

Further Evidence on the Underlying Schwa of Syllabic Consonants in Present-Day English: Against the Form without Schwa

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Abstract

This paper argues for the underlying schwa of syllabic consonants in Present-Day English and rejects the form that consists solely of a nonsyllabic consonant. The deletion of schwa in the environment of syllabic consonants appears in both language acquisition and diachronic change and is plausible in view of syllabic consonants occurring as a result of the deletion of vowels with lower sonority. The deletion of schwa is natural when we consider some other sorts of phonological processes in English (e.g. pretonic schwa elision and diphthongal glide), although the epenthesis of schwa has limited condition of occurrences. It might be true that the form without schwa can predict the syllabicity of sonorant consonants with respect to the sonority, but there are exceptions to this explanation. The Obligatory Contour Principle-based merge of two similar sounds and the Underspecification Theoretical comparative unmarkedness also support the underlying schwa.

1. Introduction

Present-Day English (henceforth PDE) has syllabic consonants, many of which are liquids and nasals. Syllabic consonants have a longer duration than their corresponding nonsyllabic counterparts:

- (1) a. fishery b. candle c. middle d. seven e. eaten f. rhythm
 [ˈfɪʃrɪ] [ˈkændl̩] [ˈmɪdl̩] [ˈsevən] [ˈiːtən] [ˈrɪðm̩]

These consonants occupy the nucleus of a syllable. In general, while vowels certainly constitute syllabic nuclei, the majority of consonants are syllable margins. The symbol below each consonant represents its syllabic status. Thus, (1a) is trisyllabic and (1b-f) are disyllabic.

This paper discusses the underlying form of the syllabic consonants in PDE, which has been rather controversial. Underlying form is the abstract and phonological level of certain phonetic forms and presents the basic information of more than one sound. Phonetic forms must be predicted by adding a plausible rule to their underlying form. In order to make a phonological generalization, such an underlying form is indispensable. (See Kenstowicz 1994, Clark and Yallop 1995, Gussenhoven and Jacobs 2005 and Odden 2005 for the explanation.) At this point an example of underlying form is introduced: that of plural suffixes in PDE. Three phonetic forms are possible in the environment:

- (2) a. [s] books, lips, stuffs
 b. [z] boys, girls, pens, clubs
 c. [ɪz] wishes, houses, benches

The pronunciations depend on their preceding segment. The phonetic forms in (2a) occur when preceded by a voiceless obstruent (other than sibilants); those in (2b) when preceded by a voiced sound including vowels, sonorant consonants and voiced obstruents (other than sibilants); the ones in (2c) when preceded by a sibilant. As shown in Gussenhoven and Jacobs (2005) and Odden (2005), the underlying form of these three phonetic forms is /z/. First, for most of the phonetic forms in this environment [z] is pronounced. Thus, the underlying form is most economical (Gussenhoven and Jacobs 2005). Second, if the underlying form is /s/, the phonetic form of a voiced sound plus a voiceless sound must be banned in the case of (2b). However, it happens as in the words *hiss*, *path*, *dance* and *false*. On the other hand, if the underlying form is /ɪz/, the phonetic form of a voiceless obstruent followed by a voiced obstruent must be prohibited. In fact, this phonetic form does not appear in PDE (Odden 2005) and the underlying form /z/ is superior to /s/.

The present paper argues for the underlying schwa of the syllabic consonants in PDE and does not bear out the underlying form without schwa. The shift of the pronunciation of syllabic consonants, the derivation of schwa, and phonological theory correctly predict the underlying schwa, although the explanation of the form excluding schwa is considered to be incorrect.

The current paper is organized in the following way. Section 2 introduces the two ideas regarding the underlying form of the syllabic consonants. The underlying schwa is supported in terms of the shift of syllabic consonants, in

section 3, and the frequent deletion of schwa, in section 4. The form that consists solely of a nonsyllabic consonant is rejected in section 5. Section 6 demonstrates that the underlying schwa also makes sense in view of the Obligatory Contour Principle and the Underspecification Theory. Section 7 presents the claim that stressed syllabic consonants in PDE underlyingly do not subsume the schwa. Section 8 concludes this paper.

2. The underlying form of syllabic consonants

Previous research has presented the two ideas on the underlying form of syllabic consonants in PDE. One of them which is shown in Trubetzkoy (1939), Trager (1942), Gimson (1980) and Wells (1995) is schwa plus a nonsyllabic sonorant consonant, as exemplified below:

- (3) a. middle b. seven
 /ə/ → [ɹ] /ən/ → [ɹ]

Irrespective of theoretical framework the four authors consider that the syllabic consonants include schwa in their abstract level and that they occur with the elision of the schwa and the phonetic lengthening of the sonorant consonants.

