasc [iəsk] ‘fish’
	seifte [ʃeftʲ] ‘resource, gen. sg.’	seift [ʃeftʲ] ‘id. nom.’

In the left-hand column words we find examples of coda-onset sequences of the general type, where the coda is a sonorant or a spirant while the onset is a plosive. Note that word-internally such sequences must be interpreted as **heterosyllabic**, i.e. belonging to different syllables. In the right-hand column we find the very same sequences which, however, would have to be treated as **tautosyllabic**, or belonging to the same syllable, since they would be treated as codas by a theory that identifies word-final consonants with codas. The fact that consonants in some words would have to change their syllabic status in closely related forms need not in itself be very surprising or disturbing: [k] and [t] are in the onset in *folca*, *donachta*, but in the alleged coda in *folc*, *donacht*, as one can legitimately claim that the syllabic status of consonants depends upon the availability of neighbouring nuclei. What is disturbing is the claim that the same consonantal cluster constitutes a coda-onset

[6]

<i>sonorant coda - plosive onset</i>	<i>sonorant coda - fricative onset</i>
temper ['tempə]	rancid ['rænsɪd]
bandit ['bændɪt]	pilfer ['pɪlfə]
banter ['bæntə]	palsy ['pɔ:lzi]
anchor ['æŋkə]	balsam ['bɔ:lsəm]
alcove ['ælkəʊv]	
<i>fricative coda - plosive onset</i>	<i>plosive coda - plosive onset</i>
aspən ['æspən]	chapter ['tʃæptə]
mister ['mɪstə]	October [ɒk'təʊbə]
rascal ['rɑ:skəl]	
laughter ['lɑ:ftə]	

There are severe restrictions on what can appear in the coda position: as we have seen in the case of nasals, for example, these have to share their place of articulation with the following onset. There are other gaps in the list of combinations, however, which require a different explanation. What is particularly striking are the sequences involving plosives: as our examples indicate, the only plosives that can freely occur in the coda position are [p, k]. Given the fact that English has six such consonants - [p, t, k, b, d, g] - the restriction of the coda to just two of them constitutes a remarkable fact about English **phonotactics**, or the study of possible segment combinations. Note that there is nothing phonetically impossible about combining plosive sequences, and English does it regularly in morphologically complex forms: [gb] in *bugbear*, [bg] in *hobgoblin*, [gd] in *begged*, [dg] in *headgear*, [bd] in *robbed*, [db] in *good-bye*, [tk] in *outcast* etc. Such combinations, while commonplace at domain and word junctures, are never found domain-internally - in other words, the coda position admits no other plosives apart from [p, k]. This idiosyncratic phonotactic fact becomes even more surprising when we consider the word-final position, where all the plosives can readily be found: *sack*, *rib*, *bud*, *big*. In fact, word-finally all the plosives appear without restrictions, in the same way as they do in onsets. If word-final consonants were codas, we would need to say that phonotactically word-final codas are different objects from word-internal ones, a conclusion that is at odds with the very notion of a syllabic constituent. Since word-final consonants show the same melodic possibilities as word-internal onsets, the simplest conclusion would again seem to be that such final consonants are onsets rather than codas.

The internal coda-onset clusters illustrated in [6] above have another intriguing property, namely they appear word-finally. In fact, leaving aside obvious sequences arising across domain junctures (e.g. [dz] in *cards* or [md] in *roamed*), these clusters constitute a large portion of all the word-final consonantal combinations of English. For ease of reference we repeat the internal coda-onset sequences and add examples of the same sequences found word-finally.

[7]

<i>sonorant coda - plosive onset</i>		<i>sonorant coda - fricative onset</i>	
temper ['tempə]	hemp [hemp]	rancid ['rænsɪd]	once [wʌns]
bandit ['bændɪt]	end [end]	pilfer ['pɪlfə]	self [self]
banter ['bæntə]	sand [sænd]	palsy ['pɔ:lzi]	Naples [neɪplz]
anchor ['æŋkə]	wink [wɪŋk]	balsam ['bɔ:lsəm]	false [fɔ:ls]
alcove ['ælkəʊv]	milk [mɪlk]		

Before a sequence of two domain-internal consonants, i.e. before a coda-onset combination, branching nuclei are possible in highly restricted contexts. These basic possibilities are a coda fricative, e.g.: *pastry* [ˈpeɪstri], *oyster* [ˈɔɪstə], or a coronal sonorant homorganic with the following onset, e.g.: *manger* [ˈmæɪndʒə], *shoulder* [ˈʃəʊldə]. In other cases before a coda consonant, the vowel is short, e.g.: *actor* [ˈæktə], *scripture* [ˈskɪptʃə], *perceptive* [pəˈseptɪv], *limpid* [ˈlɪmpɪd], *finger* [ˈfɪŋgə] etc. We can interpret these facts by saying that with the exception of specified cases, the nucleus in English must be non-branching before a coda consonant. This, however, can only mean that word-final consonants do not occupy the coda position since, as [9b] documents, branching nuclei are perfectly acceptable before any final consonant.

By now we may have come to expect that when a word-final consonant sequence is identical to an internal coda-onset combination, similar effects follow. Thus, since before a true coda only short vowels occur - with specified exceptions - word-final codas followed by a consonant should exhibit similar results. This is indeed what happens, including the specified exceptions. We observed above that before a coda fricative or a coronal sonorant homorganic with the following onset - the *pastry-manger* cases - the nucleus can branch; the same ‘specified exceptions’ are attested word-finally, e.g.: *haste* [heɪst], *range* [reɪndʒ], *child* [tʃaɪld]. Vowels are invariably short before other consonant combinations which word-internally function as coda-onsets, e.g.: *limp* [lɪmp], *tank* [tæŋk], *self* [self], *act* [ækt]. In this context branching nuclei are impossible hence *[laʊmp], *[teɪŋk], *[si:lʃ], *[eɪkt] are not admissible single morphemes in English. We can thus repeat our earlier conclusion that word-final consonant clusters behave as if they were sequences of a coda followed by an onset. The phonological identity of the coda-onset internal combination with the word-final consonant sequence indicates that the final consonant is actually an onset, while the pre-final one is a rhymal complement (the coda).

