

Stress and Syllabification in English

Issam M. Abu-Salim **

* I would like to thank Thomas Berg and the anonymous reviewer(s) of AJH for their comments on an earlier version of this paper.

** Ph.D. in Linguistics, Univ. of Illinois, U.S.A., 1982.

Associate Prof., Dept. of Foreign Languages, Faculty of Education, Ta'if, Saudi Arabia.

Abstract

This article deals with the role of stress in the syllabification of intervocalic consonant clusters in simple words in English. It shows that stress plays a significant role in the syllabification of such clusters, which explains why stressed syllables attract consonants onto their side in violation of certain basic principles of syllabification. The analysis presented in this article explains, among other things, how ambisyllabic consonants arise in the course of phonological derivations, and how the process of resyllabification that yields such consonants is triggered by stress.

Introduction

Stress, as a suprasegmental property of the utterance, is generally viewed as a relative prominence relation established among the syllables composing any particular utterance. Stressed syllables are therefore defined, in perceptual terms, as being more prominent than unstressed syllables, as they are louder, longer, and higher in pitch than unstressed syllables (Hyman 1975, Ladefoged 1982) ^{1,2}. Each language employs a set of rules to locate the position of stress (in its different degrees: primary, secondary, tertiary, etc.) on the syllables of which the utterance is composed. These rules are for the most part, language-specific, although they share some universal features. In English, for instance, the stress rules refer to various properties of the utterance, some phonological and some grammatical. These include the phonological structure or weight of the syllable, the position of the syllable with reference to word boundaries, the morphological structure of the word (simple, complex, or compound), and the morphological category of the word (noun, verb, adjective, etc.). These pieces of information have to be incorporated in the statement of the word-stress rules of English. (For more information on the stress assignment mechanism in English, see, for instance, Chomsky and Halle 1968, Fudge 1948, and Halle and Vergnaud 1987) ^{3,4,5}.

Syllabification, on the other hand, refers to the process whereby utterances are divided up into syllables according to certain principles, some are universal and some are language-specific. One of the universal principles of syllabification is that every (+ syllabic) segment is placed in the nucleus of a syllable. Consequently, the number of syllables in any particular utterance is equal to the number of (+ syllabic) segments in that utterance (Kahn 1976) ⁶.

Another universal principle is that word-initial and word-final consonants, or consonant clusters, are syllabified, respectively, in the onset and coda of the first and last syllables (Kahn 1976) ⁷.

Languages differ, however, in the syllabification of intervocalic consonants or consonant clusters. The syllabification of such consonants depends on a number of factors including the syllable inventory of the language under consideration and the phonological structure of the syllable in terms of the number and type of consonants that may occupy its onset and coda. In Standard Arabic, for instance, the onset is a basic constituent of the syllable, and is occupied by no more than one consonant (Abu-Salim 1987)⁸. The coda, on the other hand, is

optional. So, in the sequence VCV, the intervocalic consonant is syllabified only in the onset of the following syllable. In English, on the other hand, the sequence VCV is syllabified as either VC.V or V.CV since the syllable inventory of English includes V-initial syllables. The V.CV method of syllabification is, however, much more common than the CV.V method (Sommerstien 1977, Kenstowicz 1994) ¹⁰.

The syllabification of intervocalic consonant clusters may be independent of or sensitive to the application of some phonological rules. Stress, as is now known, plays a significant role in determining how intervocalic consonants and consonant clusters are phonetically syllabified in English (see, for example, Hoard 1971, Selkirk 1982, and Fudge 1984) ^{11, 12, 13}.

One important principle of syllabification in English, which will be referred to frequently in the following sections, is that syllable-initial consonant clusters are of maximal length (Kahn 1976) ¹⁴. This means that intervocalic consonant clusters are syllabified in such a way so that the maximum number of consonants possible in the onset of the English syllable are syllabified in the onset.

Consequently, words like *pony*, *Jacob*, *actress*, and *Boston* are syllabified as pony, not pon.y; Ja. cob, not Jac. ob; ac. tress, not act.ress; and Bo. ston, not Bos. ton nor Bost. on (Kahn 1976) ¹⁵.

