The interrelationship of epenthesis and syncope
Evidence from Dutch and Irish

Raymond Hickey
University of Bonn

Abstract

Dutch and Irish can be shown to resemble each other in having epenthesis and to differ in that the former does not have syncope. An examination of the triggering conditions for epenthesis shows that it is governed by a sonority scale of consonantal segments and that Dutch has epenthesis and syncope is shown to go hand in hand and the sonority scale which triggers the former is also responsible for the latter which appears on resyllabification of base forms when suffixes are added to them.

A frequent characteristic of languages is that they add or deduct phonetic substance from words under certain conditions. This substance can be either vocalic or consonantal. On a very general level the addition of phonetic substance on the other hand can be the result of a (diachronic) process of deletion whereby the segments in unstressed syllables are partially or entirely lost. It can also however be part of the synchronic system of morphophonemic alterations in a language. This latter type of deduction I term syncope; it can be found in a variety of languages, e.g. In Modern Irish (see examples in (35) below).

The present paper will only be concerned with the deduction type ‘syncope’. Indeed it is the explicit aim of the paper to show that epenthesis and syncope are interrelated as synchronic phonological processes. The common factor between epenthesis and syncope is the set of syllabification principles which hold for a given language or language variety. With both processes phonetic substance is added or deleted in order to arrive at structures which are acceptable in terms of syllable structure.

To begin with epenthesis, one can ascertain that the substance added can be either vocalic or consonantal. An example of the latter is the epenthetic stop which has developed after a final alveolar in the forms in (1).

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Source Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>peasant</td>
<td>&lt; French paysan</td>
</tr>
<tr>
<td>German</td>
<td>Palast</td>
<td>&lt; French palais</td>
</tr>
<tr>
<td>Irish</td>
<td>aris</td>
<td></td>
</tr>
</tbody>
</table>

Stop epenthesis will not be treated here although it bears a relation to vowel epenthesis. It is dictated by the notion of preferred phonological structure for syllable codes. In accordance with the reduction of sonority from the nucleus of a syllable towards the edge a non-sonorous element (in (1a-c) = a (homorganic) stop) is added after the final continuant element before epenthesis (in (1a-c) = /n/ and /s/ respectively).

Vowel epenthesis is more absolute than consonantal epenthesis. While the latter is by no means to be found after all instances of (non-inflectional) final /s/ or final /n/
in the languages quoted in (1a-c), the former type of epenthesis does occur in all clusters which synchronically satisfy its structural description. Thus if a language or language variety shows an epenthetic vowel in a syllable final sequence of two sonorants in a particular lexeme then it will show this vowel in all lexemes. For example if a language has a form such as [sulm] then it cannot have one such as [kalm] as this would be tantamount to random vowel epenthesis which is non-existent.

While synchronically the addition of phonetic substance is always labeled epenthesis, deduction of phonetic substance is not always syncope. Consonantal deletion such as that of the inter consonantal alveolar stop in:

(2a)  windmill  [-nm-]
(2b)  fastner  [-sn-]
(2c)  handcuff  [-ŋk-] (<-nk-)

is not to be regarded as syncope. Vocalic deletion on the contrary is always syncope, or apocope/procope when in final or initial position. Two types of syncope must be recognized in this connection. The first is an allegro phenomenon as in English in:

(3a)  family  [fæmli]
(3b)  holiday  [hɔldei]
(3c)  secretary  [sekrətri]

The second is triggered by word formation as in German in:

(4a)  Regen  /reːɡən/  ‘rain’
(4b)  regnen  /reːɡən/  ‘to rain’
(4c)  basteln  /bastəln/  ‘to make sth. oneself’
(4d)  Bastler  /bastlər/  ‘do-it-yourself worker’

The essential difference between the two is that the former type of syncope disappears in formal registers whereas the forms of (4b) and (4d) can never be ‘desyncopated’: */reːɡən/ and */bastlər/ are not possible phonological forms in German. For the present study only the latter type of syncope is of interest.

Further general statements must be made to begin with when dealing with syncope and epenthesis. Regarding the latter there is an essential distinction between universal and language specific epenthesis.

(5a)  Universal vowel epenthesis: Epenthesis is universal if it is dictated by contingencies of phonetic articulation.
(5b)  Language-specific vowel epenthesis: Epenthesis is language-specific if it is not dictated by articulatory necessity but is conditioned phonotactic factors.

The first type can be easily illustrated from Dutch. Various initial clusters of stop and sonorant are possible in Dutch among these are the following:

(6a)  /kl/  klinker  /klnkər/  ‘vowel’
Although the phonological transcription for the form in (6c) is /kn/ phonetically it is [k’n]. The reason is simply that a simultaneous [k] and [n] is phonetically impossible: The velum cannot be lowered for nasalization and at the same time be raised during the production of the voiceless velar stop. Of necessity the cluster /kn/ involves consecutive formation and release. The same holds in Irish for sequences such as /tn/ in:

(7)  tnúth /tnu:/  [t’nu:]  ‘envy’

as it does for similar sequences (/dn/ in Russian) where in both cases the sounds are produced consecutively, in these cases because they are homorganic. Such instances of vowel epenthesis will not be treated any further here however as they are automatic and purely phonetic.