What we have seen above are restrictions on branching nuclei in closed syllables, i.e. in rhymes containing a consonantal coda. The brunt of the argument was to show that a word-final consonant does not make the preceding syllable closed; rather such a consonant constitutes the onset of a syllable whose nucleus is melodically empty. The predominant tendency is for closed syllables to contain non-branching nuclei, i.e. short vowels. This constraint holds for monomorphemic words (single phonological domains) but is also attested in some morphophonemic alternations. We would like to consider these briefly now.

As we have seen, morphophonemic alternations are found when a given morpheme displays a changed phonetic form in combination with some other morpheme or morphemes. Thus, for example, the adjective *final* in isolation appears as [ˈfɑɪnəl], but when combined with the noun-forming suffix *-ity* its stress shifts and its second vowel is changed to [ˈfɑɪnəl], i.e. *finality* [ˈfɑɪnəlɪti]. The patterns of morpheme combinations and possible morphologically complex words do not constitute the domain of phonology but rather of morphology and the lexicon. The alternations existing may be the result of changes which were operative in the language centuries ago and thus are not in any sense a direct result of the synchronic phonology of the language. However, if our phonological generalisations are correct and capture regularities prevailing in the language, then morphological alternations cannot be at odds with them. In this way we can regard morphological alternations as strengthening the validity of the generalisations we formulate. Thus, no matter when specific morphemes were combined and what historical changes they were subsequently subjected to, their current phonetic shape must conform to existing synchronic phonological generalisations. The scope of phonological regularities is, primarily, coterminous with the phonological domain, which need not and often does not coincide with what is a lexical word. However, when

morphologically complex words entail alternations characteristic of simplex units, then they invariably are single phonological domains.

With these observations in mind consider the alternations between branching and non-branching nuclei found in a number of related words: the final nucleus in the left hand-column words below is branching, whereas the corresponding vowel in the domain-internal (pre-suffixal) position is non-branching or short.

[10]

receive [rɪ'si:v]	reception [rɪ'sepʃən]
describe [dɪ'skraɪb]	descriptive [dɪ'skrɪptɪv]
wise [waɪz]	wisdom ['wɪzdəm]
five [faɪv]	fifty ['fɪftɪ]
retain [rɪ'teɪn]	retentive [rɪ'tentɪv]

Note that the final consonant in the left-hand column words is an onset, which means that the preceding syllable is open and does not contain a coda; this is the context where the vowel can be long. In the right-hand column words, however, a sequence of a coda and an onset arises at a morpheme juncture and this means that the preceding syllable is closed. This is the context where, with the exception of forms of the *pastry-manger* type, branching nuclei tend to be disallowed. The alternations also involve vocalic qualitative differences and consonantal distinctions, but these are a matter for the lexicon rather than phonology: from the synchronic phonological point of view the relevant point is that closed syllables disfavour branching nuclei.

At this stage it comes as no surprise that similar alternations are also found when consonantal suffixes are attached to stems containing a branching nucleus.

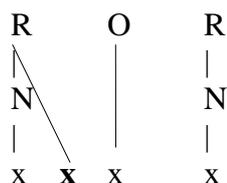
[11]

keep [ki:p]	kept [kept]
leave [li:v]	left [left]
thief [θi:f]	theft [θeft]
five [faɪv]	fifth [fɪfθ]
wide [waɪd]	width [wɪdθ]

The final consonantal cluster in the right-hand column words behaves in the same way as the cluster in the morphologically complex words in [10], i.e. the first consonant is a coda while the second one is an onset. A coda consonant closes the syllable and hence a long vowel is less likely to appear in its nucleus. The final consonant in *keep* etc. does not impose such a requirement, which follows from the fact that it is an onset in the same way as [p] in *keeper* is an onset, and hence a long vowel may precede it. As before, the nature of the qualitative alternations or consonant modifications is outside the purview of phonology.

The above discussion of the restrictions on the occurrence of consonants in different positions within a word and the concomitant limitations on the distribution of branching nuclei points in the same direction as the Irish consonant distribution: word-final consonants are onsets. If preceded by another consonant (within the same phonological domain) they have the same structure as word-internal sequences, hence in both cases they are interpreted as a combination of a coda and a following onset. This means, however, that we can talk about a coda only when there is a following onset. It is the onset which **licenses**, supports or sanctions the appearance of a coda. The onset itself in turn is licensed by a nucleus which may but does not have to be phonetically expressed. The structure of the coda then is the same word-internally and word-finally and can be represented as follows:

[12]



The emboldened **x** is the coda position. Note that the coda and the onset are invariably adjacent on the skeletal tier. This observation allows us to return to the notion of nasal place sharing which we discussed in the preceding chapter.

5.4 Nasal-obstruent place sharing continued

In Chapter Four we discussed at some length the sharing of the place of articulation between a nasal consonant and a following obstruent in a number of languages (examples like *simply* ['sɪmpli], *bandy* ['bændi], *finger* ['fɪŋgə] in English). In all the cases we considered the consonantal sequences which appeared word-internally, and we stressed that the sharing takes place when the nasal occupies the coda position which is immediately followed or - as we would now say - licensed by an obstruent in the onset. Thus the place sharing is found in the rhyme-onset combination, and the cases where no sharing is found can be interpreted as indicating that the phonetic consonant sequence is not a phonological sequence (e.g. *flimsy* ['flɪmzi]). In other words, the nasal and the following obstruent must be seen as being in separate onsets with a nucleus intervening. Some languages provide direct evidence for the reality of the nucleus, which in certain cases receives phonetic interpretation (recall the Polish examples like *śłomka* ['swɔmkɑ] 'straw, dim.' with a non-homorganic cluster and its gen. pl. form *śłomek* ['swɔmek] where the nucleus separating the members of the offending cluster has melodic content).

The generalisation that nasal sharing crucially involves a rhyme and an onset is directly relevant to our discussion of the syllabic status of word-final consonants. If word-final consonants are indeed onsets, then a nasal preceding them should be syllabified into the rhymal complement position in exactly the same way as happens word-internally. The ensuing coda-onset combination should display place of articulation homorganicity, once again reflecting exactly the internal situation. This is indeed what happens in all the languages we have considered. In what follows we shall illustrate place sharing briefly, since it introduces no new factors into our analysis apart from confirming the conclusion that word-final consonants are onsets, and as onsets may be preceded by a rhymal complement in the previous syllable.

