Artur Kijak

Vowel reduction in English

The aim of the paper is to explore two closely related processes of vowel reduction in English, i.e. syllabic consonant formation and syncope. Apart from many similarities between these two processes, there are also quite a few differences and this paper presents them both. More specifically, we discuss the exact context in which they occur, try to find out the constraints governing their distribution and explain the reason for their diverse and varied effects on the preceding and following phonological material. It is pointed out that such differences arise due to two general cross-linguistic constrains operating in English.

1. Introduction

It is common knowledge that in English vowels are reduced in unstressed syllables. In this prosodically weak context vocalic contrasts are reduced to three melodic units ə ɪ ʊ. This already severely curtailed set suffers further reduction, which results in a single melody, i.e. the schwa ə and this is not the end of the road. The following two steps on the simplification scale lead to a total vowel loss. The first one consists in the formation of syllabic consonants, while the result of the last one is a new consonant cluster. The latter phenomenon is known in the phonological literature as compression, sonorant disyllabification or syncope. Now consider the example which best illustrates the whole distance a form may cover on the

reduction path, the adverb *awfully* [ɔ:fʊlɪ] → [ɔ:fəlɪ] → [ɔ:fl̩ɪ] → [ɔ:flɪ].[1] It should be clarified here that in the majority of cases the latter two phenomena depend on the tempo of speech and/or frequency of use. In this paper we look at the last two stages of the vowel reduction phenomenon, i.e. syllabic consonant formation and syncope. As we will see below, these two are closely related. This relationship is confirmed by a simple observation that syncope invariably occurs in the place of the previously syllabic consonant, while the opposite is not always true, i.e. only some syllabic consonants are affected by syncope. Note that syncope occurs only when followed by another unstressed vowel, e.g. *elaborate* adj. [ɪlǽbrət] vs. *elaborate* v. [ɪlǽbərèɪt]. In the latter form syncope is not possible simply because the potential syncope site is followed by the stressed vowel. Syllabic consonants, on the other hand, seem not to be affected by the same ban as they occur freely before both unstressed and stressed vowels, e.g. *family* [fǽml̩ɪ] and *capitalistic* [kæ̀pɪtl̩ístɪk] respectively. Moreover, both phenomena operate on the same site, that is, C_1əC_2, where C_2 is obligatorily a sonorant and C_1 is an obstruent or a sonorant but usually less sonorous than C_2. In this paper, besides the differences mentioned above, we address the following questions: a) what are the exact conditions and constraints imposed on the occurrence of both processes; b) why do the syncope site have to be followed by another (unstressed) vowel but syllabic consonants not necessarily so, e.g. *fiddler* [fĭdlə] and *fiddle* [fĭdl̩] respectively; c) why can syllabic consonants follow certain consonant clusters after which syncope is not allowed, e.g. *patron* [péɪtr̩n] and *patronage* *[péɪtrnɪdʒ] respectively; d) why can syncope precede the syllabic consonant at the right edge of the word, while the reverse order is not possible, e.g. *rational* [ræʃn̩l] and *[ræʃn̩l] respectively. Note that the form with two syllabic consonants is also attested, i.e. [ræʃn̩l̩].

The data for the analysis have been collected mostly from the pronunciation dictionaries: Wells (1990) and Jones (1997), although Hammond (1999) and Szigetvári (2002) have also proved very valuable. Most of the examples cited in the following sections come from the British English, more specifically from the variety spoken in the London area. The analysis is couched in the Government Phonology (GP) model, or actually in its recent development known as the Strict CV approach (Lowenstamm 1996, Scheer 2004, Rowicka 1999, Cyran 2003). For our purposes we have cho-

[1] Note that although the form [ɔ:fʊlɪ] is rare and rather obsolete, it is still possible as reported by Wells (1990).

sen Cyran's version of the model thoroughly expounded in Cyran (2003). Since it is a relatively new approach to phonological analysis, the wisest thing would be to introduce this model. However, the lack of space forces us to mention only the key concepts without unpacking them properly.