The second type of epenthesis described in (5b) is by no means ‘purely phonetic’ but is determined by higher level considerations of possible phonological structure of words in a given language. Despite the broadly phonological nature of language-specific epenthesis works on those languages do not usually deal with it as an independent phenomenon. Cohen et al. (1972: 88ff.) for example for Dutch quote some forms with epenthetic vowels but mixed with non-epenthetic vowels as illustrations for the vowel /ɔ/. Hermkens (1969: 26ff.) mentions vowel epenthesis and gives a few forms showing it but adopts a prescriptive stance to it and classifies epenthetic pronunciation as ‘incorrect Nederlands’ (see van den Berg (1972 : 98) for the same view). For Irish the situation is better, there being short sections giving taxonomies of, but not explanations for the occurrence of epenthesis in the studies of the various dialects.1 One reason for the scanty or absent treatment of epenthesis in Dutch2 is the fact that in many of these cases where it occurs there is no orthographic recognition of it as in:

(8a)  elf /elɔf/  ‘eleven’
(8b)  melk /mɛlɔk/  ‘milk’

The obvious epenthetic nature of the second vowel in all the forms in (9a-c) can be confirmed by comparing them with the English words with which they are glossed. As a matter of procedure below I will offer the German cognates of the Dutch forms as (Standard) German does not have epenthesis and so can be used to contrast epenthetic forms in Dutch.

The comparison with other Germanic languages is necessary here to show that Dutch epenthesis is not restricted to clusters whose first element is a non-nasal sonorant. In his treatment of this kind of schwa-insertion in Dutch Booij (1981: 155ff.) specifies that an epenthetic schwa only occurs between a non-nasal sonorant and a non-coronal consonant. This accounts for [hɑ.rəp] for harp ‘harp’; [hɑlɔm] for halm ‘straw; blade (of) grass’, etc. but not for forms such as hennep [henəp] ‘hemp’ with the syllable-final sequence ‘nasal nd non-coronal obstruent’. It could be argued that /np/-clusters do not exist synchronically in Dutch and that the sequence /nəp/ should
be posited underlyingly. But for those speakers with epenthesis in *elf* for example the
schwa is not delectable (cf. affixed forms such as *elftal* [ələftə:l] ‘football team’
where the schwa is still retained) so that if one argues that all segments which do not
disappear somewhere in a set of morphophonemic alternations should be posited
underlyingly then one must assume /eləl/ to be the underlying form of *elf*. In this case
there would be no schwa-insertion rule at all and the generalization concerning the
restriction on clusters in syllable-final position would be lost. The conclusion to be
drawn here is tat if one assumes schwa-insertion to operate in final clusters of
non-nasal sonorant and non-coronal consonant then it must also hold for the more
general cluster type ‘sonorant and sonorant or non-coronal obstruent’.

When dealing with epenthesis in a given language the first generalization to be
made is that it is due to phonotactic restraints on certain clusters. These may
incidentally be initial or final. Spanish is a well-known example of a language with a
phonotactic restriction prohibiting initial clusters of the type /s/ + stop or sonorant.
For this reason epenthetic /e/ occurs here. Again comparison with cognate forms in a
related language without epenthesis (e.g. Italian, copare *scuola* with Spanish *escuela*)
shows clearly the epenthetic nature of this initial vowel.

In both Irish and Dutch vowel epenthesis only exists syllable-finally. For
eexample the final sequence /-rm/ is not allowed in either language. Thus one has:

(10a) Dutch:   *arm* /a.ram/  ‘arm’
(10b) Irish:   *arm* /arəm/  ‘arm’

The instances of epenthesis depend on a variety of factors, three of which are the
nature of the phoneme inventory, the set of possible combinations of segments
(systematic phonotactics) and the set of lexical attestations.

Further generalized statements about epenthesis in Irish and Dutch are possible.
Consider the following:

(11a) Epenthetic vowels are always syllabic.
(11b) Epenthetic vowels are always unstressed.
(11c) The epenthetic vowel in Dutch is always /ə/. 3
(11d) The epenthetic vowel in Irish is always /i/.

The first statement may seem somewhat controversial. After all speakers of language
with epenthesis do not normally regard epenthesis vowels as syllabic. Such a view is
propounded in Kenstowicz and Kisseberth (1979: 263) when quoting Borgstrøm’s
report of a speaker of Scottish Gaelic who maintained that there was no ‘space’
between the consonantal segments of an epenthetic cluster, i.e. that the epenthetic
vowel was not syllabic. But such statements should be viewed with scepticism as they
reflect more the automatic character of epenthetic vowel insertion for the native
speaker (hence the low level of consciousness of it) that its putative non-syllabic
character.

But consider the function of epenthesis for a moment. If in Irish and Dutch the
final sequence [-rm] is impermissible (on the level of phonetic realization) what
possibilities are there for realizing phonological segment sequences such as /-rm/?
The cluster can be broken up by means of a vowel which is inserted between its
elements. The effect of this is to create an extra syllable so that the first element of the
cluster belongs to one syllable (the original one) and the second to the newly created syllable.

