The Prosodic Structure of Stressed-Suffix in English*

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Key words: recursive prosodic word structure, stressed-suffix, Optimality Theory

要旨　英語には、強勢の移動を引き起こす class 1 接辞と強勢の移動を全く引き起こさない class 2 接辞の他に、強勢を持つ接尾辞がある。この接尾辞が付加された派生語では、接尾辞に主強勢が付与される場合と第二強勢が付与される場合とがある。本稿では、この接尾辞が付加された派生語の強勢を韻律構造に基づいて分析し、再帰的な韻律語構造(recursive prosodic word structure)を仮定することにより、強勢を持つ接尾辞の音韻的性質を明らかにできると共に、接尾辞に付与される主強勢と第二強勢について統一的な説明ができることを示す。

0.　Introduction

The stress assignment of English affixed words has been discussed within the framework of Optimality Theory (Benua 1997, Pater 1995, 1998). The proper treatment of stress-affecting affixes has been the subject of debate by generative phonologists. In Optimality Theory, OO-correspondence relations (Benua 1997) account for the stress shift caused by affixation. In English, it has been claimed that there are two groups of affixes called class 1 and class 2 affixes. However, English has a class of affix other than class 1 and class 2 affixes, which is rarely discussed in Optimality Theory. The first syllable of this affix bears primary stress. Through affixation this affix attracts primary stress in affix and secondary stress realizes on the base. Secondary stress is one of the challenging prosodic phenomena in Optimality Theory.

In this paper, I will discuss the stress patterns in derived words with stressed-affixes and secondary stress surfaced in affix and base.[1] I claim that stressed-suffix in English is a prosodic word and I propose four prosodic structures of stressed-affixed words. Then, it is argued that these prosodic structures can account for stress in affixed form. Recursive prosodic word structure argues that stressed-affix is a prosodic word with a head.

This paper is organized as follows: In section 1, I present some data concerning stressed-suffixed words. In section 2, I discuss the prosodic structure of stressed-suffixed words, and argue that stress assignment in stressed-suffixed word is dependent on distinct

prosodic structures. In section 3, I analyze stress assignment of stressed-suffixed words. Concluding remarks are in section 4.

1. Stress in Affixed Words

Morphologically-complex words of English show a number of transderivational identity effects, involving both over- and underapplication of phonological alternations. Affixes in English fall into two groups: class 1 (-al, -ate, -ic, -ity, -ous, in-, etc.) and class 2 (-able, -er, -ful, -ist, -ness, un-, etc.) (Siegel 1974). The familiar descriptions are that class 2 affixation is invisible to stress (or "stress-neutral") and similarly is irrelevant to other phonological rules, while class 1 affixation is "stress-affecting" and subject to a variety of segmental alternations. In addition to these two classes, there is a third group of suffixes in English. The suffixes in this group are stressed and are also "stress-affecting", and they are also subject to a variety of stress assignment. I term the third group of suffixes as stressed-suffix. In this section, I will present relevant examples concerning stressed-suffix in English.

1.1 Stress in Suffixed Words

In most cases, primary stress in words derived by stressed-suffixes is on the suffixes, while primary stress in the bases becomes secondary stress. A list of stressed-suffixed words is shown in (1).

(1) a. /-ette/

banner-étte, kitchen-étte, novel-étte, leather-étte, wagon-étte, maison-étte, sermon-étte, luncheon-étte, amour-étte

b. /-ee/

patent-ée, counsel-ée, abandon-ée, offer-ée, solicit-ée, warrant-ée, present-ée, interview-ée, borrow-ée

c. /-eer/

engin-éer, auction-éer, market-éer, mountain-éer, camel-éer, pamphlet-éer, muffin-éer, puppet-éer, ballad-éer, profit-éer

d. /-ade/

lemon-áde, masquer-áde, colonn-áde, harlequin-áde, cannon-áde, gallop-áde, ginger-áde, tampon-ade, orange-áde

