Level 1 and Level 2 Affixes in English: Morphological Productivity and Semantic/Phonological Transparency[1)]

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Cho, Hyung-Mook. (2007). Level 1 and Level 2 Affixes in English: Morphological Productivity and Semantic/Phonological Transparency. *Modern English Education, 8(2).* 40-58.

The goal of this paper is to investigate the traits of level 1 and level 2 affixes in English with regard to their morphological productivity and semantic/phonological transparency. Hay (2002a, b) and Hay & Baayen (2002) argue that level 2 affixes are more productive than level 1 affixes. On the other hand, Plag (2004) and Hay (2000) suggest that level 2 affixes exhibit higher semantic and phonological transparency. In this paper, we provide more evidence for higher semantic and phonological transparency of level 2 affixes in English. In addition, we attempt to account for the relationship between transparency and productivity and why level 2 affixes are more productive.

Keywords: [productivity/transparency/parsability/level 1 and level 2 affixes/생산성/투명성/분리 가능성/1 단계 접사와 2 단계 접사]

1. Introduction

This paper is an attempt to investigate the characteristics of level 1 and level 2 affixes in English (cf. Siegel 1974) with regard to their productivity and transparency. On the morphological productivity of affixes in English, Hay (2000, 2002a, 2002b) and Hay & Baayen (2002) argue that level 2 affixes in English are

1) The research was supported by a grant from the University Restructuring Program (funded by the Ministry of Education and Human Resources Development) of Chungju National University.

more productive than level 1 affixes. On the basis of boundary phonotactics, they argue that level 2 affixes are more parsable (i.e. decomposable) than level 1 affixes and that more parsable affixes are more productive. To back up their argument, Hay and Baayen (2002) analyze parsability (i.e. decomposability) and productivity of 80 affixes in English and provide evidence for their argument.

On the other hand, Hay (2000) and Plag (2004) state that more parsable affixes (i.e. level 2 affixes) in English are semantically and phonologically more transparent than less parsable affixes (i.e. level 1 affixes). Semantic transparency generally refers to the compositionality and recoverability of meaning (cf. *washable* vs. *probable*), while phonological transparency refers to the degree of phonological integration between morphemes (cf. *excitement* vs. *decision*). As to the relationship between productivity and transparency, Plag (2004) and Uffmann & Callies (2004) explain that more transparent affixes display higher productivity.

The goal of this paper is first to provide more evidence for higher semantic and phonological transparency of level 2 affixes in English compared to level 1 affixes. Although Hay (2000) provided some evidence for transparency of level 2 affixes, we attempt to provide more practical evidence for higher transparency of level 2 affixes. Secondly, we try to account for the relationship between transparency and productivity. That is, we attempt to provide an explanation for why more transparent level 2 affixes are more productive in word formation.

The organization of this paper is as follows. After outlining the background and goals of this paper, we discuss the notion of productivity and the ways to measure it in chapter 2. In addition, we examine the different productivity of level 1 and level 2 affixes in English. In chapter 3, we provide more evidence for higher semantic and phonological transparency of level 2 affixes and try to account for the reason level 2 affixes are more productive. Chapter 4 is the summary and conclusion of this paper.

2. Morphological Productivity

The term "morphological productivity" is generally defined as the property of an affix or morphological process to give rise to new formations on a systematic

basis (cf. Adams 1973, Bauer 1983, Spencer 1991, Plag 2003).[2] For instance, the suffix *-ness* in English display a high degree of productivity and so, it is widely used in the creation of new words. On the contrary, the suffix *-th* is regarded as unproductive.[3] In this chapter, we will discuss the notion of morphological productivity, the ways to measure it, and the different productivity of level 1 and level 2 affixes in English.