The Strict CV model views syllable structure as strictly alternating sequences of non-branching onsets and non-branching nuclei hence, there are no branching constituents, no rhymes and no codas. This, among many other things, means that empty positions must play an indispensable role in this approach. Note that each consonant cluster is separated by the empty nuclear position and word-final consonants are not final at all but followed by the empty nucleus. One of the conditions on the distribution of empty nuclei in phonological representation is that they cannot occur in sequences (*ϕ–ϕ). Moreover, nuclei distribute prosodic licensing within the phonological word. This means that at the constituent level each onset must be licensed by a nucleus.

In the Strict CV model syllabification follows from the asymmetrical relations between two segments. Thus in a sequence of an obstruent (T) and a sonorant (R) both consonants must contract a dependency relation where the more complex segment (the governor) governs a less complex one (the governee).[2] We should bear in mind that the governing relations between consonants are contracted across melodically empty nuclei. Such nuclei, as locked within governing relations, are not visible to phonological processes and do not violate the constraint on sequences of empty nuclei (*ϕ–ϕ). For a meticulous discussion and presentation of the Strict CV model, along with the comparison with other theories (including GP), the reader is referred to Szigetvári (1999), Rowicka (1999), Cyran (2003), Scheer (2004). In the following section we look at the syllabic consonants in English.

2. Syllabic consonant formation

The most evident and at the same time the most general observation concerning the consonantal inventory of English is the fact that some of

[2] Segments are composed of elements and complexity is gauged from the number of elements a given segment contains. For the introduction to Element Theory, see Harris (1994), Harris and Lindsey (1993, 1995), Scheer (1999), Cyran (2003).

the consonants can play a syllabic role. In other words, such consonants take over the syllabic duties. Consonants which are able to function in this way are generally referred to as sonorants. As was mentioned above, syllabic consonants operate on the $C_1əC_2$ site, where the disappearance of the schwa results in the appearance of the syllabic consonant. In the Strict CV terms, it means that the association line between the melody, in our case ə, and the nuclear slot is for one reason or another severed. In this situation the following sonorant spreads to the left and docks on to the position originally occupied by the schwa. This is represented in (1).

(1)

Since in the Strict CV model resyllabification is prohibited for the theory internal reasons, it follows that the optimal representation for syllabic consonants is the one where the sonorant is linked to a consonantal slot, while at the same time it spreads to a neighbouring nuclear position. Interestingly enough, it is not true that all sonorants have an equal opportunity to become syllabic. Thus, in English only nasals, the lateral and the post-alveolar approximant can play the syllabic role (2). Furthermore, the syllabicity of the velar nasal is marginal simply because this nasal never appears after schwa (see Szigetvári 1999, Gussmann 1998). Thus, every occurrence of the syllabic velar nasal is the result of the process of progressive place assimilation, e.g. *chicken* [tʃíkən] → [tʃíkn̩] → [tʃíkŋ̩].[3] Consider now some more examples of syllabic consonants in (2).

(2)

a.		b.		c.	
legend	[lédʒn̩d]	napkin	[nǽpkn̩]	until	[n̩tíl]
arrogant	[ǽrəgn̩t]	bosom	[bú́zm̩]	balloon	[bl̩ú:n]
scenery	[sí:nr̩ɪ]	shrapnel	[ʃrǽpnl̩]	convulsed	[kn̩vʌ́lst]
cabinet	[kǽbn̩ət]	rascal	[rú:skl̩]	confetti	[kn̩fétɪ]/[kŋ̩fétɪ]

[3] Szigetvári (2002) notes that progressive place assimilation is suppressed when followed by a vowel, e.g. *open* [əʊpən] → [əʊpn̩] → [əʊpm̩] but *[əʊpmɪŋ].

d.		e.	
casual	[kǽʒu̩l]	loyal	[lɔ́ɪ̩l]
gradual	[grǽdʒu̩l]	violin	[vàɪ̩lín]
sexual	[sékʃu̩l]	dial	[dáɪ̩l]
usual	[jú:ʒu̩l]	vowel	[váʊ̩l]