The other idea is that the syllabic consonants consist only of a nonsyllabic sonorant consonant in the underlying form, as Jones (1967) and Giegerich (1992) demonstrate:

- (4) a. middle b. seven
 /ɹ/ → [ɹ] /n/ → [ɹ]

In this case the longer phonetic duration of the sonorant consonants is identical, but the abstract level of the syllabic consonants does not entail schwa despite theoretical framework. The analyses in (4a, b) imply that the underlying monosyllables surface as disyllabic.

Comparatively recently, Wells (1995) adduces three pieces of evidence on the underlying schwa. First, as in the above examples, schwa plus a nonsyllabic sonorant consonant is actually pronounced. It is also assumed that from the perspective of the underlying form introduced in section 1, the form including schwa is more economical than the one without schwa. The former needs only one type of derivation, although the latter two. Second, the two phonetic forms (e.g. [ɹ], [əɹ]) are hard to distinguish and perceptually similar to each other. This leads to the explanation that the syllabic consonants are considered to be schwa plus their corresponding nonsyllabic consonant in the mind of English speakers. Phonetic forms and their underlying form are not different in kind. Third, in most cases, syllabic consonants tend to occur in unstressed syllables, not in stressed syllables. Schwa also appears in unstressed syllables, not in stressed syllables. This distributional similarity suggests the underlying schwa of the syllabic consonants. In fact, unstressed and stressed vowels differ from each other. Vowels like /ɪ/ and /ʊ/ are weak and tend to be common in unstressed syllables. By contrast, diphthongs and long vowels are mostly stressed.

In what follows I argue for the underlying schwa (i.e. (3), not (4)) and present some other pieces of evidence in favor of the form.

3. The deletion of schwa in the environment of syllabic consonants

Let us review the actual pronunciations in the environment of syllabic consonants:

- (5) a. middle b. seven
 [ɹ], [əɹ] [ɹ], [ən]

Then, look at the two types of the underlying forms, as demonstrated in (3) and (4). Provided that the underlying form includes schwa, schwa is deleted, not inserted. Contrastively, the underlying form without schwa means the insertion of schwa, not the deletion of schwa. This is clue to the underlying form of the syllabic consonants.

In particular, two types of schwa deletion happen in connection with the syllabic consonants. First, as Wells (1995) states, the pronunciation with schwa is relatively common among children and that with syllabic consonants is comparatively frequent among adults respectively. Broadly speaking, this implies the following difference in pronunciation:

- (6) a. children b. adults
 [əɹ], [ən] [ɹ], [ɹ]

Consider the change in the pronunciations in view of language acquisition. Native speakers of English delete the schwa in the environment. The insertion of schwa does not happen in their language acquisition. Therefore, the underlying form including schwa and the process of schwa deletion are more natural than the one without schwa and the epenthesis of schwa.

Second, the same situation has been observed in historical sound change. Dobson (1957:§319) illustrates that in Early Modern English the following syllabic consonants occur:

- (7) a. hammer b. camel c. riddles d. muttony e. hempen
 [r̥] [l̥] [l̥] [ŋ̥] [ŋ̥]

Those like the above imply that in Early Modern English syllabic consonants occur for the most part in posttonic syllables. In contrast to them, PDE has some occurrences of syllabic consonants which do not exist in Early Modern English. First, there are syllabic consonants as a result of resyllabification from the onset to the preceding rhyme (Wells 1995:408):

- (8) a. intellectual [ˌmɪtr̥ˈlɛktʃuəl] → [ˌmɪtəˈlɛktʃuəl] → [ˌmɪt̥ˈlɛktʃuəl]
 b. cardinality [ˌkɑːdr̥ˈnælɪtɪ] → [ˌkɑːdəˈnælɪtɪ] → [ˌkɑːd̥ˈnælɪtɪ]

Second, according to Dobson, Early Modern English has a fluctuation between schwa plus a nonsyllabic sonorant consonant and a syllabic consonant. In PDE the situation is very similar. Some syllabic consonants are, however, obligatorily articulated in a British accent (Roach 2000:87):

- (9) a. bottle b. muddle c. struggle
 [l̥] [l̥] [l̥]

Third, the following new syllabic consonants occur in Received Pronunciation (Wells 1995:401):

- (10) a. bitterly b. catalogue c. detonate
 [l̥] [l̥] [ŋ̥]

These sound changes mean that the deletion of the schwa in the environment of the syllabic consonants proceeds between Early Modern English and PDE. As has already been shown, the schwa is not inserted, but deleted.