Another important principle of syllabification in English is that of making intervocalic consonants ambisyllabic, i.e., belonging to two adjacent syllables. In *pony*, for example, the intervocalic /n/ is simultaneously syllabified in the onset of the ultimate syllable and in the coda of the penultimate syllable (Kahn 1976) ¹⁶. In the following sections, we will see that this principle of syllabification is better expressed when reference is made to stress.

In the remainder of this paper, the principles governing the syllabification of intervocalic single, two, three, and consonant clusters comprising more than three consonants, with stress taken into consideration, are discussed in some detail, and the final section presents some of the theoretical consequences of the relationship between stress and syllabification.

The data used in this paper comes primarily from *The American Heritage Dictionary of the English Language (AHD)*. *Webster's Seventh New Collegiate Dictionary* was consulted for alternate pronunciations of various items. However, the transcription of sounds, basically vowels, has been slightly modified for typographical purposes. ¹⁷ Moreover, the dot (.) is used for the syllable boundary,

the acute sign (+) for primary stress, and the grave sign (˘) for secondary stress.

Finally, emphasis in this paper has been placed on simple words, although complex words have not been totally avoided, especially when their syllabification pattern follows that of the simple words. This has been done for practical reasons only due to space limitations.

Syllabification of intervocalic single consonants.

Given the Maximal Syllable Onset Principle (MSOP) whereby syllable onsets in English are expected to be of maximal length (Selkirk 1982)¹⁸, intervocalic single consonants are consequently syllabified in the onset of the following syllable, rather than in the coda of the preceding one, except when there are constraints on the distribution of such consonants in the onset, as in the case of the velar nasal /ŋ/ which does not occur in syllable-initial position in English. This is in line with the naturalness criteria established for distinguishing between natural or unmarked and less natural or marked syllables in language. Since syllables beginning with a consonant in the onset are considered more natural than syllables beginning with a vowel (Sloat et al. 1978)¹⁹, the aforesaid principle may be restated in such a way as to allow for the derivation of more natural syllable types and, whenever possible, to suppress the derivation of less natural syllable types.

This tendency is not always observed, however. As we will see below, stress plays a significant role in determining the syllable affiliation of intervocalic single consonants and consonant clusters. Stressed syllables will be shown to attract consonants onto their side, without, of course, violating the general principles of syllabification in the language. In other words, there is a tendency for stressed syllables to be heavy, attracting the maximum number of consonants onto their peripheral subconstituents, i. e., the onset and coda (Hoard 1971, Fudge 1984, among others)^{20, 21}.

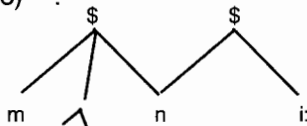
The data collected for this study show that intervocalic single consonants are syllabified according to the following principles, with stress taken into consideration:

- (1) Intervocalic single consonants are syllabified in the coda of the preceding syllable if that syllable is stressed and contains a lax vowel.

gallant /gál. ənt /

money	/mʌn.i:/
lizard	/lɪz. ə rd /
Paris	/pár. is / 22
essence	/és. ə ns /

Apparently, this method of syllabification violates the MSOP. This is caused by the aforesaid tendency for stressed syllables to attract consonants onto their peripheral subconstituents. What happens here is that the MSOP requires the intervocalic consonant to be syllabified in the onset of the following syllable, whereas the tendency in (1) requires the stressed syllable to attract the following intervocalic consonant onto its coda. This conflict is then resolved by syllabifying the intervocalic consonant simultaneously in the onset of the following unstressed syllable and in the coda of the preceding stressed syllable, thus making that intervocalic consonant ambisyllabic (Kahn 1976)^{25, 26, 27}. A better representation of ambisyllabic consonants is provided by the autosegmental analysis of phonological units. A word like *money* is accordingly represented as follows, where the intervocalic /n/ is simultaneously associated with the preceding and following syllables (Kahn 1976)²⁸.