2.1 Measuring Productivity

In this paper, we assume that productivity is a quantitative notion. That is, productivity is a matter of degree, and morphological processes or affixing processes are more productive or less productive than others. In other words, morphological processes and affixes are not clearly divided into productive and unproductive ones and the concept of productivity is a gradable phenomenon(cf. Bauer 1992, Mohanan 1986, Haspelmath 2002, among others).[4]

For example, the suffix *-ness* in English is highly productive so that it can relatively freely attach to adjectives which express quality. Compared to *-ness*, the suffix *-ize* has less productivity, and the new words with this affix sometimes sound awkward (e.g. *?paper-ize*). Another affix with limited productivity would be *-ee* and there are few neologisms with this affix (e.g. *arrestee, offendee, mergee, editee, enrolee,* and *abusee*) (Barker 1998). Finally, there are affixes that

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2) When we refer to morphological productivity, it generally means the productivity of morphological processes and/or productivity of affixes. In this paper, however, we confine our focus to the productivity of affixes.

3) If we investigate the productivity of affixes, we can find that they display various degrees of productivity. In addition, the productivity of affixes varies according to the kinds of bases to which they attach (Baayen and Lieber 1991), and sometimes, it is influenced by different registers (Hay 2000). In spite of wide variables in the productivity of affixes, there are, however, generally accepted views on the productivity of affixes.

4) Some scholars, including Booij (1977), argue that the notion of productivity is qualitative one and so, morphological processes or affixes are either productive or unproductive. However, the problem of such a qualitative approach is that unproductive processes sometimes yield new formations.

are almost unproductive. One example is the English suffix *-eer*. It is reported that this affix was used to create a neologism once recently, *Common Marketeer*, 'advocate of the Common Market' (Haspelmath 2002:42).

The scalar nature of affix productivity is illustrated in (1) below.

(1) A scale of productivity: Some examples from English

-ness *-ize* *mis-* *-ee* *-eer* *-al* *-th* *-ter*

(*goodness*) (*globalize*) (*misrepresent*) (*invitee*) (*profiteer*) (*refusal*) (*warmth*) (*laughter*)

←most productive----------least productive→

(Haspelmath 2002:42)

As we have noted, most scholars, including Bauer (1992), Mohanan (1986), and Haspelmath (2002), agree that productivity is a gradable property of morphological processes or affixes. From now on, we will discuss how to measure morphological productivity. Among the measures proposed, we will discuss the suggestions made by Aronoff (1976) and Baayen (1989) which we believe are the two typical measures proposed up to now.

2.1.1 Aronoff (1976)

As a way to measure productivity, Aronoff (1976) proposes to calculate the ratio of actual words to possible words. Actual words means existing established words, and possible words designate all words that could be morphologically well-formed and produced by the pertinent word-formation rules. Therefore, the productivity of the morphological process is high if the ratio of actual words to possible words is high.

Baayen (1989) formalizes the index of productivity suggested by Aronoff (1976) as given in (2). V here means the number of types of actual words, and S means the number of forms the morphological processes could create (i.e. possible words). [5]

5) The term "types" refers to different words in a corpus and "tokens" refers to instances or occurrences of a type. For example, the sentence Mary goes to Edinburgh next week, and she intends going to Washington next month contains two tokens of the word form next. In other words, the word form next, as a type, is instantiated twice in this sentence (Carstairs-McCarthy 2002:146).

(2) I = V/S

However, there are some improper points in Aronoff's measure. The first problem noted in Lieber (1992) is that it is sometimes difficult to measure exactly the figure S, because a certain affix can attach to a particular base very productively. If we borrow the term in Williams (1981), certain affixes "potentiate" certain bases. For instance, the productivity of the suffixes *-ness* and *-ity* differs according to different base morphemes. In case the base ends in *-ive* (e.g. *perceptive*), *-ness* will show much higher productivity. On the contrary, if a words ends in *-ile* (e.g. *servile*), *-ity* will display higher productivity.

Secondly, it cannot make a proper prediction about the productivity of the morphological process or affix that has extremely high or low productivity. If the productivity of an affix is extremely high, then S will become infinite, and the index of productivity would be near zero. For instance, if we consider the productivity of the English suffix *-ness,* its productivity should be extremely low since the affix is used for the creation of almost infinite number of new words. In the same context, it is very hard to measure the productivity of a completely unproductive affix, like *-th*. In the case of *-th*, if we measure its productivity on the basis of the ratio of actual words to possible words, it would reach the highest productivity of 1. So, it should be considered to be an extremely productive affix. However, the affix *-th* is generally regarded as the least productive affix in English.[6] Furthermore, as Lieber (1992) points out, if the affix is extremely highly productive, it is hardly possible to measure the number of types formed with that affix, since no dictionary will list all such forms.