(12)  \textit{arm} /\textipa{ar\textbackslash r\textbackslash m}/

Infact a case can be made for the /\textipa{r}/ in (12) being ambisyllabic. Whether this is the case or not is however irrelevant to the matter at hand. What counts is that the /\textipa{r}/ and the /\textipa{m}/ are not phonetically realized as segments of the same syllable coda; this is prevented by schwa-insertion.

Two grades of epenthesis can be recognized here. With the first it suffices for the elements which have an epenthetic vowel when tautosyllabic to become heterosyllabic. Speakers of Dutch with this type of epenthesis have the pronunciation in (12) but no epenthetic vowel in:

(13)  \textit{armee} /\textipa{a.r\textbackslash m\textbackslash e}/  ‘army’

The second grade of epenthesis disallows certain segment sequences irrespective of whether a syllable boundary runs between them or not. This type is found for Dutch as well with those speakers who have pronunciations like (Collins and Mees (1982: 214)):

(14a)  \textit{Hilversum} /\textipa{hil\textbackslash v\textbackslash r\textbackslash m\textbackslash e\textbackslash n\textbackslash m}/
(14b)  \textit{helpen} /\textipa{h\textbackslash l\textbackslash e\textbackslash p\textbackslash e\textbackslash n}/  ‘help’
(14c)  \textit{morgen} /\textipa{m\textbackslash o\textbackslash r\textbackslash e\textbackslash g\textbackslash e\textbackslash n}/  ‘morning’

When remarking on the possible cause for epenthesis Hermkens (1969: 27) mentions that stress always occurs before the epenthetic cluster and implies in the pair of examples which he gives (\textit{balk} /\textipa{b\textbackslash l\textbackslash k}/ ‘beam’ vs. \textit{balkon} /\textipa{b\textbackslash l\textbackslash k\textbackslash o\textbackslash n}/ ‘balcony’) that stress can be sued as a determining factor for the occurrence of epenthesis. Initial stress can be used as a determining factor for the occurrence of epenthesis. It so happens that disyllabic lexical forms with a syllable boundary running through a potentially epenthetic cluster will not have epenthesis. Placing stress on the first syllable of \textit{balkon} will not induce epenthesis.

To remark that the vowel in lexically monosyllabic forms with epenthesis is short and to list exceptions as does Hermkens (ibid.) is again to imply that there is a causal relationship between phonological shortness of the vowels which induces epenthesis but phonetic lengthening due to a sonorant and obstruents cluster following the vowel (see below). In fact in some cases that stressed vowel is phonologically long due to being before /\textipa{t}/ e.g. \textit{hoorn} /\textipa{ho\textbackslash r\textbackslash n}/ but the vowel is still phonetically shorter after epenthesis than it would be without it (again see below). Even less valid are appeals to the orthography. There is no justification for speaking of epenthesis in \textit{doorn} /\textipa{d\textbackslash o\textbackslash r\textbackslash n}/ ‘thorn’ but not in \textit{toren} /\textipa{t\textbackslash o\textbackslash r\textbackslash e\textbackslash n}/ ‘tower’ simply because it is recognized orthographically in the second form (Eijkman (1955: 102)). In Irish these comment have an equal validity. While epenthesis is usual after phonologically short vowels (cf. \textit{bolg} /\textipa{b\textbackslash l\textbackslash o\textbackslash g}/ ‘belly’) it also occurs after phonologically long vowels if the conditions on cluster composition are met (cf. \textit{táirg} /\textipa{t\textbackslash a\textbackslash r\textbackslash i\textbackslash g\textbackslash l}/ ‘manufacture’). Now consider the following condition on epenthesis.
Resyllabification induced by epenthesis involves minimal phonological means.

Looking at the generalizations (11c) and (11d) above one sees that they are determined by the condition in (15). In order to achieve resyllabification of consonants in an impermissible cluster all that is required is to introduce a vowel between them. The simplest vowel for this is /a/ in Dutch and /i/ in Irish. The latter vowel has two chief realizations depending on whether the cluster it is introduced into is palatal or non-palatal as in:

(16a)  
\[
\begin{align*}
\text{ainm} & /\text{an}^1\text{m}/ & \text{‘name’} \\
\text{anam} & /\text{an}^0\text{m}/ & \text{‘soul’}
\end{align*}
\]

The cover vowel /i/ is used for the realizations in (16a, b). The generalization in (11b) follows as a correlate of the stress patterns of Irish and Dutch. With initial stress, epenthetic vowel which occurs in a cluster which is at the end of a syllable is of its nature stressed. Note that /a/ in Dutch and /i/ in Irish are not used for epenthesis because they are unstressed but because of all the segments in the vowel inventory they are phonetically the least prominent.

The above generalizations about epenthesis in Irish and Dutch are seen to be true but by far the most important one, which has significance beyond the two languages being examined here, is:

(17)  
Epenthesis is never used to indicate a morphological category.

If a morphological category is indicated by adding, subtracting or modifying part of the phonological shape of word, such as a vowel, then this presupposes that the rules of phonetic realization allow such alteration. Say now for argument’s sake that a certain morphological category is indicated in a certain language by schwa-insertion and that the absence of this category is shown by schwa-deletion; this schwa cannot then be an epenthetic vowel as epenthesis is introduced in to derivations to guarantee a certain surface form.