An alternative analysis of how ambisyllabic consonants arise may be presented by making reference to the affinity between stress and heavy syllables. Syllables are considered heavy either by composition or by position. A syllable is heavy by composition if it contains either a lax vowel followed by a consonant or more in its coda or a tense vowel (Hayes 1981, Hyman 1985)^{29, 30}, as in the second syllable in *pervent* or *believe*. A syllable is heavy by position, on the other hand, if it is, generally speaking, followed by a C-initial syllable, as in the first syllable in *picnic*. Although the two syllables in this example are of the CVC type, the first is considered heavier or stronger since the onset of the following syllable adds more weight to it, so that it is now viewed as if it were of the CVCC type. If a light CV syllable is assigned stress due to its being heavy by position, this affinity between stress and heavy syllables becomes opaque. To avoid this situation, the stressed CV syllable is made heavy by resyllabifying the onset of the following syllable in its coda, thus making that consonant ambisyllabic.³¹ The correlation between stress and heavy syllables in polysyllabic words is thus maintained

(Hayes 1982, Durand 1990) ^{32, 33}.

- (2) If the preceding stressed syllable contains a tense vowel, the intervocalic consonant is syllabified in the onset of the following syllable.

gable	/géi. b ə 1 /
focus	/fów. k ə s /
slaughter	/sló:. t ə r /
fighter	/fái. t ə r /
evil	/i: v ə l /

The tendency for stressed syllables to attract consonants onto their codas observed in (1) above has now been violated in (2). This violation may be explained by referring to a universal tendency for associating stress with heavy syllables as they are defined in individual languages (Hyman 1985)³⁴. In English, for instance, a syllable of the type (C) V, where the rhyme is occupied by a lax vowel, is considered light, whereas a syllable of the type (C) VC 1 or (C) VV, where the rhyme is occupied by a lax vowel followed by a consonant or more or by a tense vowel, is considered heavy. Thus, the intervocalic consonant in (1) is resyllabified in the coda of the stressed syllable in order to make that syllable heavy and, consequently, enforce the tendency for associating stress with heavy syllables. In (2), on the other hand, the stressed syllable is heavy by composition due to the presence of the tense vowel in its nucleus and, therefore, the need to make that syllable heavy, or simply heavier, does not arise since the stress - heavy syllable correlation is already observed. The MSOP is thus maintained in (2).

The principles of syllabification in (1) and (2) are supported by the presence of words with alternate pronunciations, one with a lax vowel in the stressed syllable, and another with a tense vowel in the same syllable. As predicted by the two principles above, the alternate forms show different syllabification patterns:

finis	/fín. is/ or /fái. nis/
debacle	/di. bák. ə l/ or /di. bá: . k ə l/
status	/stát. ə s/ or /stéi. t ə s/
dogged	/dóg. id/ or /dó: . gid/

- (3) Intervocalic single consonants are syllabified in the onset of the following stressed syllable regardless of the tenseness/ laxness property of the vowel in its nucleus.

aback	/ə. bák /
abase	/ə. béis /
delete	/di. lí:t /
define	/di. fáin /
evince	/i. víns /

In this case, the tenseness. laxness property of the vowel in the nucleus of the stressed syllable is not crucial in determining the syllable affiliation of the intervocalic consonant. Firstly, the onset does not add to the weight of the syllable; it is only the rhyme that matters (Halle and Vergnaud 1980, Hayes 1981) ^{35, 36}. So, the intervocalic consonant is syllabified in the onset of the stressed syllable, not to add more weight to it, but to maintain the MSOP. Secondly, the intervocalic consonant is syllabified in the onset of the stressed syllable since it would otherwise make the preceding unstressed syllable heavy. If this is the case, the placement of stress on the following syllable, especially when that syllable contains a lax vowel, is rendered difficult to explain. It is therefore the presence of stress on the following syllable that draws the intervocalic consonant onto its onset, thus maintaining the MSOP.

The following examples with alternate syllabification methods resulting from their alternate stress patterns provide further evidence for the principles above:

essay	/és. ei/ or /e.séi/
savant	/sáv. ənt/ or /sə.vá: nt/
paresis	/pár. ə. sis/ or /p ə. rí: . sis/
amino	/ám. ə. now/ or /ə. mí:. now/
present (n.)	/préz. ənt./
present (v.)	/pri. zént/

The principles in (1-3) above predict that a medial stressed syllable with a lax vowel in its nucleus will attract both preceding and following intervocalic

consonants onto its onset and coda, respectively. This can be illustrated by the following examples:

commodity	/k ə. mó.d. ə. ti:/
commission	/k ə. mi š. ə n.
original	/ə. ríj. a ə n. ə/
abolition	/áb. a ə. líš. a n/
eleven	/i. lév. ə n/