e. /-ine/

　tàmbour-íne, wòlver-íne, figur-íne, nèctar-íne, victor-íne, brìlliant-íne,

　òpal-íne

f. /-esque/

　pìctur-ésque, hùmor-ésque, àrab-ésque, scùlptur-ésque, Ròman-ésque,

　lìon-ésque, gàrden-ésque, òpal-ésque, màdrigal-ésque, plàter-ésque

The data listed above show that primary stress in stressed-suffixed words always falls on the suffix, regardless of the number of syllables in the base. No secondary stress is in the derived disyllabic words, since two adjacent stressed syllables are avoided. Secondary stress is realized on the base in the derived words more than trisyllabic, since primary stress in the base becomes secondary stress. However, when stressed-suffixes are attached to base which is traditionally called bound form, primary stress is always on the suffixes and secondary stress is not on the base. A list of stressed-suffixed words with bound base is shown in (2).

(2)　a. /-ette/: brun-étte, cass-étte, roul-étte, toil-étte, vign-étte

　　b. /-ee/: rup-ée, Legr-ée, pong-ée, wamp-ée, Pawn-ée

　　c. /-ade/: arc-áde, broc-áde, casc-áde, crus-áde, brig-áde

　　d. /-ine/: sard-íne, cuis-íne, benz-íne, tont-íne, fasc-íne

　　e. /-esque/: grot-ésque, burl-ésque, Dant-ésque

The data listed above show that primary stress falls on the suffix, while no stress appears in the base.[2] Inkelas (1993) argues that the bases as in (2) are defined as those which are unable to stand alone; that is, they are morphologically dependent. However, she also argues that these bases are phonologically independent and serve as a possible phonological word. Following Inkelas (1993), I assume that these bases have their own prosodic structures.

As I presented in (1), primary stress is on suffix in derived forms, while secondary stress is realized on base in more than trisyllabic words. However, primary stress is not always on stressed-suffix. Secondary stress is assigned to stressed-suffix in some cases. In other cases, no secondary stress is assigned to stressed-suffix.

(3) /-ee/: commít-ee, pútt-ee, péw-ee, búst-ee, tóff-ee

(4) /-ine/

    a. nèctar-íne, victor-íne, figur-íne, wòlver-íne, brìlliant-íne, tàmbour-íne

    b. néctar-ìne, víctor-ìne, fígur-ìne, wólver-ìne, brílliant-ìne, támbour-ìne

    c. héro-ine, dóctr-ine, ráp-ine, légat-ine, chóp-ine, óliv-ine

The derived words with the suffix /-ee/ show that primary stress is on base, but not on suffix. The derived words with the suffix /-ine/ have three different stress patterns: First, as seen in (4a), primary stress is assigned to suffix and secondary stress to base. Second, as seen in (4b), primary stress is assigned to base and secondary stress is assigned to suffix. Third, as seen in (4c), primary stress is assigned to base, no stress to suffix.
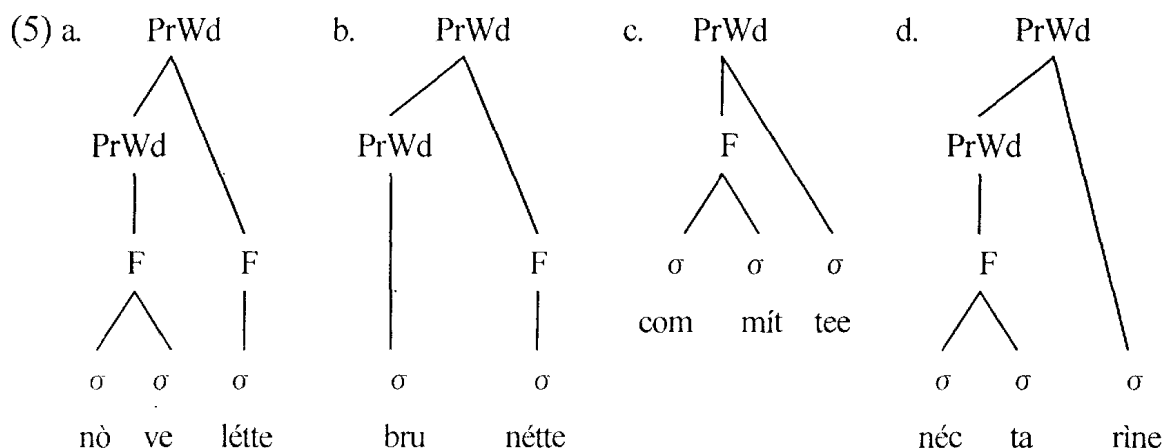
In the following section, I will discuss the prosodic structures of stressed-suffixed words, and propose that these different stress patterns are triggered by the prosodic structures of the stressed-suffixed words.