It cannot be left unapplied; a morphological process which involves schwa-insertion and deletion cannot be indicated (in its insertion mode) by epenthesis because, for a language variety with epenthesis, deletion of the epenthetic vowel is impermissible. Furthermore the processes which indicate morphological categories (when these are shown by alteration of the phonological shape of word forms) cannot have access to ‘later’ aspects of surface form derivations such as epenthesis. The validity of this claim can be tested and vindicated by looking at a number of forms in Irish. The words:

(18a)  
\[
\text{o}ll\text{amh} /\text{o}l\text{əv}/ \text{‘professor’}
\]

(18b)  
\[
\text{banbh} /\text{ban}\text{əv}/ \text{‘child’}
\]

have a similar final structure: Sonorant plus schwa vowel plus voiced fricative. Leaving the orthography aside the question can be put: Does each of these forms manifest an epenthetic vowel? To answer this, consider the condition on epenthesis in
Irish mentioned above that the consonants of an epenthetic cluster must be either palatal or non-palatal. This they are in (18a, b). Now to form the genitive singular in Irish (i.e. to indicate a certain morphological category) one can with certain words palatalize the final consonant; this applies to those in (18) giving:

(19a) \( \text{ollaimh} /əlɪṽ/ \) \( \) ‘professor-GEN’
(19b) \( \text{bainbh} /baɪṽ/ \) \( \) ‘child-GEN’

The palatalization of the /v/ in (19b) is thus proof of the epenthetic nature of the vowel which follows it.

The establishment of a number of generalizations concerning epenthesis would seem to render possible its prediction for any given cluster. This is both true and not true as one can see from:

(20a) Dutch: \( \text{veld} /vɛld/ \) ‘field’
(20b) Irish: \( \text{bord} /baʊrd/ \) ‘table’
(20c) Dutch: \( \text{melk} /mɛl̃k/ \) ‘milk’
(20d) Irish: \( \text{olc} /əlk/ \) ‘evil’

The non-occurrence of epenthesis in (20a) and (20b) can be explained by the preliminary generalization:

(21) Epenthesis is not found in homorganic consonant clusters.

But what of the third and fourth forms in (20c) and (20d)? In terms of phonetic character and phonological classification the final consonants in both forms are identical. To find a reason for the different behaviour of Irish and Dutch in this respect a final set of postulates must be offered to account for the occurrence or non-occurrence of epenthesis.

It is a commonplace observation that in the phonological shape of words there tends to be a decrease of sonority from a vocalic core of a syllable towards the edge. This is the case in English if one looks at any arbitrary set of forms.

(22a) \( \text{quilt} /kwɪlt/ \)
(22b) \( \text{plant} /plænt/ \)
(22c) \( \text{flask} /flæsk/ \)

Assuming that glides, sonorants, fricatives and stops are arranged in that order in terms of sonority then the forms in (22a-c) conform with that hierarchy. It is to be observed most clearly in monosyllabic forms which do not have a morpheme boundary within them; contrast \( \text{past} /pæst/ \) and \( \text{hats} /heɪts/ \).

In Irish and Dutch similar hierarchical ordering governs the appearance of phonological segments in clusters. Both languages do not utilize equally the possibilities open to them with a given sonority hierarchy. Thus Dutch has /ps/ and /fn/ clusters initially:

(23a) \( \text{psalm} /psalm/ \) ‘psalm’
(23b) finuikend /fnɔykənd/ ‘breaking, fatal’

which Irish does not. It also has sequences of two fricatives which are forbidden by
the phonotactics of Irish.

(24a) schaal /sxa:l/ ‘scarf’
(24b) schur /sxu:r/ ‘barn’

Equally Irish has combinations unknown in Dutch as with initial /mn/, /tn/, etc. But for
epenthesis and the prediction of it the actual attestations in a language are irrelevant. It
acts on a higher level of abstraction where phonological segments are grouped into
natural classes of sounds. For both Irish and Dutch one can say, without considering
epenthetic forms as yet, that epenthesis occurs preferentially in word final clusters of
the following abstract types, whereby (1) represents the most sonorant type and (5) the
least sonorant.

(25) sonorant (1) plus sonorant          (1)
    voiced fricative       (2)
    voiceless fricative   (3)
    voiced stop             (4)
    voiceless stop          (5)

Note that there are in fact two types of ‘cluster’ which are more sonorous: Sonorant
plus bowel and sonorant plus glide. Obviously with the first type to talk of epenthesis
is pointless as there is no process whereby a vowel is introduced before another
vowel and which can be phonologically related to epenthesis. But there are cases in
Irish where it looks as if there are such processes.

(26) tarbh /tarəv/ [ta:ru:] ‘bull’

What has happened with the form in (26) and similar forms is that the non-palatal /v/
which closes the final cluster has very little friction in its phonetic realization and is
now manifested as a glide [w] though phonologically (through morphophonemic
alternation) it is definitely a consonant. This renders the sequence [əw] [əv/], which
has been fully vocalized to [u:] giving the phonetic for in (26).