A word of clarification concerning the data under (2) is in order here. The forms in (2a) and (2b) are fairly obvious: syllabic consonants arise in the place of the previous schwa after a less sonorous segment (an obstruent or a sonorant). The examples of the word-initial syllabic consonants both in closed and open syllables are given in (2c). Finally, (2d) and (2e) illustrate the situation where a syllabic consonant occurs postvocalically, after unstressed and stressed vowels respectively. Note that the latter two groups, that is (2d) and (2e) are problematic because they do not operate on the $C_1əC_2$ site. However, Szigetvári (2002) observes that in such cases the syllabic consonant actually occurs after the glide w or j, e.g. *sexual* [sékʃu^{w}l̩] and *dial* [dáɪ̯l̩] so the condition on $C_1əC_2$ context is satisfied.

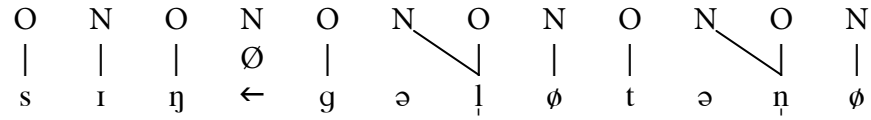
In his analysis of vowel syncope in English Szigetvári (2002) observes that syllabic consonants arise only when preceded by a consonant and hence there are no word-initial syllabic consonants. Szigetvári (2002) argues his point by indicating that in the majority of cases the unstressed word-initial vowel fails to reduce to schwa and hence cannot be replaced by the following sonorant, e.g. *angelic* [ændʒélɪk]. Moreover, in the forms which do contain the word-initial schwa, e.g. *unless* [ənlés], the sonorant never becomes syllabic *[n̩lés]. The same holds true for word-initial open syllables, e.g. *allow* *[l̩áʊ], *annoy* *[n̩ɔ́ɪ]. Finally, Szigetvári (2002) points to the fact that while syllabic consonants can follow unstressed vowels, they do not normally appear after stressed ones, e.g. *casual* [kǽʒuəl] → [kǽʒu̩l], *jewel* [dʒú:əl] → *[dʒú:l̩] respectively. However, the distributional constraints enumerated in Szigetvári (2002) are violated by the examples given in Hammond (1999). Thus, we find a word-initial syllabic consonant in *until* [n̩tíl][4], or a syllabic consonant in the word-initial open syllable, e.g. *balloon* [bl̩ú:n]. Similarly, the ban on syllabic consonants after stressed vowels does not seem to hold in *violin* [vàɪ̩lín], *vowel* [váʊ̩l] or *dial* [dáɪ̩l]. What seems true, however, is Szigetvári's (2002) observation concerning

[4] Note that this is the only example where C_1 is missing, which means that the condition on the operational site $C_1əC_2$ is not met here.

the restricted distribution of the consonants flanking the receding schwa. It was noted above that in the sequence C_1əC_2, C_1 must be less sonorous than C_2. It follows that while the lateral can become syllabic after the bilabial nasal, the reverse order of consonants is not possible, that is, the syllabic bilabial nasal after the lateral, e.g. *camel* [kǽml̩] and *column* *[kɒ́lm̩] respectively. Interestingly enough, the post-alveolar approximant behaves inconsistently with respect to the latter observation. Occurring both in C_1 and C_2, it seems to be either more sonorous than the lateral and nasals (when in C_2), e.g. *celery* [sélr̩ɪ], *camera* [kǽmr̩ə], or less sonorous than the lateral and nasals (when in C_1), e.g. *barrel* [bǽrl̩], *quorum* [kwɔ́ːrm̩]. Moreover, unlike other sonorants, r may occur in C_1 and C_2 simultaneously, e.g. *temporary* [témpr̩r̩ɪ].

Summing up, if the representation of syllabic consonants in (1) is correct, it follows that vocalic positions occupied by the left branch of the following sonorant should function structurally as regular vowels. The latter is confirmed by the observation that such quasi-empty vocalic positions do not violate the ban on the sequence of two empty nuclei *ø–ø. In this situation the general conclusion from the discussion in this section is that the key factor in the distribution of syllabic consonants is the *ø–ø constraint. Note that not a single example in (2) violates this ban. Finally, consider the representation of *singleton* [síŋgl̩tn̩] in (3).