If, on the other hand, the stressed syllable contains a tense vowel, only the preceding intervocalic consonant is syllabified in its onset.

amino	/ə. mí: . now/
deletion	/di. lí: . š ə n/
erosion	/i. rów. ž a n/
bikini	/bi. kí: . ni:/
aroma	/ə. rów. m ə/

When neighboring syllables are both unstressed, the intervocalic consonant is syllabified in the onset of the following syllable in conformity with the MSOP, as in the following examples, where the consonant under consideration is in boldface:

Lucifer	/lú: .s ə. f ə r/
nebulous	/néb. y ə. l ə s/
ultimate	/Al. t ə. mít /
negligent	/nég. li. j ə n t/
livery	/lív. ə. ri:/

Finally in this section, a note about rhotacized or r-coloured vowels, as they are called in Ladefoged (1982) ³⁷, is in order. *AHD* includes four such vowels: /âr/, /îr/ ôr/ and /ûr/ which occur in words like *care*, *pier*, *for*, and *fur*, respectively. The /r/ part of these vowels is always syllabified in the same syllable that contains the vowel when that syllable is stressed, as in the following example:

curry	/kúr. i:/
euphoria	/yu: fór, i: . ə/
Gary	/gár. i:/
hero	/hír. ow/

The /r/ in these examples and similar ones is generally considered a syllabic vocoid rather than a liquid (Kenstowicz 1994) ³⁸, and therefore it is syllabified along with the vowel in the nucleus of the stressed syllable.

But when the syllable containing the rhotacized vowel is unstressed, the /r/ part of the vowel is syllabified in the onset of the following syllable, as in the following examples:

horrendous	/hò. rén. d ə s/
Auriga	/ . ô rái. g ə/
aurora	/ . ô rô´r. ə/

In this case, the /r/ functions as a liquid rather than a syllabic vocoid. Consequently, it is placed in the onset of the following syllable.

So, we see that stress is significant in explaining how rhotacized vowels are syllabified in English.

Syllabification of intervocalic two-consonant clusters

Intervocalic two-consonant clusters may be subdivided into four major categories with respect to syllabification: obstruent-obstruent, sonorant-sonorant, obstruent-sonorant, and Sonorant-Obstruent clusters. Due to the sonority constraints on the distribution of consonants in the peripheral parts of the syllable, the Sonorant-obstruent cluster does not occur in the onset, and the Obstruent-Sonorant cluster does not occur in the coda of the English syllable. The remaining clusters are distributed in the two peripheral parts of the syllable as follows: in the onset we find the Obstruent-Obstruent, Obstruent-Sonorant, and Sonorant-obstruent clusters, and in the coda we find the Obstruent-Obstruent, Sonorant-Obstruent, and Sonorant-Sonorant clusters. Of course, not all combinations of these consonant types occur in the onset and coda. (For more details on the sonority hierarchy and the distribution of consonants in the English syllable, see, for instance, Gimson 1980, Selkirk 1982, 1984) ^{39, 40, 41}. However, when the intervocalic cluster is neither possible in the onset nor in the coda, it

is split up into two parts, the first placed in the coda of the preceding syllable, and the second in the onset of the following syllable.

We have seen that the presence of a consonant in the coda of a syllable having a lax vowel in its nucleus makes that syllable heavy, and that when a syllable contains a tense vowel, no intervocalic consonant is placed in its coda even when that syllable is stressed. A possible explanation for this method of syllabification may be related to the definition of heavy syllables in English. A heavy syllable is one that contains in its rhyme either a lax vowel followed by a consonant or a tense vowel (Hyman 1985) ⁴². Therefore, there is no need to have another consonant in the coda for the syllable to be heavy. This leads to the conclusion that, in the case of intervocalic two-consonant clusters, both consonants may not be syllabified in the coda of the preceding syllable since only one consonant is needed to make that syllable heavy when it has a lax vowel. I will, therefore, concentrate on the situation where both intervocalic consonants are syllabified in the onset of the following syllable, or when the cluster is split up between the coda of the preceding syllable and the onset of the following syllable. The decision as to whether the first method of syllabification or the second is to be adopted is taken in view of the following principles:

- (4) Both consonants are syllabified in the onset of the following syllable if it is stressed, thereby maintaining the MSOP.