In English the attested domain-final nasal and obstruent sequences are homorganic, although there are some language-specific complicating factors. Consider these examples

[13]

- | | | |
|----|-------------------|-----------------|
| a. | stamp [stæmp] | bump [bʌmp] |
| | romp [rɒmp] | nymph [nɪmf] |
| | triumph [traɪəmp] | |
| b. | tend [tend] | brand [brænd] |
| | abound [ə'baʊnd] | mount [maʊnt] |
| | font [fɒnt] | ant [ænt] |
| | dance [dɑ:ns] | tense [tens] |
| | bronze [brɒnz] | wrench [rentʃ] |
| | punch [pʌntʃ] | plunge [plʌŋdʒ] |
| | whinge [wɪŋdʒ] | |

c.	brink [brɪŋk]	plonk [plɒŋk]
	rank [ræŋk]	dunk [dʌŋk]

In [13a] the shared place of articulation involves labiality or labio-dentality, in [13b] it is alveolarity or post-alveolarity (the latter marked here as [ɲ]) while in [13c] it is velarity - in brief, the clusters in question are homorganic. Viewed in this way the examples in [13] are not different from what is found domain-internally when rhymal complements are homorganic with following onsets (e.g.: *tempo* ['tempəʊ], *dandy* ['dændi], *tango* ['tæŋgəʊ]). If we wish to maintain a single, syllable-based generalisation about nasal sharing in English, we need to conclude that the final consonantal clusters in [13] constitute the same kind of syllabic structure as they do domain-internally, i.e. they are sequences of rhymal nasals followed by onset obstruents. This, of course, means that the final consonants of the words are onsets and, like onsets in general, they need to be sanctioned by a following nucleus. The final nuclei in these words happen to have no phonetic content and hence remain inaudible. English offers little direct evidence in the form of alternations which supports the existence of empty nuclei. This sort of indirect evidence is particularly significant as it emerges out of the logic of the system. The empty nuclei are a straightforward consequence of basic assumptions such as the one claiming that onsets must be licensed by nuclei.

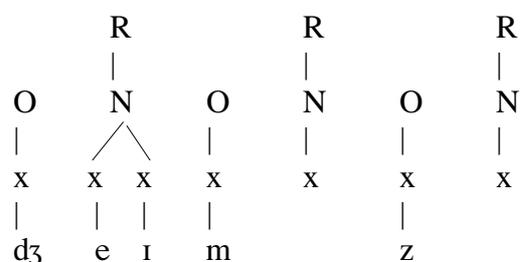
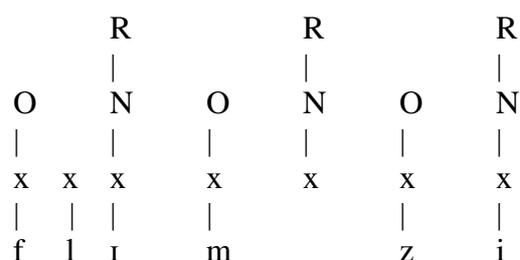
Nasal sharing can be regarded as a uniform phonological regularity and in this sense there are no syllabification differences between the domain-internal and the domain-final position as far as the participating segments are concerned. Domain-final sequences do not tolerate anything which is not admitted internally. There are, however, certain differences between what can appear in the two positions, and although this does not undermine the main points we are making here, the differences are interesting from the point of view of the phonology of English as a whole and as such merit some discussion.

Notice that domain-finally certain consonantal combinations are not tolerated. These gaps are striking since they involve homorganic clusters of a nasal and a voiced plosive which are found domain-internally, namely [mb] and [ŋg]. While internally we find words like *lumber* ['lʌmbə], *gambit* ['gæmbɪt] or *finger* ['fɪŋgə], *bungalow* ['bʌŋgələʊ], the same sequences are impossible in the final position. Thus there are no words *[sæmb] or *[rɒŋg] with a pronounced final plosive. The only voiced plosive that can appear after a nasal domain-finally is a coronal, as in [13b]. When discussing the representation of the velar nasal in 3.2 we pointed out that the domain-final voiced velar plosive is suppressed after a homorganic nasal, yielding phonetically the simple nasal [ŋ], as in *king* [kɪŋ]. Such suppression is a language-specific operation and constitutes part of its synchronic phonology; in earlier English the voiced velar plosive was just as acceptable after a nasal as a voiceless one and even today, there are dialects of the language which do not follow this pattern so that a word like *sing* is pronounced [sɪŋg] with an audible final plosive (see our discussion in 3.2). The impossibility of this combination in most varieties of the language is a phonological fact which turns out to be part of a more general tendency to disallow certain phonetic sequences. As noted above, apart from the absence of final [ŋg], there is also the inadmissibility of final [mb], which really means that the only voiced plosive tolerated domain-finally after a homorganic nasal is the coronal [d]. It is probably not an accident that a similar pattern can be observed when a lateral in the rhyme is followed by a voiced plosive in the onset: domain-internally the lateral can be followed by a labial (*elbow* ['elbəʊ]), a coronal (*shoulder* ['ʃəʊldə]) or a velar (*vulgar* ['vʌlgə]). Domain-finally the situation is radically different: the voiced coronal is amply attested after a lateral (*hold* [həʊld], *field* [fi:ld]), the labial plosive seems to appear in just one word (*bulb* [bʌlb]), while the velar plosive is altogether unrecorded - words like **dilig* [dɪlg] look and sound totally un-English. Viewed in this perspective, the restricted range of nasal plus plosive combinations domain-finally illustrated

in [13] must be regarded as resulting from an independent phonological constraint operative in the language. The complications emerging from the operation of the constraint do not in any way undermine our main claim made in this chapter, namely that word-final consonants, rather than belonging to the coda, constitute onsets and are followed by nuclei without phonetic content. Nasal sharing domain-finally, to the extent that it is not disallowed by additional constraints, is not in conflict with this conclusion.