Furthermore, higher and lower sonority vowels make a sharp contrast as to whether or not they are deleted. Recent research (de Lacy 2004, Kenstowicz 2004) has shown five degrees on the sonority of vowels. Each example is illustrated in (12):

- (11) Low Peripheral Vowel > Mid Peripheral Vowel > High Peripheral Vowel > Mid Central Vowel > High Central Vowel
 (12) Low Peripheral Vowel /a/, Mid Peripheral Vowel /e/, /o/, High Peripheral Vowel /i/, /u/
 Mid Central Vowel /ə/, Mid High Vowel /ɪ/

In PDE the lower three vowels in the sonority ranking can be deleted, while the higher two can not. Relevantly to them, Kahn (1980:190) and Wells (2000:866) illustrate some syllabic consonants in PDE. See below:

- (13) a. your c. first
 [r̥] [r̥]

I assume that these kinds of syllabic consonants happen if the deleted vowel is either a high peripheral vowel (13a) or a mid central vowel (13b). Even if stressed vowels can be deleted, their sonority scale is always lower. In the light of the pronunciations of these examples, schwa is considered to be a vowel that is frequently deleted.

4. The deletion of schwa in other environments

While the deletion of schwa tends to occur in relation to the pronunciation of the syllabic consonants, it also does in other environments. The first example is pretonic schwa elision whereby the number of syllables decreases each by one (e.g. Davidson 2006:79):

- (14) a. potato b. demolish
 [pt̥] [dm̥]

Underlyingly (14a, b) are trisyllabic. If the pretonic schwa elision happens, both of them are changed into disyllabic. Examples like the above have a specific relationship with the deleted schwa. The second case is the deletion of schwa as a diphthongal glide in American English:

- (15) a. cure b. fair c. year
 [kj̥r̥] [f̥r̥] [j̥r̥]

The second element of the diphthongs is schwa underlyingly, when we intentionally separate the second element from the first. While the schwa in American English is 'r'-coloured, it can be articulated as [r̥] in the phonetic form (cf. Wells 2000:193, 282, 864). This points to the deletion of the schwa that exists in the underlying form. The last two examples come from Early English. In Middle English the deletion of word-final schwa outnumbers (see Minkova 1991 for discussion):

- (16) a. whanne 'when' b. helpe 'help'
 /ə/ → deleted /ə/ → deleted

Open Syllable Lengthening in Middle English also causes the deletion of schwa. It is by definition simultaneous with the vowel lengthening (Minkova 1982) and the process is known as compensatory lengthening (Hayes 1989):

- (17) a. name 'name' /nɑmə/ → /nɑ:m/
 b. mete 'meat' /metə/ → /mɛ:t/

Thus, the deletion of schwa is very frequent not only in the environment of the syllabic consonants but also in other phonological processes.

5. Against the form without schwa

Some of the previous research regard the underlying form of the syllabic consonants as only a nonsyllabic consonant, as repeated below:

- (18) = (4) a. middle b. seven
 /ɹ/ → [ɹ] /n/ → [ŋ]

The present paper considers that the underlying form might be able to predict the syllabicity of each sonorant consonant since it underlyingly violates the Sonority Sequencing Principle. (See Selkirk (1984), Clements (1990), Rice (1992), Blevins (1995), Zec (1995) and references cited therein for sonority.) The principle specifies the gradual rise in sonority from the onset to the nucleus and the gradual fall in sonority from the nucleus to the coda. The sonority scale of consonants is given as follows:

- (19) Semivowel > Rhotic > Lateral > Nasal > Fricative > Stop

Examining the underlying forms in (18), the /ɹ/ is more sonorous than the /d/ and the /n/ than the /v/. Thus, the violation of the Sonority Sequencing Principle is clear. Since the violation of the Principle in PDE is confined within coronal obstruents as in *spring* and *next* (e.g. Hall 2002), the word-final sonorant consonants in (18) (if the underlying form is correct) become the nucleus of each second syllable. Although the perspective is not extremely impossible, there are some exceptions to it:

- (20) a. jerome b. anaemic
 [dʒɹ'oum] [n'ɪmɪk]

In (20a) the syllabic [ɹ] can be pronounced (Hayes 1995:20) and in (20b) the syllabic [ŋ] (Jensen 2000:197). On the basis of the underlying form without schwa, however, the syllabic consonants in (20a, b) underlyingly do not violate the Sonority Sequencing Principle. This means that the underlying form can not predict the syllabicity of the /t/ and the /n/. Therefore, the underlying schwa makes sense and is superior to the form without schwa.