supply	/s ə. plái/
betray	/bi. tréi/
deduce	/di. dyú: s/
reflect	/ri. flékt/
mistake	/mi. stékt/
amuse	/ ə. myú: z/

- (5) If the preceding syllable is stressed, and if its nucleus is occupied by a lax vowel, the first intervocalic consonant is syllabified in the coda of the preceding stressed syllable, and the second in the onset of the following syllable.

deputy	/dép. y ə. ti:/
ablative	/áb. l ə. tiv/

negligence	/nég. li. j ə n s/
africa	/áf. ri. kə/
tremulous	/trém. y ə. l ə s/
million	/míl. y ə n/

(6) If the preceding stressed syllable contains a tense vowel, both consonants are syllabified in the onset of the following unstressed or secondarily stressed syllable.

patronize	/péi. tr ə. náiz/ (Cf. /pát. r ə. náiz/)
aqua	/á: . kwə/ (Cf. /ák. w ə/)
scabrous	/skéi. br ə s/ (Cf. /skáb. r ə s/)
produce	(n.) /prów. dyu: s/ (Cf. /pród. yu: s/)
allegro	/ə. léi. grow/ (Cf. /ə. lég. row/)
reflex	(n.) /rí: . fléks/

There seem to be some systematic exceptions pertaining to the cluster /ny/. Although this cluster is possible word-initially in examples such as news/ n (y) u: z/, it rarely occurs in the syllable onset word-medially, as attested by the following examples, where /n/ is syllabified in the coda of the preceding stressed syllable that contains a tense vowel, contrary to the principle in (6) above:

Kenya	/kí: n. y ə/
senior	/sí: n y ə t/
ammonia	/ə. mówn. y ə/
convenient	/k ə n. ví: n. y ə nt/
lasagna	/l ə. z á: n. y ə/

Moreover, /n/ is syllabified in the coda of the preceding unstressed syllable, even when that syllable contains a tense vowel, as in seniority /si: n. y ó: r. ə. t i: /.

The cluster /ly/ behaves in a similar fashion. This cluster is possible word-initially in British English in words like *lewd* (Gimson 1980, Roach 1983) ^{43, 44}, although it is far less frequent than /ny/. In American English, this cluster does not occur in the syllable onset, even when the preceding

syllable contains a tense vowel, as in the following examples:

seraglio	/si. rá: l. yow/
alien	/éil. y ə n/
ameliorate	/ə. mí: l. y. ə. rèit/
Australia	/o: . stréil. y ə/
carnelian	/ka: r. ní: l. y ə n/

- (7) When both preceding and following syllables are unstressed, the MSOP is enforced, i. e. , both intervocalic consonants are syllabified in the onset of the following syllable.

discipline	/dís. ə. plin/
eloquent	/él. ə. kw ənt/
cerebral	/sér. ə. br əl/
immigrant	/ím. i. grənt/
quadruplet	/kwód. r ə. plit/

Intervocalic two-consonant clusters beginning with /s/ seem to be irregular in their manner of syllabification. In many such clusters, /s/ is syllabified in the coda regardless of the tenseness/ laxness property of the preceding vowel or the stress pattern of the neighboring syllables, as the following examples show:

rooster	/rú: s. t ə r/
festivity	/fes. tív. ə. ti:/
plaster	/plá: s. tər/ (Cf./ plás. tər/)
testator	/tes. téi. tər/
escort (v.)	/es. kó: rt/

However, when the vowel immediately preceding the cluster is /ə/, regular patterns of syllabification are adopted. In other words, the MSOP is observed.

asparagus	/ə. spár. ə. g ə s/
astound	/ə. stóund/

Augustine	/o: . g ə. stí: n/ (Cf. /o: .g ʌ s. tin/)
nasturtium	/n ə. stûr. s ə m/
peristalsis	/per. ə. stó: l. sis/

A possible way of explaining this pattern of phonetic syllabification is to say that since /ə/ is a weak or reduced vowel, a syllable having it in its nucleus should also be weak. To ensure this, such syllables are made open in non-final positions by not syllabifying the following consonant (s) in their codas. In final position, the final consonant cluster is syllabified, as mentioned in the preceding section, in the coda of the last syllable regardless of the preceding vowel, simply because there is no other choice.

syllabification of intervocalic three-consonant clusters.