The claim that nasal sharing is observed between a coda nasal and an obstruent in the following onset allowed us to provide an account of the cases where sharing is not observed between phonetically consecutive consonants, e.g. *flimsy*. It will be recalled that in such cases we postulate an empty nucleus separating the nasal and the following obstruent. Domain-finally we also find departures from the expected pattern. These include in the first place the very common cases where inflectional endings are attached to stems, e.g.: *aims* [eɪmz], *aimed* [eɪmd] - in such examples, as we argued above, the ending is separated by a nucleus from the final consonant of the stem. In other words, the final consonant of the stem and the consonant of the ending are both independent onsets, and place sharing is neither possible nor required. There is, however, a handful of words, almost exclusively personal or place names, without any obvious internal morphological structure, which violate place sharing, e.g.: *James* [dʒeɪmz], *Holmes* [həʊmz], *Thames* [temz], *Eames* [i:mz], *hames* [heɪmz] (the last word may be the plural of *hame* but it is also a lexicalised singular as shown by the regional expression *to make a hames of something*). These examples parallel certain similar and equally infrequent violations found domain-internally and by their infrequency confirm the identity of nasal sharing. It seems natural to view the failure of nasal sharing as due to the same phonological mechanism in both cases. Recall that in the case of words like *flimsy* an empty nucleus was posited between the nasal and the following spirant, which means that the two consonants both occupy onset positions, with no room for place sharing. Extending the same treatment to words like *James* we will claim that these, too, contain a nucleus which places the flanking consonants in onset positions and thus allows phonetic non-homorganic clusters. The representations of the words *flimsy*, *James* have the following shapes:

[14]



James is seen as containing two empty nuclei: one is required because it licenses the word-final onset, and one to explain the non-homorganicity of the nasal and the following obstruent. Note also that the related word *Jameson* has several possible pronunciations, one of them being [dʒeɪmɪsən] with the vowel [ɪ] filling the melody of the first of the empty nuclei

above. The need to postulate an empty nucleus following the nasal in *James* and the fact that the corresponding nucleus in a related word has a melody can hardly count as an accident.

To sum up: English place sharing in nasal plus obstruent clusters domain-finally is conditioned by exactly the same factors as it is domain-internally. If a uniform analysis is accepted, then in both cases the obstruent must be assigned to the onset position. This, in turn, means that word-final consonants in such sequences are not codas but onsets, and thus strengthens the case for treating all final consonants, no matter whether preceded by a coda or not, as onsets and hence followed by empty nuclei.

After this extended discussion of nasal place sharing in word-final position in English we will deal with the situation in German, Dutch and Polish very briefly. From the point of view of the theoretical issue we are arguing, i.e. the non-coda status of word-final consonants, these three languages offer exactly the same type of evidence as does English. Thus a word-final nasal followed by an obstruent predominantly displays the same properties as it does domain-internally, where it is, indisputably, a coda. Nasal sharing can be described as a uniform regularity only when the consonants involved in it are syllabified in the same way in both positions. The examples below illustrate domain-final nasal sharing in German [15a], in Dutch [15b], and in Polish [15c].

[14]

- | | | |
|----|--|---|
| a. | Hand [hant] ‘hand’
ganz [gants] ‘quite’
Bank [baŋk] | Kind [kɪnt] ‘child’
Wunsch [vʊnʃ] ‘wish’ |
| b. | ramp [ramp] ‘disaster’
rund [rynt] ‘cow’
zink [zɪŋk] ‘sink, imper.’ | tand [tant] ‘tooth’
bank [baŋk] ‘bench’ |
| c. | dąb [dɔmp] ‘oak tree’
band [bant] ‘gang, gen. pl.’
rządź [ʒɔŋtɕ] ‘rule, imper.’
draż [drɔŋk] ‘pole’ | sej [sɛmp] ‘vulture’
rząd [ʒɔnt] ‘government’
chęć [xɛŋtɕ] ‘willingness’
rąk [rɔŋk] ‘hand, gen. pl.’ |

If we compare the final clusters in [15] with the examples of internal nasal place sharing discussed at length in the preceding chapter, we must conclude that [15] introduces nothing new. In fact, whatever combinations are attested finally are also found domain-internally.

The above examples are instructive in a somewhat indirect way: when we compare the internal and final sharing effects, we observe that while the final sequences are all subsumed under the internal ones, the reverse is not true. In all three languages the post-nasal obstruent is necessarily voiceless in word-final position, while internally both voiced and voiceless consonants are possible. While the range of effects might thus seem to be different in the two positions, a little familiarity with the languages reveals that the difference arises as a result of an independent constraint. German, Dutch and Polish display a reasonably wide-spread phenomenon whereby the word-final position does not tolerate voice distinction in obstruents; this means that all obstruents appearing word-finally are necessarily voiceless. The impossibility of voiced obstruents in this position is responsible for the restricted range of consonantal clusters with place sharing word-finally. What is crucial, however, is that place sharing and voicing distinctions are independent regularities of the three phonological systems - note that voicing or rather its impossibility is amply attested by examples where no nasal precedes, e.g.: German *Wald* [valt] ‘wood’, Dutch *Madrid* [ˈmadrit] ‘id.’, Polish *sad* [sat] ‘orchard’. Word-finally the two independent regularities - nasal place sharing and the voicing restriction - meet and jointly affect the same phonological units. We conclude then that nasal sharing is a single phonological phenomenon, attested both domain-internally and domain-

finally. The unified nature of the phenomenon strengthens the case for the onsethood of final consonants.

In the preceding pages we have looked at a few phonological regularities which indicate that consonants appearing in word-final position are different from typical word-internal codas. On the other hand, we have seen that they pattern with word-internal onsets in that they accept the same range of consonants and in that they have an identical effect on preceding nuclei. Thus the phonological role that word-final consonants play places them together with syllabic onsets. In Chapter Seven we will see that some word-final consonantal clusters in Icelandic have to be analysed as branching onsets, a conclusion that may look initially surprising but which is in agreement with the view that onsets, and syllabic constituents in general are independent of the position they occupy within a word. Onsets, whether branching or not, have to be licensed by nuclei, hence if final consonants are onsets they must be followed by empty nuclei. A close study of the phonological data brings us to the conclusion that something that initially appears to be a coda is in fact a different syllabic constituent, namely an onset. In order to uncover the syllabic structure of words one must often go beyond mechanical procedures which interpret sequences of segments as syllabic units, and it is necessary to part with traditional assumptions or prejudices. We now turn to a different case which illustrates the same point, where something that looks as if it belongs to the onset actually behaves phonologically as if it were a different constituent.