Furthermore, as argued in section 3, when we consider the syllabic consonants the underlying form without schwa implies the epenthesis of schwa. However, it has limited condition of occurrences: only between coronals:

- (21) athletic
 /θl/ → [θəl]
 (22) a. raises b. watches
 /zz/ → [zəz] /tʃz/ → [tʃəz]

(21) shows that the schwa epenthesis happens between the /θ/ and the /l/ (i.e. intercoronally) (cf. Wells 2000:52). (22a, b) are examples from Singapore English and demonstrate that when plural noun suffixes are attached, schwa is epenthesized between a sibilant and the /z/ (i.e. intercoronally) (Kenstowicz 1994:73, citing Mohanan 1992). (The underlying form of plural suffixes is /z/, as noted in section 1.) The example in (18a) is the one where the schwa epenthesis between the two coronals is possible because both the /d/ and the /l/ are coronals. Of course, there are some other examples like that (e.g. *bottle*, *eaten*, *fishery*). There also exist some that do not consist of two coronals, however:

- (23) a. bottom b. happen c. twinkle d. seven
 [tm̩] [pm̩] [k̩] [vn̩]

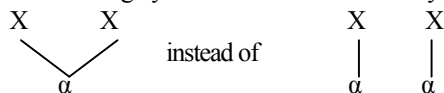
The existence of these examples requires that the underlying form of the syllabic consonants be composed of schwa plus a nonsyllabic consonant and that the form without schwa and the epenthesis of schwa be illegal.

6. Theoretical explanations

The Obligatory Contour Principle (henceforth OCP, cf. McCarthy 1986, Odden 1988, Myers 1997, Côté 2004 and

others) bans the adjacent occurrence of two similar elements. Thus, it is marked that identical or similar sounds occur as a sequence. Relevantly, the OCP also states the preference of the merge of two similar sounds as follows:

(24) Grammars are highly valued to the extent that they use



(McCarthy 1986:255)

Examples in PDE are /tr, dr/. Each of these may seem to be a sequence of two coronal consonants, but it behaves as an affricate (i.e. one consonant). Examining the phonetic characteristics of the syllabic consonants in question, this notion (i.e. the merge of two similar sounds) is applicable to the syllabic consonants. In American English syllabic [r] is frequent and, according to Gick (2002), schwa and /r/ are connected with each other. In addition, as Ladefoged (1996) describes, liquids and nasals are very close to vowels from an acoustic point of view and they very frequently have a syllabic status. While obstruents are rarely syllabic, their characteristic is different from that of vowels. This paper therefore claims that the syllabic consonants in PDE occur as the merge of the two similar sounds.

The Underspecification Theory (cf. Avery and Rice 1989, Paradis and Prunet 1989 and others) requires that unmarked features exist underlyingly and that coronal consonants be unmarked. Avery and Rice (1989) provide the following examples to illustrate the unmarkedness of coronals. (25) exemplifies glottal stops and (26) the derivation of the word *in*.

(25) /t/ → [ʔ] button, football

(26) /n/ → [m], [ŋ], [ɲ], [ɳ], [ɰ]

a. i[m] Brussels b. i[ŋ] France c. i[ɲ] there d. i[n] Toronto e. i[ɳ] Kingston

Coronals are in fact considered to be unmarked in PDE and to exist underlyingly. Since the syllabic consonants in PDE occur in unstressed syllables, let us examine the unmarked status of coronals and schwa in them. While coronals often arise in the environment, labials and velars are also common (The following are from Received Pronunciation):

(27) a. elective b. going c. finger d. parade
[r'lektɪv] [ˈgəʊɪŋ] [ˈfɪŋgə] [pə'reɪd]

This paper therefore claims that coronals are *relatively unmarked* in unstressed syllables in PDE from the perspective of frequency. On the other hand, schwa abounds in unstressed syllables, as shown below:

(28) /ə/ lemon, common, abot, again, consonant, evidence, reason, centimeter

Thus, in my assertion, schwa is *extremely unmarked* in the same environment. Since unmarked features must exist underlyingly, the *extremely unmarked* schwa is necessary in the underlying form of the syllabic consonants. It is unreasonable to assume that such an extremely unmarked segment underlyingly does not exist.

7. Stressed syllabic consonants

Although almost all of the syllabic consonants in PDE are restricted within unstressed syllables, there also exist the following syllabic consonants in stressed syllables:

(29) a. mmm b. hmm
[m] [m]

The current paper asserts that these syllabic consonants underlyingly do not include schwa. The reasons for this are two-fold. First, in the above examples the form with schwa is not pronounced. Second, schwa is the vowel that does not appear in stressed syllables. In English stressed and unstressed syllables have some totally different characteristics (see Yamada 1994 for discussion): the way of pronunciation, the distribution of vowels, the distribution of allophonic consonants and sound change. Because of the difference, underlying forms must be separately analyzed between unstressed and stressed syllables. Thus, the underlying schwa of syllabic consonants in PDE is essential for unstressed ones, but not for the stressed ones.

8. Conclusion

This paper has argued for the underlying schwa of the syllabic consonants in PDE and has not supported the form without schwa, which is correct for the stressed syllabic consonants, though. Examining the factual phenomena, the derivations and the theoretical notions, the underlying schwa does make sense. The form excluding schwa has been shown to be flawed. When we consider the underlying form of the syllabic consonants in PDE, the form with schwa is superior to the other.

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