The intervocalic three-consonant clusters may be divided into two types with respect to syllabification: those which are possible in the syllable onset, and those which are not. In the latter case, the cluster has to be divided up into two parts permissible in the coda and onset of the preceding and following syllables, respectively. Stress is not, therefore, a significant factor in determining the syllable affiliation of the members of the cluster.

The three-consonant cluster is split up in two ways, CCC or CC-C, with the first part placed in the coda of the preceding syllable and the second in the onset of the following syllable. The choice is primarily determined by whether or not the second part of the cluster is possible in the onset. If the last two consonants of the cluster are possible in the onset, they are syllabified there:

distinguish	/dis. tíg. gwiʃ/
membrane	/mem. brein/
expose	/ek. spówz/

It, on the other hand, the last two consonants of the cluster are not possible in the onset, only the last consonant is syllabified there, and the first two consonants are placed in the coda of the preceding syllable.

sphincter	/sp ^h k. t d r/
distinctive	/dis. t ^h k. tiv/
consumption	/k ə n. sʌ/ mp. ʃ ə n/

Thus, the MSOP is observed whenever possible.

When the three-consonant cluster is possible in the onset, some principles, similar to those established in the preceding sections, seem to play a significant role in their syllabification. The three-consonant clusters permissible in the syllable onset all begin with /s/, followed by a voiceless stop, which in turn is followed by a liquid or glide. However, not all combinations of these three groups of sounds occur in the onset. There are some accidental gaps such as /spw/, /stl/, and /stw/, and some of the occurring clusters are not frequent.

The syllabification of three-consonant clusters is mostly predictable, and it follows the following principles:

- (8) If the preceding syllable is stressed, only /s/ is syllabified in its coda, and the remaining two consonants are syllabified in the onset of the following syllable:

gastric	/gás. trik/
escrow	/és. krow/
esplanade	/és. pl ə. néid/
costume	/kós. tyu:m/

The initial stressed syllable in all these examples contains a lax vowel. When that syllable contains a tense vowel, the whole cluster is syllabified in the onset of the following unstressed syllable, as in *bistro* /bí: . strow/ (cf/bís. trow/). But, as in other cases, there are exceptions to this generalization, as in *Austria* /ó: s. tri: . ə/ and *pastry* /péis. tri:/.

- (9) When, on the other hand, stress falls on the following syllable, the three consonants are syllabified in the stressed syllable:

restrict	/ri. stríkt/
describe	/di. skráib/
resplendent	/ri. splén. d ə n t/
esprit	/e. sprí:/
askew	/ə. skyú:/

Again, some exceptions are found, as in *dysprosium* /dis. prów. zi: . ə m/, *Rasputin* /ras. pyú: . tɪn/, and *estrane* /es. tréinj/

- (10) When neighboring syllables are both unstressed, the MSOP is generally observed:

ministry /mín. i. stri:/

orchestra /ó: r. ki. strə/

(Cf. /ó: r. kès. trə/)

Exception: Chemistry /kém. is. tri:/

Syllabification of longer clusters

The syllabification of intervocalic four or more consonant clusters is now predictable. Such clusters must be divided into two parts, one to be syllabified in the coda of the preceding syllable and the other in the onset of the following syllable. As in the previous cases, the MSOP is taken into consideration. Thus, if the last three consonants in the cluster are possible in the onset of the following syllable, they are syllabified there, leaving only one consonant to be syllabified in the coda of the preceding syllable, as in the following examples:

excuse /ek. skyú: z/

excrete /ek. skrí: t/

excrement /ék. skr ə. m ə n t/

explain /ek. spléin/

extra /ék. str ə/

In these examples, stress does not seem to have a significant role in determining the syllable affiliation of the intervocalic cluster. In *excuse*, *excrete*, and *explain*, where the first syllable is unstressed, only /k/ is syllabified in the coda of the first syllable, simply because it cannot be syllabified in the onset of the following syllable. The same pattern is observed in *excrement* and *extra* where the first syllable is stressed. Only one consonant is syllabified in the coda of the stressed syllable in compliance with the generalization mentioned earlier concerning the relationship between stress and syllable weight. Consequently, when the stressed syllable has a lax vowel in its nucleus, all that is needed to make that syllable heavy by composition is only one consonant in its coda.