5.5 Consonant sequences starting with [s]

Syllabification as a phonological operation consists in uncovering what constituent individual segments are assigned to. As we have seen, this is not a straightforward operation since certain elements of the syllabic structure may remain unexpressed phonetically. Thus the discovery of the syllable structure needs to go beyond the phonetic sequencing of segments and delve into the phonological consequences of specific syllabic configurations. In other words, the syllabic affiliation of segments need not be accessible to direct inspection but its impact is felt through its consequences. If words in languages consisted exclusively of strings such as [sælrɔtə] or [bɔðaxərɪ], i.e. if they were just alternating sequences of vowels and consonants, the question of syllable structure would be either trivial or it might as well not arise at all. In such a case vowels would have to be nuclei and consonants would have to be onsets. In other words, an intervocalic consonant - VCV - will always be in the onset position, where it is licensed by the second vowel; it could not be a rhymal complement since it would need to be licensed by a following onset. Apart from such simple options, syllabification is a significant phonological operation because in a number of cases its results cannot be predicted in a mechanical fashion. This is because syllable structure is intricately bound up with the phonological organisation of the language as a whole.

A case that illustrates this dramatically involves consonant sequences beginning with /s/, which can be found in a variety of languages, e.g. English *still* [stɪl], French *scorbut* [skɔʁbyʁ] ‘scurvy’, Russian *stol* [stol] ‘table’, Irish *spárán* [spəˈrɑːn] ‘purse’ etc. European languages, in particular, abound in combinations of this type; it should additionally be noted that the spirant may be modified in various ways, mostly as regards palatality and voicing, e.g. English *shrew* [ʃruː], German *Sprache* [ˈʃpʁɑːxə] ‘language’, Russian *zdorovyj* [zɔɫˈroviːj] ‘healthy’, Polish *ściska* [ɕɕɨsk] ‘crowd’ etc. In languages outside the Indo-European family such sequences are rare or not found at all: in Hungarian, for instance, they appear only in borrowings, e.g.: *szkeptikus* [ˈskɛptikuʃ] ‘sceptical’, *sport* [ʃpɔrt] ‘sport’ etc. The infrequency of such combinations in the languages of the world may suggest that they are specific to Indo-European, and are in some sense exceptional.

Another intriguing characteristic of s+C(onsonant) combinations emerges once we attempt to interpret them in syllabic terms. An initial difficulty often noted in past syllabic

studies is of a phonetic nature. It has been observed that a typical branching onset consists of an obstruent followed by a sonorant (which may be subject to additional conditions such as the ban on homorganicity). In this light, a sequence such as [sk] is an unlikely candidate for a branching onset since it consists of two obstruents.

As we have seen in the few examples above the s+C combinations are found at the beginning of words. A frequent assumption made in syllabic studies is that whatever precedes the first vowel in a word must be an onset, i.e. [tr] and [bl] are branching onsets in *treat* and *blaze* respectively. While this assumption yields the desired results in a number of cases, it is by no means necessarily true. There are languages which tolerate complex or exotic consonant combinations in word-initial position, but there is little evidence that these combinations are syllabified as onsets. In Polish initial [rt] is possible, e.g. *rtęć* [rteɕ] ‘quick silver’, as is the improbable-looking string [drgn] in *drgnać* [ˈdrgnɔɲɕ] ‘shudder’. Domain-internally the former cluster is regularly syllabified as a coda-onset sequence. In *warty* [ˈvartɨ] ‘worthy’, for example, [r] constitutes the coda while [t] forms the following onset, thus conforming to the general requirement that a sonorant in the rhyme may be followed by an obstruent in the onset. The sequence [drgn] on the other hand does not appear in internal onsets, which would be a peculiar restriction since syllable structure should be in principle independent of the position of a cluster in the word. The most straightforward solution to this puzzle would be to claim that the sequences in question are not branching onsets but, arguably, combinations of onsets separated by empty nuclei. This conclusion means that we cannot mechanically identify word-initial consonants with the syllabic constituent onset, and it places on us the burden of establishing the syllabic structure of words on the basis of phonological evidence. If no automatic identification of word-initial sequences with onsets is possible, we cannot assume that s+C strings are necessarily onsets. Below we will consider evidence from a few languages which suggest that combinations of s+C are not branching onsets, but represent a different syllabic configuration. It should be borne in mind, however, that phonological evidence needs to be carefully sifted before its significance can be ascertained. Also, it is a well-known fact that languages very often fail to provide compelling evidence in support of a specific theoretical proposal, which makes the task of the phonologist more challenging. In our search for a syllabic structure for s+C sequences we start by looking at some facts of Italian.

5.5.1 Italian vowel length

Modern Italian vowels display alternations in length which depend on their position within the word. This type of dependence is found quite frequently in languages, although the factors determining the alternations may differ significantly (see Chapter Seven for a detailed look at vowel length alternations in Modern Icelandic). In Italian long vowels can appear exclusively in internal stressed syllables. This is not a sufficient condition as additionally the vowels may not be followed by a rhymal complement (a coda); if a coda follows, the vowel is short. Examples of long and short vowels are provided below.

[16]

- | | |
|------------------------------------|-----------------------------------|
| a. insipido [inˈsiːpido] ‘insipid’ | b. piccolo [ˈpikkolo] ‘small’ |
| figliolo [fiˈʎoːlo] ‘son’ | figlioccio [fiˈʎottʃo] ‘godson’ |
| feroce [feˈroːtʃe] ‘savage’ | bocca [ˈbokka] ‘mouth’ |
| casa [ˈkaːza] ‘house’ | campo [ˈkampo] ‘field’ |
| muro [ˈmuːro] ‘wall’ | ruzza [ˈruddza] ‘argument’ |
| artefice [arˈteːfitʃe] ‘craftsman’ | tristezza [trisˈtɛttsa] ‘sadness’ |
| malefico [maˈleːfiko] ‘harmful’ | centro [ˈtʃɛntro] ‘centre’ |

We can see that a stressed vowel followed by a single consonant is long; the single consonant must obviously be treated as the onset of the following syllable, hence the stressed syllable is open. When a sonorant occupying the rhymal complement position follows, or when a geminate consonant appears, the syllable is closed and its vowel is short. Thus a geminate consonant can be regarded as having the same structure as a coda-onset combination. Since a short vowel followed by a coda corresponds to two skeletal positions in exactly the same way as a long vowel, we may formulate the generalisation that in Italian an internal stressed rhyme must dominate two positions. If there is no coda consonant, the two positions will be taken by the nucleus, hence the vowel will be long; if a coda does appear, it occupies one slot, hence the preceding vowel must also make do with a single slot and remains short.