Using the hierarchy in (25) one can now consider actually attested epenthetic
forms in Irish and Dutch. The former has the following:

(27a) anam /anəm/ ‘soul’ 1 + 1
(27b) leanbh /lənəv/ ‘child’ 1 + 2
(27c) dorcha /dɔrəxa/ ‘dark’ 1 + 3
(27d) borb /bɔrəb/ ‘rude’ 1 + 4
(27e) folc /fəlc/ ‘downpour’ 1 + 5

It would seem from the above forms that Irish has epenthesis between clusters
consisting of a sonorant and any further segment with sonority down to a voiced stop.
Now consider a set of Dutch forms:
The Dutch forms are not as clear cut as the Irish ones as there are a number of additional factors to be considered. Firstly final sequences of two sonorants are always homorganic. But even with such clusters because sonorants are at the top of the sonority scale there is epenthesis overriding the condition in (21), cf. Keulen (German Köln) ‘Cologne’ with /lɔn/ as well as the /rɔn/ in (28a). Secondly final devoicing means that clusters of 1 + 2 never appear phonetically as such, thus /mɛʁx/. For this reason they have been placed in brackets. Clusters of 1 + 4 only exist in Dutch when both are homorganic (e.g. Geld /ˈɣɛld/ ‘money’). What one would need for the position in (28d) is an alveolar sonorant followed by a heterogenic voiced stop. But /r/, /l/ + /g/ do not exist in Dutch as Germanic /g/ is obviously represented by /ɣ/ in Dutch. The sequences /rb/, /lb/ which would be realizations of 1 + 4 do not exist either as Dutch has devoiced and fricativized all cases of inherited /b/ after an alveolar sonorant, e.g. Dutch kalf (German Kalb) ‘calf’ and Dutch korf (German Korb) ‘basket’.

The existence of epenthesis in 1 + 5 clusters would suggest that epenthesis in Dutch has a larger domain than in Irish.

But the existence of forms like ambt /ˈɑmt/ forces one to reconsider the description of epenthesis somewhat. As the pronunciation */ɑmt/ is not possible and as the form is an example if an 1 + 5 cluster it must be seen as an exception. However, such a view is unacceptable as there are no exceptions to epenthesis. The very term exception is unsuitable here as it suggests a form which is lexically stored as not complying to a certain rule in the derivational sense; epenthesis is a automatic scanning of output forms from the phonological component for a acceptability according to surface phonotactics. If it holds for a variety of a language then it applies to all clusters which satisfy its structural description.

The non-occurrence of */ɑmt/ implies that part of the structural description of epenthesis is that the sonorant which is involved in it (or the first if there are two, see (28a) for example) cannot be a labial. As velar sonorants are confined to [ŋ] one can offer the following generalized condition on epenthesis.

(29) The first element of a cluster which contains an epenthetic vowel is always an alveolar sonorant.

To achieve a slightly greater degree of generality it would be appropriate to classify the sonorants mentioned above as coronal. This not only allows for an optional dental realization but also facilitates the specification of the second element of an epenthetic cluster.

From both the Dutch and the Irish forms considered so far it is clear that the element following the coronal sonorant is either (i) a coronal sonorant (cf. Dutch Keulen from German Köln), or (ii) a non-coronal obstruent or sonorant (i.e. labial or
velar cf. Irish borb [bɔɾb] ‘rude’ and Dutch melk [mɛlɔk] ‘milk’. (29) can now be expanded to give (29a).

(29a) In a cluster which contains an epenthetic vowel the first element is always a coronal sonorant and the second a non-coronal obstruent or a sonorant.

The specification of coronality for the first element of an epenthetic cluster was prompted by the consideration of the Dutch from ambt. This form is also illuminating when delimiting epenthesis from other phenomena with which it may be confused. Consider the pronunciation of ambt /ampt/. Here one has a bilabial plosive between the sonorant and the following coronal plosive. It may seem as if one has a case of stop epenthesis which might be linked up with the vowel epenthesis in melk /mɛlɔk/, etc. But this is not the case the /p/ in /ampt/ does not arise from a phonotactic restriction on syllable-final clusters like /mt/ in Dutch but it is a simple coarticulatory phenomenon which arises when the velum is lowered (in anticipation of the following (non-nasal) coronal stop) before the labial release of the /m/.

A corollary of the condition worked out in (29) and (29a), and something noted by Guile (1972: 64) but not explained by him, is that epenthesis never occurs in a cluster which does not contain a sonorant. Within the framework which does not contain a sonorant. Within the framework which is given below the reason for this is obvious: A cluster which consists of obstruents alone fordoes not induce phonetic lengthening of the stressed vowel preceding it and hence does not trigger epenthesis.

Now consider for a moment what has happened to vowels before similar clusters in two languages. In Early Middle English the vowel before clusters of a sonorant and further homorganic stop lengthened (and were later diphthongized) giving present-day pronunciations like those in (30a-c) (see Philips (1980: 341) for a similar explanation of this phenomenon to that offered below).

(30a) binden /i/ → /i:/ → /ai/ ‘bind’
(30b) cild " " " ‘child’
(30c) climban " " " ‘climb’

In the development of Irish, vowels which stood before a cluster of sonorant and homorganic stop lengthened (and were later diphthongized) giving present-day pronunciations like those in (30a-c) (see Philips (1980: 341) for a similar explanation of this phenomenon to that offered below).