2. Prosodic Structure of Suffixed Words

In this section, I will discuss the prosodic structure of stressed-suffixed words. In section 2.1, I will propose that the stress patterns in derived words are closely related with the prosodic structures, and argue that the stress assignment in derived word with stressed-suffix is triggered by these prosodic structures and they produce four different stress patterns. In section 2.2, I will discuss constraints which force to realize secondary stress.
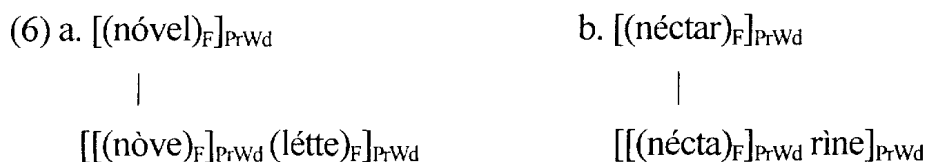
2.1 Stressed-Suffix as a Prosodic Word

In this section, I will discuss the prosodic structures of derived words listed in (1), (2), (3) and (4), which are generated by stressed-suffixes, and show that the stress patterns of the derived words can be accounted for by their distinct prosodic structures. I propose recursive prosodic word structure for stressed-suffixed words, and its structure strives to preserve primary stress in suffix. Stressed-suffix is assumed to be a prosodic word, since they have moras and "Prosodic Word" is the domain of stress assignment (Peperkamp 1995, Raffelsiefen 1998). In (5), I illustrate the prosodic structure of the stressed-suffixed word.

(5) a.　　PrWd　　　b.　　PrWd　　　c.　　PrWd　　　d.　　PrWd

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(5) a.    PrWd          b.    PrWd          c.    PrWd          d.    PrWd
          /\                  /\                  /\                  /\
       PrWd  \            PrWd  \              F    \            PrWd  \
         |    \              |    \           /\     \             |    \
         F     F             |     F         σ  σ  σ   σ           F     \
        /\     |             |     |        com mít tee           /\     \
       σ  σ    σ             σ     σ                             σ  σ     σ
       nò ve létte          bru  nétte                          néc ta  rine
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The prosodic structure in (5a) includes recursion of prosodic word. Base forms foot that is part of inner prosodic word, while suffix forms foot that is dominated by outer prosodic word. In this structure, primary stress is on suffix, while secondary stress is realized on base. The prosodic structure in (5b) also shows recursive prosodic word structure. In this structure, primary stress is assigned to suffix, while no stress is assigned to this base, since the satisfaction of *CLASH (Raffelsiefen 1996, 1998), which bans adjacent stressed syllables, strives to delete base stress. In the prosodic structure (5c), the base forms a disyllabic foot and primary stress is assigned to the second syllable because it is the head of the foot. In (5c), the suffix is integrated into prosodic word and is directly dominated by prosodic word. The prosodic structure in (5d) shows recursion of prosodic word. In this structure, the base forms foot that is dominated by inner prosodic word, while the suffix does not form foot which is different from (5a). In this prosodic structure, primary stress is assigned to base, while secondary stress is on suffix.

2.2 Secondary Stress

As discussed in the previous section, suffixed words have four different prosodic structures. The prosodic structure plays a crucial role in stress assignment. We see that secondary stress is on base in (5a), while secondary stress is on suffix in (5d). Realization of secondary stress is illustrated in (6).