The above reasoning supplies us with a phonological test for the syllabification of internal consonant sequences: if a preceding vowel is short we would expect the first consonant of the cluster to be placed in the rhyme. Conversely, if the vowel is long it means that the consonant in question must belong to the next syllable. With this in mind, consider the examples below where a stressed vowel is followed by various consonant sequences.

[17]

- | | | | |
|----|-----------------------------|----|----------------------------------|
| a. | quadro [kwa:dro] ‘square’ | b. | basta [‘basta] ‘enough!’ |
| | sidro [si:dro] ‘apple tart’ | | triste [‘triste] ‘sad’ |
| | pietra [pjɛ:tra] ‘stone’ | | pesca [‘pɛska] ‘peach’ |
| | zebra [dʒɛ:bra] ‘zebra’ | | pesca [‘pɛska] ‘catch (of fish)’ |
| | putrido [pu:trido] ‘putrid’ | | ruspa [‘ruspa] ‘bury’ |
| | sopra [so:pra] ‘on’ | | nostro [‘nostro] ‘our’ |

The significance of the evidence in [17] is straightforward: before a typical branching onset, as in [17a], the preceding stressed vowel is long. This is never the case before s+C, which can only mean that such clusters do not form an onset. Rather, the examples in [17b] form a match with those in [16b] where the first consonant of the cluster was invariably assigned to the rhyme of the syllable, hence its vowel could not be long. The same, it seems, must be said about the s+C sequences in [17b]: since the preceding stressed vowel is not long, this can only mean that it forms a branching rhyme with the consonant /s/. Thus internal s+C sequences assign their members to separate syllables, which conforms to the general requirement that within onsets two obstruents are not possible.

The syllabification within words whereby /s/ is assigned to the rhyme rather than the onset is not particularly controversial, and the distributional restrictions on long vowels fully support it. However, sequences of s+C are also found in word-initial position, e.g.: *scatola* [ska:tola] ‘box’, *smarrire* [smarri:re] ‘lose’, *specifico* [spe’tʃi:fiko] ‘specific’ etc., where there is no obvious rhyme to which the initial spirant /s/ could be assigned. Could it be the case that it does form a branching onset with the following consonant initially? Could we then have different syllabification depending on the position in the word? To answer these questions we need to examine another problem of Italian grammar, namely the shape and distribution of articles.

5.5.2 Italian masculine articles and the s+C sequences

The definite masculine article in Italian displays a few different shapes which seem to be determined by the segment that begins the following word (a noun or a noun modifier). Oversimplifying somewhat the facts for the sake of clarity let us consider the definite article: it has the forms *il* [il], *lo* [lo] (and *l’* [l]) in the singular and *i* [i] or *gli* [ʎi] (*gl’* [ʎ]) in the plural. The variants *il/i* appear before a single consonant (18a) or a branching onset (18b):

[18]

a.	il monte ‘mountain’	i monti ‘id. pl.’
	il cane ‘dog’	i cani
	il soldato ‘soldier’	i soldati
	il padre ‘father’	i padri
b.	il branco ‘herd’	i branchi
	il plico ‘file’	i plichi
	il granchio ‘crab’	i granchi
	il piato [pja:to] ‘trial’	i piati

It should be noted in particular that a single initial /s/ (*soldato*) selects the same variants as any other initial consonant appearing in the onset.

Before a vowel the definite article is *lo*, which appears in this form only in very artificial styles of speech where every word is pronounced separately; in connected speech the vowel of the article is dropped; in the plural the prevocalic variant is *gli*, occasionally simplified to just *gl’*.

[19]

l’amico ‘friend’	gli amici
l’anno ‘year’	gli anni
l’italiano ‘(an) Italian’	gli italiani - gl’italiani
l’onore ‘honour’	gli onori

We can say that the article appears in the shape *l’gli* when the onset of the noun is empty. Consider now nouns beginning with our sequence s+C.

[20]

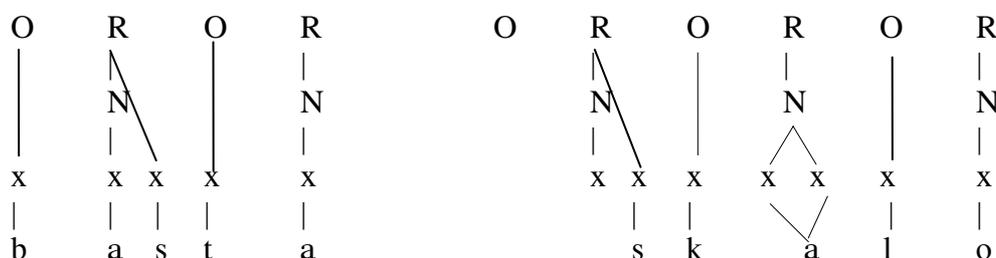
lo scalo ‘port’	gli scali
lo studente ‘student’	gli studenti
lo sfoggio ‘luxury’	gli sfoggi
lo smacco ‘insult’	gli smacchi
lo slancio ‘energy’	gli slanci

The article before the s+C combinations differs minimally from the variant appearing before vowel-initial nouns: as we have seen in [19], the vowel of the singular article is dropped before a vowel in the noun. In the plural the forms of the article before a vowel and before s+C are identical. It is important to stress that before branching onsets and before non-branching onsets containing just /s/, the article has different shapes, as demonstrated in [18]. Since the initial s+C combinations behave differently from initial /s/, we conclude that the /s/ in the two cases occupies a different syllabic position, and specifically that the /s/ beginning the words in [20] cannot be in the onset. The s+C sequences pattern with onsetless nouns. The question then arises as to what exactly the syllabification of such sequences is.

In our discussion of Italian vowel length above we concluded that domain-internally /s/ before a consonant is a coda. The main reason for this was that the vowel preceding the cluster is invariably short exactly as before other coda-onset sequences. As we have just seen, initially /s/ before a consonant is not an onset. If /s/ in the s+C sequences must be analysed as a coda domain-internally, the most natural thing would seem to be to extend this interpretation also to the initial position. Since the nucleus has a coda consonant as its complement, we must assume that this holds for internal and initial position alike; internally there are no problems, since in words like *basta* (see [17b]) a vowel directly precedes the fricative /s/. If the consonant is to be a coda initially, it also must be preceded by a vocalic unit. The only difference is that the initial vowel has no melodic content, i.e. it is an empty nucleus.