(31a) ard /ard/ → /ɑːrd/ ‘high’
(31b) coinne /kniŋlɪə/ → /kiːnŋlɪə/ ‘candle-GENITIVE
(31c) tinn /tʃɪnŋlɪ/ → /tʃiːnŋlɪ/ ‘sick’

(31c) has a former geminate which, before geminates were simplified in Irish, had the same lengthening effects as did clusters of two dissimilar sonorants.

The point being made here is that nasals before clusters of two sonorants or a sonorant and an obstruent became long in both Irish and English although there are no examples of vowel lengthening before obstruents or obstruent clusters in either language. In fact in English at the time of the lengthening shown in (30a-c) a shortening of vowels before double obstruent sequences took place (cf. Old English dūst, Early Middle English dūst, for example).

Bearing these diachronic developments in Irish and English in mind, consider
now the realization of the following words in Irish English, one with one without epenthesis (for a detailed discussion of epenthesis in varieties of Irish English, see the sections 1.2.3.6.; 2.2.3.6.; 3.1.4.2.1. in Hickey (1984) and one with epenthesis:

<table>
<thead>
<tr>
<th>non-epenthetic variety</th>
<th>epenthetic variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>(32a) film</td>
<td>[ˈfɪlm]</td>
</tr>
<tr>
<td></td>
<td>['film]</td>
</tr>
<tr>
<td>(32b) burn</td>
<td>[bɔːn]</td>
</tr>
<tr>
<td></td>
<td>['bɔːran]</td>
</tr>
</tbody>
</table>

In the variety without epenthesis the vowels are phonetically long; where there is epenthesis the first vowel is shorter and the following sonorant as well. In (32b) this is particularly clear because the long rhotacized vowel corresponds to a short stressed central vowel plus short tap. The length of both words in (32a,b) is approximately the same. Epenthesis has the effect of shortening the stressed vowel and the following sonorant while introducing a further vocalic element between the first and the second sonorant.

In order for the stretching of syllable length to be resolve by epenthesis certain phonetic conditions have to be met. The breaking of a monosyllabic form into two syllables by epenthesis implies that the segments which precede the epenthetic vowel can be and have been shortened phonetically.

\[
\begin{array}{c}
\{ – IVVS \} \\
\rightarrow \\
{ – /VSVS \} \\
\end{array}
\]

C

(33) is an attempt to indicate that both the vowel and the sonorant before and epenthetic vowel have been shortened. In both Irish and Dutch there is a distinction in vowel length so that the shortening of the vowel does not present any difficulties. But of course neither of the languages have a phonological distinction in length for consonants. However phonetically it is possible to shorten sonorants. It is clear that the tap [r] is shorter than the alveolar frictionless continuant [ɹ] (see (32b)). The tap is a single ballistic movement which flings the apex of the tongue towards the alveolar ridge whereas [ɹ] involves a controlled articulatory movement in which the apex is raised towards the alveolar ridge by continual muscular contraction. A similar distinction in articulation is possible for [l] and [n]. Both can be articulated very briefly producing something like a lateral and a nasal tap respectively. This type of articulation is used where epenthesis has occurred, it then corresponding phonetically to stressed vowel shortening as indicated in (33).

With this interpretation of epenthesis it is easy to see why there is no epenthesis in a word like ambt. To begin with there is no comparable phonetic lengthening of vowels before clusters of a bilabial nasal and a heterorganic obstruent (although it is attested for English when the obstruent was homorganic, see (30c). Secondly phonetic shortening by tapping which is possible for alveolar sonorants is obviously not so for bilabial nasals.

Consider now the condition in (29a) I the following abstract form:

\[
\begin{array}{c}
S_\alpha O_\beta \\
\rightarrow \\
S_\alpha V O_\beta \\
\end{array}
\]

\[
\begin{array}{c}
S_\alpha S_\alpha_\beta \\
\rightarrow \\
S_\alpha V S_\alpha_\beta \\
\end{array}
\]

Where S = sonorants, O = obstruent, α = coronal, and β = non-coronal
Note that for (34a) the apex of the tongue must be lowered from alveolar contact anyway as the obstruent which follows is heterorganic to it (e.g. /lf/, /rk/, etc.). This phonetically facilitates the rise of an epenthetic vowel. With (34b) when it involves \( S_\alpha S_\beta \) (e.g. /rm/, /lm/) the same is true. But when the sonorant cluster is \( S_\alpha S_\alpha \) (e.g. /rn/, /ln/, /rl/) the apex of the tongue has to be raised, lowered and raised again if vowel epenthesis is to occur in the cluster. This runs counter to the norm of phonetic assimilation. However, a cluster of two alveolar sonorant plus obstruent, this phonetic over length allowing the phonetic unnaturalness of introducing a vowel between two consecutive coronal segments to be overridden.

A corollary of the fact that a cluster of two sonorants induces the greatest degree of length in the preceding vowel is that when the second element of the cluster decreases in sonority (according to the scale in (25)) the phonetic lengthening of the preceding stressed vowel diminishes correspondingly rendering epenthesis less and less likely.