There are cases, however, where stress seems to be relevant in the

syllabification of such clusters. Consider the following examples:

expletive	/éks. pl̩ ð. tiv/
explicate	/éks. pli. kèit/
exploit (n.)	/éks. ploit/
exploit (v.)	/ek. splóit/

In the first three examples, we notice that the first two consonants of the intervocalic four-consonant cluster are syllabified in the coda of the preceding stressed syllable. This goes contrary to the generalization mentioned above concerning the minimal weight requirement of stressed syllables when they have lax vowels in their nuclei, i. e., having only one consonant in their codas. In the last example, where the second syllable is stressed, only the first consonant of the cluster is syllabified in the coda of the first unstressed syllable.

However, when we consider other examples such as *exclaim* /eks. kléim/ and *exclude* /eks. klú: d/, we notice that the first two consonants of the intervocalic cluster are syllabified in the coda of the first syllable although it is unstressed. This, of course, contradicts the MSOP which requires the last three consonants of the cluster to be in the onset of the following syllable. This contradiction can be explained by referring to the morphological structure of such complex words, which may suggest that the syllabification of intervocalic consonant clusters in complex words is different and more complex than the syllabification of such clusters in simple words. It is beyond the scope of this paper, however, to deal with syllabification in complex words, as mentioned in the introduction.

Conclusion

We have seen that stress plays a significant role in the syllabification of intervocalic consonant clusters in simple words in English. Since stress and other phonological rules will not have a chance to apply until the phonemic representation of the word is properly syllabified by the basic syllable structure rules (Kahn 1976) ⁴⁵, it is logical to order the stress assignment rule (s) after the basic or initial syllabification rules. This means that the latter rules are not sensitive to stress assignment. Their application, however, creates the proper environment for stress to apply, since, as is now known, stress is a property of the syllable rather than of single sounds. The ordering relationship that exists between the two rules is, therefore, of the feeding type (Kiparsky 1968, Kenstowicz and Kisseberth

1979)^{46, 47}: syllabification feeds stress assignment.

But, as we have seen, stress has a role in determining the syllable affiliation of intervocalic consonant clusters. This role is realized only after stress has been assigned, and it is achieved by a process of resyllabification, triggered by stress and other phonological rules that affect the syllable structure such as syncope and epenthesis, to modify the basic syllabification of utterance. Resyllabification is thus ordered after stress assignment, also in a feeding order: stress assignment feeds resyllabification.

This leads to the following ordering relationship between syllabification and stress: basic syllabification applies first in the phonological derivation of the utterance, followed by stress assignment, which in turn is followed, but not necessarily directly, by resyllabification. The last rule does not have to immediately follow stress assignment since other phonological rules that apply after stress may also trigger resyllabification. As a result, while basic syllabification applies first in the phonological derivation, resyllabification has to wait until a number of phonological rules, including stress, have applied.

This conclusion, which is based on the examination of data found in *AHD*, is in line with conclusions that other researchers have arrived at concerning the structure of the syllable in English (see, for instance, Selkirk 1982)⁴⁸.

Notes

1. Hyman, L. (1975). *Phonology: Theory and Analysis*. New York: Holt, Rinehart and Winston.
2. Ladefoged, P. (1982). *A Course in Phonetics*. 2nd ed. New York: Harcourt Brace Jovanovich.
3. Chomsky, N., and M. Halle (1968). *The Sound Pattern of English*. New York: Harper and Row.
4. Fudge, E. (1984). *English Words-Stress*. London: George Allen & Unwin.
5. Halle, M., and J. - R. Vergnaud (1987). *An Essay on Stress*. Cambridge, Mass.: MIT Press.
6. Kahn, D. (1976). *Syllable-Based Generalizations in English Phonology*. Cambridge, Mass.: MIT Ph.d dissertation. Distributed by Indiana University Linguistics Club.
7. Ibid.
8. Abu-Salim, I. (1987). "The syllable structure of Arabic" (in Arabic). *Journal of the Jordan Academy of Arabic* 11.33, 45, 63.
9. Sommerstein, A. (1977). *Modern Phonology*. London: Edward Arnold Ltd.
10. Kenstowicz, M. (1994). *Phonology in Generative Grammar*. Cambridge, Mass.: Blackwell Publishers.