(6) a. [(nóvel)$_F$]$_{PrWd}$　　　　　　b. [(néctar)$_F$]$_{PrWd}$

　　　　　|　　　　　　　　　　　　　　　|

[[(nòve)$_F$]$_{PrWd}$ (létte)$_F$]$_{PrWd}$　　　　[[(nécta)$_F$]$_{PrWd}$ rìne]$_{PrWd}$

In (6a), primary stress on the base shifts to secondary stress when the stressed-suffix dominated by foot is the rightmost prosodic word and preserves primary stress. In (6b), primary stress is preserved in the base. In this case, secondary stress is on the stressed-suffix, that is, secondary stress in suffixed form is realized if the stressed-suffix is directly dominated by outer prosodic word.

In the following section, I will analyze stress assignment of stressed-suffixed forms within the framework of Optimality Theory (McCarthy & Prince 1993, Prince & Smolensky 1993).

3. Analysis

In this section, I will discuss stress assignment of stressed-suffixed words within OT framework. In section 3.1, I will analyze the words derived by stressed-suffixes in which primary stress is on the suffix. In section 3.2, I will analyze the word with stressed-suffix which has primary stress on the base, but not on the stressed-suffix, that is, the stressed-suffix cannot preserve its stress.

3.1 Stress in Stressed-Suffixed Words

In this section, first, I analyze the stressed-suffixed words in which primary stress is assigned to the suffix. Stress assignment in suffixed form can be accounted for by its prosodic structure which is shown in (5). The prosodic structure in (5a) shows that the recursive prosodic word structure strives to preserve primary stress in suffix, and that stress is assigned to foot. To ensure this prosodic structure, the constraint, PARSE- σ (McCarthy & Prince 1993) should be introduced.

(7) PARSE- σ (PA- σ): Syllables must be footed.

The constraint in (7) requires all syllables to be parsed by feet. As is discussed in the previous section, primary stress on the stem shifts to secondary stress in the stressed-suffixed form dominated by foot. The suffix functions as the rightmost prosodic word and preserves primary stress. This stress pattern is induced by the satisfaction of both alignment constraint (McCarthy & Prince 1993b) and prosodic faithfulness constraint (Benua 1997). The relevant constraints are introduced as follows:

(8) ALIGN-HEAD (Align (PrWd, R, Head(PrWd), R)) (ALIGN-H):

　　Align the right edge of the prosodic word with the right edge of the head of the prosodic word.

(9) a. OO-ANCHOR-ROOT (OO-A-R):

　　If stress in base is in a prosodic word, then its correspondent stress in the output is in a prosodic word.

　b. OO-ANCHOR-AFFIX (OO-A-A):

　　If stress in suffix is in a prosodic word, then its correspondent stress in the output is in a prosodic word.

(10) *TWOPEAKS (*TWOP): No two peaks in a single word.

(11) HEAD-TO-FOOT (HF): Only head prominence falls in the domain of foot.

The constraint ranking in (12) can account for stress patterns of the derived words with stressed-suffixes.

(12) Input: novel+ette, Base: nóvel, Output: nòvelétte

	*TWOP	PA-σ	ALIGN-H	HF	OO-A-R	OO-A-A
☞a. [[(nòve)$_F$]$_{PrWd}$(létte)$_F$]$_{PrWd}$				*		
b. [[(nóve)$_F$]$_{PrWd}$(lètte)$_F$]$_{PrWd}$			*!*	*		
c. [[(nóve)$_F$]$_{PrWd}$(létte)$_F$]$_{PrWd}$	*!		**			
d. [[(nóve)$_F$]$_{PrWd}$ lette]$_{PrWd}$		*!	**			*
e. [[nove]$_{PrWd}$(létte)$_F$]$_{PrWd}$		*!*			*	

In tableau (12), candidate (12b) is eliminated by violating ALIGN-HEAD, since primary stress does not coincide with the right edge of the prosodic word. Candidate (12c) is also ruled out, since it violates the constraint, *TWOPEAKS. Candidate (12d) and (12e) are not selected as optimal by violating the constraints, PARSE-σ. Thus, candidate (12a) is the winner, though since non-head prominence in (nòve)$_F$ falls in the domain of foot, it violates HEAD-TO-FOOT.

Next, I analyze the stress assignment of the derived words. These words are composed of bound form and stressed-suffix and have the prosodic word structure in (5b). It shows that recursive prosodic word structure strives to preserve primary stress in suffix. In this case, stress in bound form is deleted. This stress assignment is induced by the satisfaction of the following constraint, *CLASH (Raffelsiefen 1996, 1998) which is given in (13).