The domain of epenthesis in a language variety rests on to the extent to which the tension between phonetic lengthening and syllable quantity is resolved by disyllabification (epenthesis). The prediction that epenthesis will occur most often where the tension is greatest is borne out by the widespread occurrence of epenthesis in \( S_\alpha S_\beta \) clusters (i.e. clusters of coronal and non-coronal sonorants). For example those varieties of English show epenthesis such as Scottish and Irish English only have an epenthetic vowel in clusters of two sonorants. Epenthesis in clusters of the \( S_\alpha S_\beta \) type (where \( O = \) plosive) are relatively rare and seems to be aerially confined in Europe to the Gaelic-speaking areas in Ireland and Scotland and to Holland and the adjacent German dialect areas (e.g. North Rhenish German which has epenthesis in \( S_\alpha O_\beta \) clusters, cf. German Kalb \([k\underline{a}l\underline{b}]\) ‘calf’).

It will have been noted already that, although Irish and Dutch both have extensive epenthesis, the domain of epenthesis in Irish reaches down the sonority scale to voiceless stops, but does not include them, whereas in Dutch it does.

This fact has a specific consequence which forms a central assumption of this study, namely that when epenthesis exists for the entire sonority scale in a language (Dutch) then there is syncope of post-stress vowels between obstruents and sonorants on suffixation. This syncope (see the remaining lexical samples from here on in the text) is found however when epenthesis is partial (Irish) or non-existent (German).

The consequence of this fact and the assumption of this study is that when epenthesis exists for the entire sonority scale in a language (Dutch) then there is no syncope; where epenthesis is partial (Irish) or non-existent (German) syncope is found.

To substantiate this claim I would like now to look at syncope and attempt to demonstrate the relationship between it and epenthesis. Consider the situation in Irish first. There are a set of verbs which when inflected lose the last vowel of the uninflected form.

\[
\begin{align*}
35a) & \quad \textit{bagair} & /\text{bagr}^1/ & \quad \text{‘threaten!’} \\
35b) & \quad \textit{bagraim} & /\text{bagri:m}/ & \quad \text{‘I threaten’}
\end{align*}
\]

Now one achieves a greater level of phonological generalization if one regards the unsyncopated forms (with verbs the forms of the second person singular imperative)
as cases of vowel insertion which arise because without this phonotactically unacceptable clusters would result, for example:

\[(36) \quad */bagr/\]

The asterisked form above is not accidentally unacceptable but predictably so just as /bart/ which does not exist is an acceptable form from the point of view of Irish phonotactics. To render the conditions on syncope explicit consider first the common factor between it and epenthesis.

\[(37) \quad \text{Epenthesis and syncope are determined by syllable structure conditions.}\]

To this there then belongs the following condition on syllable structure:

\[(38) \quad \text{Syllables in Irish involve a decrease in sonority from nucleus to periphery in accordance with the sonority hierarchy (in (25)).}\]

To deal fully with syncope a slight refinement of the hierarchy in (25) must be given whereby sonorants are divided into two groups:

\[(39) \quad 1 \text{ sonorants} \rightarrow (1a) \text{ liquids} \quad (1b) \text{ nasals}\]

Now if one analyses the phonological segments in /bagr/ in terms of the sonority scale then one arrives at:

\[(40a) \quad /bagr/\]
\[4041\]

From this one can see that sonority does not decrease steadily from the nucleus (the vowel with value 0 on the sonority scale) to the periphery and so the form must have a vowel inserted to break up the sequence 41 yielding an (acceptable) non-syncopated form

\[(40b) \quad /bagr^l/\]
\[4041\]

Syncope occurs when an affix is added. As resyllabification is triggered by affixation one arrives at:

\[(41) \quad bagraim \quad /bag$ri:m^l/\]
\[404§101\]

which is acceptable according to (38) and is the attested form. A random selection of other syncopating verbs shows that resyllabification is the factor which permits syncope and loss of the epenthetic vowel.

\[(42a) \quad ceangail \quad */kaŋl/ \rightarrow /kaŋ§gl^l/ \quad \text{‘tie’}\]
\[501b41a \quad 501b§401a\]
Note that as opposed to epenthetic clusters those of non-syncopated forms do not have to agree with respect to palatality. Because of the condition on all disyllabic verb stems that the final consonant be palatal there is frequently a difference in palatality between the ultimate and penultimate consonants (see (42a, c, and d)).

On syncope the condition on final consonants does not apply (as the consonants are now medial because of the suffix) and there is agreement in the cluster; compare the syncopated forms of (42c) and (42d):

(43a) $\text{iomraím} \quad /\text{imr}:\text{mi}/ \quad \text{‘I row’}$
(43b) $\text{músclaim} \quad /\text{mus:kli:m}/ \quad \text{‘I awake’}$

A further point to note and simultaneously a correspondence with epenthesis is that the vowel which occurs in non-syncopated forms is /i/ which is realized as /i/ however as the final consonant (the one which determines the vowel realization) is always palatal.