(3)



This form is probably the extreme example of English heavy consonant clusters. What is crucial, however, is that this is the final step the vowel reduction can reach in this form. In other words, syncope is not possible here, otherwise the *ø–ø constraint would be violated. In the following section we look closer at the final stage on the vowel reduction scale, that is, syncope.

3. Syncope

Let us begin this section by enumerating the similarities between syllabic consonants and syncope. The latter process, just like the former one,

affects only the weak vowel, i.e. the schwa, and occurs in a rigidly defined context – C_1əC_2, where C_1 is occupied by a less sonorous segment (an obstruent or a sonorant) and C_2 is a sonorant, e.g. *company* [kʌ́mpnɪ], *chocolate* [tʃɒ́klət], *separate* [séprət], *general* [dʒénrəl], *family* [fǽmlɪ].[5] Although in the vast majority of cases it is an obstruent followed by a sonorant, two sonorants are also possible. In the latter case the first sonorant must be less sonorous, e.g. *finally* [fáɪnlɪ] vs. *colony* *[kɒ́lnɪ]. However, apart from the similarities, there are quite a few differences which separate both phenomena. First, it has been observed (Harris 1994) that if the post-tonic nucleus is followed by a secondary-stressed nucleus occurring in an independent foot, syncope does not take place. It follows that syncope is possible in the adjective [séprət], but it is not allowed in the differently stressed verb [sépərèɪt]. Simply put, syncope is possible only before another unstressed vowel (or a syllabic consonant), e.g. *memory* [mémrɪ] vs. *memorize* [méməràɪz], or *nationalize* [nǽʃnəlàɪz] but *[nǽʃənlàɪz]. Additionally, the situation where the syncope site is followed by an empty nucleus is not attested in the language. Note that in the latter context a syllabic consonant is perfectly possible, e.g. *fiddle* [fĭdl̩]. When the same cluster is followed by the unstressed vowel, the conditions are satisfied and syncope occurs, e.g. *fiddler* [fĭdlə]. Second, unlike in the syllabic consonant formation where r can occur in both C_1 and C_2, in syncope this segment may be supported only by C_2, e.g. *tolerant* [tɒ́lrənt] vs. *perilous* *[pérləs].[6] Finally, while syllabic consonants are insensitive to the preceding consonantal material, syncope occurs only after falling sonority consonant clusters. Consider some examples in (4) which are quoted after Szigetvári (2002: 146).

(4)	a.		b.	
	angle	[ǽŋgl̩]	company	[kʌ́mpnɪ]
	patron	[péɪtrn̩]	patronage	*[péɪtrnɪdʒ]
	sequel	[síːkwl̩]	equally	*[íːkwlɪ]

[5] One may want to include here the forms where the schwa is lost between two obstruents, e.g. *vegetable* [védʒtəbl̩], *comfortable* [kʌ́mftəbl̩], *potato* [ptéɪtəʊ], etc. Since, however, the clusters in question do not contain a sonorant, they cannot be related to syllabic consonants and in consequence the schwa reduction in such forms must be recognised as the instantiation of a different phenomenon, see Abercrombie (1967) and Rodgers (1998).

[6] This situation is explained by the fact that in this paper the data for the analysis come from the non-rhotic variety of English where the preconsonantal r is not realized.

mongrel	[mʌ́ŋgrl̩]	centrally	*[séntrlɪ]
rational	[rǽʃnl̩]	rationally	*[rǽʃnlɪ]

It is clear from the above examples that both processes may occur after falling sonority clusters, e.g. *angle* [ǽŋgl̩] and *company* [kʌ́mpnɪ]. However, syllabic consonants, to the exclusion of syncope, are also found after rising sonority clusters, e.g. *patron* [péɪtrn̩] but *patronage* *[péɪtrnɪdʒ].