(13) *CLASH (*CLA): Two adjacent stressed syllables are prohibited.

The constraint ranking in (14) can account for stress patterns of the derived words.

(14) Input: brun+ette, Output: brunétte

	*CLA	*TWOP	PA-σ	ALIGN-H	HF	OO-A-R
☞a.[[bru]ₚᵣwₐ(nétte)ₑ]ₚᵣwₐ			*			*
b.[[(brú)ₑ]ₚᵣwₐ(nétte)ₑ]ₚᵣwₐ	*!	*		*		
c.[[(brú)ₑ]ₚᵣwₐ nette]ₚᵣwₐ			*	*!		
d.[[(brù)ₑ]ₚᵣwₐ(nétte)ₑ]ₚᵣwₐ	*!				*	

In tableau (14), candidate (14b) and (14d) are ruled out by violating *CLASH, since their stressed syllables are adjacent. Candidate (14c) is also eliminated by violating the constraint, ALIGN-HEAD. Thus, candidate (14a) is selected as optimal.

3.2. Stress Variation

In this section, I analyze the words with non-recursive prosodic word structure in (5c) which are derived by the attachment of stressed-suffix. In these derived words, the stressed-suffix loses its stress. The lost of the stress in stressed-suffix is triggered by the prosodic structure in which stressed-suffix is directly dominated by prosodic word. In this case, a violation of PARSE- σ plays a critical role in stress assignment of base. The constraint ranking in (15) can account for stressed-suffixed words of which primary stresses are not on the suffix.

(15) Input: commit+ee, Base: commit, Output: committee

	*CLA	*TWOP	PA-σ	ALIGN-H	HF	OO-A-R
☞a.[(commit)$_F$ tee]$_{PrWd}$			*	*		
b.[[(commit)$_F$]$_{PrWd}$(tée)$_F$]$_{PrWd}$	*!	*		*		
c.[commit(tée)$_F$]$_{PrWd}$			**!			*
d.[[(commit)$_F$]$_{PrWd}$(tée)$_F$]$_{PrWd}$	*!				*	
e.[[(commit)$_F$]$_{PrWd}$(tèe)$_F$]$_{PrWd}$	*!			*	*	

In tableau (15), candidate (15c) incurs the violation of the constraint, PARSE-σ, twice, since disyllabic base is not parsed into foot. Candidates (15b), (15d) and (15e) are ruled out by violating the highest-ranked constraint, *CLASH. Thus, candidate (15a) is the winner.

However, stressed-suffixed words like *héroine* do not violate *CLASH. In this case, the constraint ranking in (15) chooses the wrong winner which has primary or secondary stress on the suffix. In the candidates where stress is on the suffix, a possible analysis is that the suffixes are dominated by the higher prosodic word. This can be formalized as in (5a), (5b) and (5d). The lost of the stress in the suffixes is forced by NONRECURSIVITY (Selkirk 1995) constraint that includes the suffixes in a single prosodic word.

(16) NONRECURSIVITY (NONREC): No C$_i$ dominates C$_j$, j=i.

This constraint puts a ban on recursive prosodic word structure. Tableau (17) also accounts for the derived word with stressed-suffix. In this case, primary stress is assigned to base, while the suffix loses its stress.

(17) Input: hero+ine, Base: héro, Output: héroine

	*CLA	*TWOP	NONREC	PA-σ	ALIGN-H	HF
☞a.[(héro)$_F$ ine]$_{PrWd}$				*	**	
b.[[(héro)$_F$]$_{PrWd}$(ine)$_F$]$_{PrWd}$		*!	*		**	
c.[hero(ine)$_F$]$_{PrWd}$				**!		
d.[[(hèro)$_F$]$_{PrWd}$(ine)$_F$]$_{PrWd}$			*!			*
e.[[(héro)$_F$]$_{PrWd}$(ine)$_F$]$_{PrWd}$			*!		**	*

In tableau (17), candidate (17b) is eliminated by violating the constraint, *TWOPEAKS.