We can summarise our discussion so far by plotting representations for the words *basta* and *scalo* which correspond to the classes of words where s+C is and is not preceded by a nucleus containing a melody.

[21]



The two problems in Italian we have discussed above indicate that the fricative /s/ can appear in the onset by itself only, i.e. that it is not part of a branching onset. Both word-initial and word-internal combinations of /s/ and a consonant have to be analysed as heterosyllabic or belonging to separate syllables. In both cases the fricative is a rhymal complement (a coda); the difference between the two positions reduces to whether the preceding nucleus has phonetic content, as is the case word-internally, or whether it is empty, the situation that prevails word-initially. Note also that this interpretation removes a theoretical problem we indicated at the outset, namely that a branching onset seems to comprise a sequence of two obstruents, instead of the expected obstruent-sonorant combination. This is no longer an option, since in every case the spirant forms part of the preceding rhyme, with or without a pronounced vowel. Needless to say, such a spirant does not have to be followed by a non-branching onset, as in the examples in [20], but may equally well be followed by a branching onset, e.g.: *sgraffo* 'scratch', *splendore* 'splendour', *strada* 'road', *sprezzo* 'contempt' etc. What remains stable is the heterosyllabic nature of the initial /s/.

A comment may be in place here about the empty nucleus in the initial position. We assume that it is silent in Italian, this being a specific phonological property of that language. In principle it could just as well be supplied with some melody, in which case there would be no initial s+C sequences but rather every such sequence would be preceded by a vowel. It can hardly be a coincidence that this is exactly what happens in a language closely related to Italian, namely Spanish. Initial s+C sequences do not exist in this language and where we would expect them on other grounds, they are accompanied by initial /e/, e.g.: *España* 'Spain', *esnob* 'snob', *escuéla* 'school', *eslovaco* 'Slovak', *escultor* 'sculptor' etc. (compare the corresponding Italian forms: *Spagna*, *snob*, *scuola*, *slovaco*, *scultore*). It appears that Spanish, in contradistinction to Italian (and other languages, including English), selects the option of filling the initial empty nuclei with a vocalic melody. It thus provides additional evidence for the reality of the initial nucleus, which in Italian can be defended only indirectly through phonological patterning. Crucially, however, the impossibility of branching onsets with /s/ is equally true for Spanish and Italian: the languages merely select different ways of expressing this.

5.5.3 English s+C sequences; the evidence of yod

As we have mentioned above, direct phonological evidence for or against a specific syllabification of linguistic forms is not always easy to come by and sometimes may not be available at all. When no relevant evidence can be used, we need to rely on cases that are well-supported and which invoke principles established independently. At times, such support

may come from a different language, as in the case of the Italian-Spanish ways of handling the initial empty nucleus in the rhyme with the spirant /s/. Similarly, it may be useful to consider dialect variation in trying to decide an issue which cannot be solved on the basis of a single dialect. We will now consider one such case involving the evidence that the English glide /j/ (yod) provides with reference to the syllabification of s+C sequences.

In RP the glide /j/ can appear after most initial consonants in stressed positions. Thus we find numerous examples like those in [22]

pure [pjʊə]	beauty ['bju:ti]	music ['mju:zɪk]
fury ['fjʊəri]	view [vju:]	enthuse [ɪn'θju:z]
neutral ['nju:trəl]	tulip ['tju:lɪp]	dune [dju:n]
suit [sju:t]	zeugma ['zju:gmə]	lucid ['lju:sɪd]
kudos ['lkju:dɒs]	gewgaw ['gju:gɔ:]	humid ['hju:mɪd]

There are some gaps, such as the impossibility of the palatal glide after a palatal consonant (e.g. *[j]), or the striking absence of [rj] initially, hence *rule* is not likely ever to be pronounced *[rju:l]. Such gaps are intriguing and they would have to be taken account of in an exhaustive study of English phonology; here it is enough to note that some varieties of British English admit yod after most single consonants. This is not contradicted by the fact that individual speakers may prefer a variant without yod, such as the frequently encountered *suit* [su:t] or *lucid* [lu:sɪd] - what is significant is that forms with the glide are found, something that could not be said about words like *rule*. Since single consonants are invariably onsets, it is natural to conclude that the glide /j/ appears in branching onsets.

Let us now consider whether the glide can appear after uncontroversial branching onsets, i.e. sequences of an obstruent followed by a sonorant. The class of such onsets which could potentially be followed by /j/ is restricted to those with /l/ as the second member, since as we have already seen, single /r/ cannot be followed by /j/ initially. In such a case one would not expect to find a glide after a branching onset ending in /r/. This is confirmed by the impossibility of initial sequences such as /trj/, e.g. *truce* is never pronounced *[trju:s]. What is more significant is the impossibility of /j/ after an onset ending in /l/, i.e. there are no pronunciations like the following:

plural *['pljʊərəl]	blue *[blju:]
clue *[klju:]	glue *[glju:]

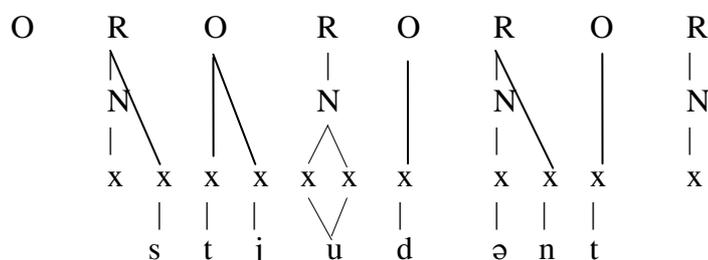
Recall that yod can follow both a single plosive (e.g. *pewter* ['pjʊ:tə]) and a single lateral (e.g. *lure* [ljʊə]) when these appear in the onset; what is impossible is its occurrence when a plosive and a lateral are combined. This prompts the conclusion that the glide cannot follow a branching onset.