Having discussed the major constraints imposed on both processes, question a) in 1 above, we are in a position to address the rest of the questions posed in the introduction. We should bear in mind that although both processes are closely related in that they operate on the same site, their final effects are slightly different. While the syllabic consonants leave the nucleus quasi-empty, syncope ends up in a consonant cluster separated by the empty nucleus. It follows that the explanation of contextual differences of syllabic consonants and syncope lies in the fact that both processes are subject to the same constraint, i.e. the ban on the sequence of two empty nuclei *ϕ–ϕ. This single fact explains why syncope site, to the exclusion of syllabic consonants, must be followed by another vowel (question b). Were it not followed by the vowel, we would end up in a sequence of two empty nuclei, which is prohibited. Thus we have *fiddler* [fĭdlə] and *fiddle* [fĭdl̩] but not *[fĭdl]. The same constraint explains the fact that syncope can precede the syllabic consonant, while the reverse order is not possible (question d). Compare *rational* /ræʃϕnl̩ϕ/ and */ræʃn̩ϕlϕ/, where ϕ denotes the empty nucleus. In the former example the quasi-empty nucleus (occupied by the left branch of the syllabic consonant) functions as a vowel, hence the *ϕ–ϕ constraint is satisfied. In the latter one, however, we have a sequence of two empty nuclei, and this is not allowed. Finally, the answer to the last question (question c) is more complex as it requires some explanation of the licensing abilities of nuclei.[7] It was mentioned above that one of the functions of nuclei is to distribute prosodic licensing within the phonological word. In consequence each onset must be licensed by a nucleus. Licensing abilities of nuclei depend on whether they are occupied by full vowels, reduced or empty ones. Vowel strength may be represented schematically on the following licensing scale v > ə > ϕ. In other words, full vowels 'v' are the strongest licensors, while empty nuclei 'ϕ' are the weakest ones. The schwa and nuclei occupied by the left branch of the syllabic consonant are somewhere in between these

[7] For the cross-linguistic analysis of the licensing abilities of nuclei see Cyran (2003).

two extremes.[8] Due to the lack of space, it is not possible to unpack these notions here. However, it suffices to say that in English empty nuclei cannot sponsor a dependency relation (government) between an obstruent and a sonorant, viz., TøR (traditional branching onsets). This explains the lack of such clusters at the right margin of the word in English. After this short and rather cursory introduction, we are ready to explain the reason for the absence of syncope after rising sonority clusters (see 4b above). It is simply because such consonant clusters cannot be licensed by the empty (syncopated) nucleus, e.g. *patronage* * p é ɪ t → r ø n ɪ dʒ ø.[9] On the other hand, when a syllabic consonant docks on to the preceding nuclear position, the latter is not empty and hence able to legitimize the governing relation between the obstruent and the sonorant, e.g. *patron* p é ɪ t → r n̩ ø. Summing up, the occurrence of both processes is governed by two cross-linguistically observed constraints, i.e. licensing abilities of nuclei and the ban on the sequence of two empty nuclei *ø–ø.

Conclusion

In this paper we have discussed two closely related processes of vowel reduction, syllabic consonant formation and syncope. We have seen that both processes operate on the same site, that is, C_1əC_2, where C_2 is obligatorily a sonorant and C_1 is an obstruent or a sonorant but usually less sonorous than C_2. Moreover, both processes affect the weak vowel, i.e. the schwa. However, the effects of these two processes are slightly different. While the syllabic consonants leave the nucleus quasi-empty, syncope ends up in a consonant cluster separated by the empty nucleus. Since the final effect of both processes vary, no wonder it translates into different behaviour in the wider phonological context. Thus, syncope, unlike syllabic consonant formation, is not allowed before an empty nucleus or after a rising sonority consonant cluster. Different final effects, the similar licensing ability of syllabic consonants and regular vowels, along with two general cross-linguistic constraints, i.e. licensing abilities of nuclei and the ban on

[8] The question whether syllabic consonants are as strong as full vowels or rather medium strong as the schwa is not crucial for the discussion here.

[9] → government, ←—— licensing.

the sequence of two empty nuclei *ϕ–ϕ are responsible for the diversified and varied behaviour of both processes.

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