11. Hoard, J. (1971). "Aspiration, Tenseness, and Syllabication in English" *Language* 47. 1, 133-140.
12. Selkirk, E. (1982). "The Syllable". *The Structure of Phonological Representations* (part II), ed H. van der Hulst and N. Smith, 337-383. Dordrecht: Foris.
13. Fudge, E. (1984). *Op. cit.*
14. Kahn, D. (1976). *Op. cit.*
15. *Ibid.*, P. 23.
16. *Ibid.*, pp. 17-19.
17. These modifications are as follows:

<u>AHD</u>	<u>This paper</u>	<u>AHD</u>	<u>This paper</u>
a	a	á	ei
ä	a:	e	e
é	i:	í	i
o	o	ó	ow
ô	o:	oo	u
oo	u:	í	ai
u	Λ	ng	y
sh	s	zh	z

The other symbols are as in the dictionary.

18. Selkirk, E. (1982) *Op. cit.*
19. Sloat, C., S. Taylor, and J. Hoard (1978). *Introduction to Phonology*. Englewood Cliffs, N. J. : Prentice-Hall.
20. Hoark, J. (1971). *Op. cit.*
21. Fudge, E. (1984). *Op. cit.*
22. In the so-called "rhotic" varieties of English, /r/ does not occur post-vocally, i. e., in the coda of the syllable (Gimson 1980, Roach 1983)^{23, 24}. Therefore, in examples like Paris, /r/ in such varieties is syllabified only in the onset of the following syllable regardless of the location of stress.
23. Gimson, A. (1980). *An Introduction to the Pronunciation of English*. London: Edward Arnold.
24. Roach, P. (1983). *English Phonetics and Phonology*. Cambridge: Cambridge University Press.
25. Kahn, D. (1976). *Op. cit.*
26. Clements, G., and S. J. Deyser (1983). *CV Phonology: A Generative Theory of the Syllable*. Cambridge, Mass.: MIT Press.
27. Anderson, J., and C. Ewen (1987). *Principles of Dependency Phonology*. Cambridge: Cambridge University Press.
28. Kahn, D. (1976). *Op. cit.*, p. 26.
29. Hayes, B. (1981). *A Metrical Theory of Stress Rules* Cambridge, Mass. : MIT Ph. D. dissertation.

30. Hyman, L. (1985). *A Theory of Phonological Weight*. Dordrecht: Foris.
31. Selkirk (1982) argues against the notion of ambisyllabicity. Instead, she proposes a process of resyllabification involving the dissociation of the consonant in question from the onset of the following syllable and associating it with the preceding syllable. (For more details, see Selkirk 1982).
32. Hayes, B. (1982). "Metrical structure as the organizing principle of yidiny phonology". *The Structure of Phonological Representations* (part I), ed. by H. van der Hulst and N. Smith, 97-110. Dordrecht: Foris.
33. Durand, J. (1990). *Generative and Nonlinear Phonology*, London: Longman.
34. Hyman, L. (1985). *Op. cit.*
35. Halle, M., and J.-R. Vergnaud (1980). Three dimensional Phonology:. *Journal of Linguistic Research* 1, 83-105.
36. Hayes, B. (1981). *Op. cit.*
37. Ladefoged, p. (1982) *Op. cit.*
38. Kenstowicz, M. (1994). *Op. cit.*
39. Gimson, A. (1980). *Op. cit.*
40. Selkirk, E. (1982). *Op. cit.*
41. Selkirk, E. (1984). *Phonology and Syntax*. Cambridge, Mass. : MIT Press.
42. Hyman, L. (1985). *OP. cit.*
43. Gimson, A. (1980). *Op. cit.*
44. Roach, p. (1983). *Op.cit.*
45. Kahn, D. (1976). *Op. cit.*
46. Kiparsky, P. (1968). "Linguistic Universals and language Change". *Universals in Linguistic Theory*, ed. by E. Bach and R. Harms, 191-212. New York: Holt, Rinehart and Winston.
47. Kenstowicz, M., and C. Kisseberth (1979). *Generative. Phonology: Description and Theory*. New York: Academic press.
48. Selkirk, E. (1982). *OP. cit.*