Thus we reach our main concern, i.e. the syllabic status of preconsonantal /s/ in words such as *stay* [steɪ]. If /s/ formed a branching onset with the following consonant, the glide should be banned from appearing after such a sequence, since it is banned after other branching onsets. Consider however the data below.

student ['stju:dənt]	stupefy ['stju:pɪfaɪ]	steward ['stju:əd]
spume [spju:m]	spew [spju:]	spurious ['spjʊəriəs]
skew [skju:]	scuba ['skju:bə]	scutum ['skju:təm]
smew [smju:]		

In RP and most British dialects in general the glide is either required or at least possible (e.g. *scuba*). American English requires, or tolerates it after non-coronals. In any event, the glide can appear after a sequence of s+C. This should not be possible if the s+C sequence were an onset, since, as we have just argued on the basis of examples in [23], yod cannot follow a branching onset. Additionally, RP admits the pronunciation with the glide in the words *slew* [slju:] and *sleuth* [slju:θ]. Although the number of such forms is very small, they are of overriding importance since they confirm that /sl/ cannot be syllabified in an onset. Taken together the evidence points to the same conclusion as the Italian data presented earlier, namely that combinations of /s/ with another consonant invariably belong to different syllables, i.e. such sequences are heterosyllabic. On the basis of Italian vowel length and definite article distribution we argued that the spirant /s/ must be properly assigned to a rhyme with no melodic content in its nucleus. It is possible to apply the same analysis to English - we can claim that in words beginning with phonetic s+C, there is an empty nucleus with the spirant as its complement, and the following consonant is the onset of the next syllable. Taking the word *student* as an example, we can offer the following representation of its syllabic and melodic structure:

[25]



As can be seen, our syllabic representation contains a nucleus both at the beginning and at the end of the word; in both cases the nucleus remains silent. Its appearance in the first rhyme is justified by the fact that a rhymal complement, i.e. /s/ in this case, requires a nucleus. The reasons why /s/ cannot be in the onset but must reside in the rhyme have been presented in the second part of this chapter. The final empty nucleus is necessary since the preceding onset must be licensed by it. The reasons why word-final consonants must be regarded as onsets were laid out in the first part of the chapter.

The interpretation of initial s+C sequences along the lines presented above removes a systematic obstacle to a uniform interpretation of branching onsets in English and other European languages. As we have seen, branching onsets consist of an obstruent and a following sonorant, which, foregoing other complications, means that this constituent can dominate two slots only. English, however, admits sequences of three consonants before the first vowel of the word; excluding those cases, discussed above, where the third consonant is /j/, the combinatory possibilities can be seen in the following examples:

[26]

spring [sprɪŋ]	splendour ['splendə]	string [strɪŋ]
sclerosis [sklɜːrəʊsɪs]	scream [skri:m]	square [skweə]

The initial /s/ can be followed by what is independently a branching onset, i.e. an obstruent and a sonorant /pr, pl, tr, kl, kr, kw/. If, following the arguments above, we believe that preconsonantal /s/ must not be syllabified in the onset, then the three-consonant initial sequences in English (and elsewhere) are nothing but a mechanical combination of a rhymal complement and a well-formed two-element branching onset. The evidence of English initial /slj/, corroborated by the facts of Italian, strengthens the conclusion that [s] cannot be the first

member of a branching onset. We have argued that it must be a complement in a rhyme whose nucleus contains no vocalic melody.

5.6 Summary

In the preceding pages we have been concerned with the syllabification of selected word-final and word-initial consonant sequences. We have focused our attention on those consonant combinations that seem to call for a syllabic affiliation that departs from traditional practice, a practice which is guided by assumptions whose validity has seldom been called into question. One such assumption is that a consonantal sequence preceding the first vowel of a word is necessarily tantamount to the syllabic constituent 'onset'. Another is that the consonantal sequence following the last syllable of the word is the same as the syllabic 'coda'. We have tried to show that both these assumptions may be challenged: while the initial consonant sequence may but does not have to coincide with the onset, the word final sequence is never identical to the coda. The way words begin and end in a language may only be suggestive of the possible syllable structures of that language. The syllabic constituents must be investigated through the study of the phonological effects they produce rather than through a mechanical chopping up of words into chunks.

On a more general level, syllabification provides evidence for the phonological regularities of the language; at the same time, syllabification itself can only be approached through such regularities. This formulation comes close to a vicious circle since it says that we study phonological regularities by invoking syllabification which is established by the regularities in question. The proximity to a vicious circle is something that cannot be avoided in linguistic argumentation but we should be aware of its existence and its pitfalls. The linguist has to establish both the structure and its regularities. Obviously the task would be easier if we could start knowing for certain what the structure is, if we could set off in full knowledge of, say, the syllabic organisation of a language and could just concentrate on discovering the regularities conditioned by that organisation. Unfortunately that is not the case: syllable structure is not given in advance. Even worse, what is given in the form of everyday intuitions, school training and the like is frequently superficial and misleading. Part of the phonological voyage of discovery is discarding some or perhaps most of the prejudices initially taken for granted.

In this chapter we have tried to shed a few such notions. Let us conclude by asking the simple question: how many syllables are there in the word *spring* in English? Everyday intuition, informed or perhaps simply formed by a particular type of education, would very likely prompt the answer: one. But this way of asking the question is simply another way of enquiring how many vowels are to be detected in the phonetic string [sprɪŋ]. The answer 'one' is harmless enough. It is probably useless enough just as well because it says very little apart from *I can hear one vowel*. By the same mechanism a speaker of Polish will give the same answer when asked about the number of syllables in the word *wzgląd* [vzglɔnt] 'consideration'. Speakers generally have a limited, if any, direct access to the structure of languages; they can tell us that something is or is not a word of their language, sometimes they will tell us that something is a possible or an impossible word. Most of the opinions that speakers may venture about their languages are either downright simplistic or humorously naive - *In English stress tends to fall where it is easiest to pronounce*, the present writer was once instructed by an informed native speaker of English. Linguists must do their share of the work themselves. Passing the buck to the native speaker is unlikely to produce significant or permanent results.

5.7 Suggested further reading

On word-final consonants as non-codas see Giegerich (1985, Chap. 2), Kaye (1990), Pigott (1991, 1999), Harris (1994, Chap. 2), Harris and Gussmann (1998).

The Irish data are based on Ó Siadhail and Wigger (1975, Chap. 2) and Ó Siadhail (1989, Chap. 4.2).

The special status of s+C has been noted by most researchers, e.g. Selkirk (1984); the discussion of the issue in the present chapter is based on Kaye (1996).

For data on the Italian definite article, see Dressler (1984).