Candidates (17d) and (17e) violate the constraint, NONRECURSIVITY, since stressed-suffix is not integrated into a single prosodic word. Thus, both are not optimal. Candidate (17c) is also ruled out, since it incurs two violation marks of the constraint, PARSE- σ . Thus, candidate (17a) is selected as the optimal form.

Next, I analyze the word derived by stressed-suffix where secondary stress is assigned to the suffix. The prosodic structure in (5d) shows that the recursive prosodic word structure forces primary stress on the base to be preserved, while secondary stress is on the stressed-suffix. This stress assignment can be accounted for by the re-ranking of the constraint. In Optimality Theory, interlinguistic variation could result from different rankings of universal constraints (Peperkamp 1995). Stress variation is accounted for by ranking HEAD-TO-FOOT higher than PARSE- σ in the constraint hierarchy. The constraint ranking in (18) can account for stressed-suffixed words of which primary stress is on the suffix, while the constraint ranking in (19) can account for stressed-suffixed words of which secondary stress is on the suffix.

(18) Input: nectar+ine, Base: néctar, Output: nèctaríne

	*TWOP	PA-σ	ALIGN-H	HF	OO-A-R	OO-A-A
☞a. [[(nècta)_F]_PrWd(ríne)_F]_PrWd				*		
b. [[(nécta)_F]_PrWd(rìne)_F]_PrWd			*!*	*		
c. [[(nécta)_F]_PrWd(rìne)_F]_PrWd	*!		**			
d. [[(nécta)_F]_PrWd rìne]_PrWd		*!	**			*
e. [[necta]_PrWd(ríne)_F]_PrWd		*!*			*	

(19) Input: nectar+ine, Base: néctar, Output: néctarìne

	*TWOP	HF	PA-σ	ALIGN-H	OO-A-R	OO-A-A
☞a. [[(nécta)_F]_PrWd rìne]_PrWd			*	**		
b. [[(nécta)_F]_PrWd(rìne)_F]_PrWd	*!			**		
c. [[necta]_PrWd(ríne)_F]_PrWd			**!		*	
d. [[(nècta)_F]_PrWd(ríne)_F]_PrWd		*!				
e. [[(nécta)_F]_PrWd(rìne)_F]_PrWd		*!		**		

In tableau (18), candidate (18b) is eliminated by violating ALIGN-HEAD. Candidate (18c) is also ruled out, since it violates *TWOPEAKS. Candidates (18d) and (18e) are not selected as

optimal by violating PARSE-σ. Thus, candidate (18a) is the winner. In tableau (19), candidate (19b) is eliminated, since it violates the constraint, *TWOPEAKS. Candidates (19d) and (19e) violate the constraint, FOOT-TO-HEAD, since secondary stress falls on foot. Thus, both candidates are not optimal. The remaining candidate is also eliminated, since it incurs two violations of the constraint, PARSE-σ. Thus, candidate (19a) is selected as optimal.

4. Concluding Remarks

In this paper, I have discussed the stress patterns found in derived words with stressed-suffixes and secondary stress surfaced in suffix and base. I proposed four prosodic structures of stressed-suffixed words and showed that stress in suffixed form is assigned, depending on these proposed prosodic structures. Recursive prosodic word structure argues that stressed-suffix is a prosodic word and must has the head. Primary or secondary stress on base results from the satisfaction of prosodic faithfulness constraints. Primary stress on suffix is induced by recursion of prosodic structure and by the satisfaction of both alignment constraint and prosodic faithfulness constraint. Recursive prosodic word structure also accounts for secondary stress in suffix and guarantees secondary-stressed suffix. The phonological status of stressed-suffix as prosodic word enables to give a unified account for stress patterns in derived words with stressed-suffixes.

Notes

1. Though there are some prefixes that surface as stressed-prefixes (e.g., býpàth, býpàst, dówncàst, dównfàll, óffprint, óffsèt, óutcàst, óutlànd, etc.), I only address the stressed-suffixes in this paper.

2. I do not treat the words with the suffix /-eer/, since there is not ample evidence of /-eer/ suffixation with bound form.

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