Evidence of the fact that syncope is a very general process, which is determined by rules of phonotactics irrespective of what the forms are which manifest it, can be seen from the automatic appearance of syncope across (i) word classes or (ii) among different types of a single word class:

(44a) (i) $\text{focal} \quad /\text{feko:l}/ \quad \text{‘word’}$
       $\text{foclach} \quad /\text{feko:lax}/ \quad \text{‘wordy, verbose’}$
(44b) (ii) $\text{focal} \quad /\text{feko:l}/ \quad \text{‘word’}$
       $\text{foclóir} \quad /\text{feko:lor}/ \quad \text{‘dictionary’}$

Turning now to Dutch and comparing the situation in Irish with it one can see that there is a predictable lack of syncope. Consider the following examples where I have given the German equivalents for the reason, specified at the outset, that Standard German does not have epenthesis and also because predictably it does have syncope:

(45a) $\text{ander} \quad \text{‘other’} \quad \text{cf. German ander(e)(r)}$  
       $\text{anderen} \quad \text{‘others’} \quad \text{‘die anderen}$
(45b) $\text{handelen} \quad \text{‘act’ (v.)} \quad \text{‘handeln}$  
       $\text{handeling} \quad \text{‘act’ (n.)} \quad \text{‘Handlung}$
(45c) $\text{zegen} \quad \text{‘bless’ (n.)} \quad \text{‘Segen}$  
       $\text{zegenen} \quad \text{‘bless’ (v.)} \quad \text{‘seggen}$

Note that the epenthesis in Keulen (German Köln) ‘Cologne’ (see above) between /l/ and /n/ is seen in a host of verbs also if one takes the orthography as one’s guideline as it reflects an older state of the language. Because of the general loss of inflectional /n/ in Dutch the endings of the verbs in (46a-c) is /alə/ in the present-day language.
Lack of syncope in Dutch can be seen in derivational morphology whereas in Irish there is syncope. Consider:

(47a) vrouwelijk /vrauwałık/ ‘womenly’
(47b) belachelijk /bo’laxałık/ ‘laughable’
(47c) tijdelijk /teidélák/ ‘timely’
(47d) verschrikkelijk /vər’sxrikálık/ ‘terrible’

These forms should be treated with some caution however. Although they have an unstressed vowel between an obstruent and a following sonorant this is for word-formational reasons, at least it would appear so when comparing words such as:

(48a) mannelijk ‘manly’
(48b) doenlijk ‘possible’

which have the same cluster structure in the centre of the word but one with, the other without, an unstressed vowel between /n/ and /l/. However this is not in conflict with general expectancy in Dutch. In (47a-d) and (48a) the /ə/ is retained, that is there is no syncope. In (48b) there is no /ə/ before /l/ because the verb from which the adjective is derived has no unstressed vowel after the nasal to begin with. Lack of syncope means the retention of unstressed vowels not the insertion of vowels where these are not present in the base form which functions as the input to a derivation (cf. (48b)).

It can still be seen that the assumptions about syncope in Irish and Dutch made above are valid when one compares the derivation of adjectives from nouns in both languages. In Irish (see (44a, b)) the phonotactics demands syncope. Equally it is absent from Dutch in comparable derivations as the phonotactics prohibits it here:

(49a) adem ‘breath’ cf. German Atem
(49b) langademig ‘long-winded’ " langatmig

In conclusion one can review the differences and similarities in the phonologies of Dutch and Irish which have been examined in the present paper. Both languages show vowel epenthsis which is quite extensive inasmuch as it is not confined to clusters of two sonorants (as in varieties of English with epenthesis, see remarks above). In both languages, and indeed (as a hypothesis of this study) in any language variety, epenthesis is seen to have a distribution which starts at the top of the sonority scale (see (25) above) and extends downwards. The domain of epenthesis on the sonority scale is however different in Irish and Dutch. As Irish does not have epenthesis down the entire sonority scale (see (27) above) one can speak of restricted epenthesis. This fact is of direct consequence for the phenomenon discussed in the latter half of the paper, viz. Syncope. It is shown that restricted epenthesis and lack of epenthesis (cf. Irish and German, respectively) is concomitant with syncope and that, equally, lack of syncope is found when the entire sonority scale forms the domain of epenthesis (cf. Dutch).
Notes

1 The explanation for this is that the dialect studies (such as de Bhaldraithe (1945), Mhac an Fhailigh (1968), Ó Cuív (1944), de Búrca (1958), Breatnach (1947)) were all prepared according to a general scheme which included a brief mention of epenthesis. Furthermore as Irish is not (phonologically) codified as a standard the epenthesis and other features of the dialects (such as metathesis) are recorded in treatments of its phonetics.

2 To forestall criticism from Dutch scholars let me say that I am only concerned in this article with those varieties of Dutch which have epenthesis. Because of the purpose at hand I am not interested in determining what varieties have or have not epenthesis, see van den Berg (1958).

3 This is a phonemic transcription for an unstressed short central vowel. Phonetically it has various relativizations, [ə], [ɪ], etc. The Irish vowel contains two distinctive variants [ə] and [ɪ] which occur before non-palatal (velar) and palatal consonants and which are always predictable from these. The symbol /i/ is intended to cover [ə] and [ɪ].

4 This is basically in agreement with the scale which Zwicky (1972: 277) also offers for English in his treatment of phonetic reduction, or which Hooper (1976: 196, 206) gives wit more general claims.

References

Hickey, R., 1985. Segmental phonology and word formation: Agency and abstraction