Finally, Lieber (1992) points out the problem in the notion of "actual words". It is agreed that there is no objective way of defining actual words. The actual words can be defined to be the ones listed in the reliable dictionaries, including the OED(Oxford English Dictionary). However, not all actual words are listed in the OED (cf. Bauer 1988). Moreover, although the actual words of mental lexicon

6) For example, Bauer (1988) mentions the abstract noun forming -th as a textbook case of a non-productive affix.

or dictionaries coincide with those of another in a large part, they do not completely coincide each other. So, Lieber (1992:3) states that the notion of "actual words" is a fiction, but an unavoidable one if we are to find some way of measuring productivity.[7]

2.1.2 Baayen (1989)

Baayen (1989) suggests a more complicated measure of productivity than (2). Baayen (1989) suggests that, if we compare the ratio of types and tokens in a large corpus of various affixes, we can find that the affixes which native speakers feel more productive show a relatively high proportion of hapax legomena (i.e. types which occur only once in the database). To the contrast, unproductive affixes show a lower proportion of hapax legomena. In other words, unproductive affixes display a higher proportion of high-frequency types than productive ones.

The formula Baayen (1989) suggests for measuring productivity is given in (3) below. In (3), n_1 is the number of types which show only one token (i.e. hapax legomena) and N is the number of tokens.

(3) $P=n_1/N$

The formula (3) provides the way to distinguish productive processes or affixes from unproductive ones. Baayen explains that if we apply this formula to frequency data of simplex words (i.e. underived words), we can measure productivity of words to create new simplex words and decide whether an affix or a morphological process is productive or not.

Baayen (1989) states that an affix might be unproductive if the value of P is lower than that of simplex words. In other words, the affix is unproductive, if it is easier to create a completely new word than to form a new item using that affix. To the contrary, the affixes that have higher P value than that of simplex words would be productive and the degree of productivity can be distinguished.

Baayen's proposal is accepted as the one matching with our linguistic intuition

7) This problem of productivity could be the common one for all the measures of productivity.

in that it provides a way to distinguish between more productive affixes and less productive ones. In addition, it provides the way to measure relative productivity among productive morphological processes and affixes. In this paper, we shall adopt the formula (3) as the measure of productivity.

2.2 Productivity of Level 1 and Level 2 Affixes

Hay (2000, 2002a, 2002b) argues that there are some more factors that are directly related to the productivity of affixes. In her attempt to investigate the productivity difference of level 1 and level 2 affixes in English, she argues that there is a close relationship between parsability and productivity. That is, she claims that a more parsable affix is more productive (Hay 2000:216).

Furthermore, through the investigation of the 80 affixes in English, Hay & Baayen (2002) demonstrate the correlation between parsability and productivity. That is, through the analysis of parsability and productivity of the 80 affixes, they show that more parsable level 2 affixes have higher productivity than less parsable level 1 affixes. As to the factor that influences parsability of affixes, Hay (2000) refers boundary phonotactics. [8)]

That is, Hay (2000, 2002a, 2002b) explains the different parsability of level 1 and level 2 affixes on the basis of the influence of high/low probability juncture. Specifically speaking, the consonant sequence in morpheme boundaries is more likely to make illegal or low probability boundary phonotactics, while the consonant plus vowel sequence in morpheme boundaries is less likely to make such illegal boundary phonotactics (Hay 2000:221). For instance, if the consonant-initial suffix *-less* is attached to the base *act*, the consonant sequence between the base and suffix /tl/ makes a low probability juncture and the listeners are likely to parse or decompose *actless* into *act* and *-less*. However, if the vowel-initial suffix *-ive* is attached to the base *act*, the consonant plus vowel

8) Besides boundary phonotactics, Hay (2000, 2002a, 2002b) and Hay & Baayen (2002) refer to the indirect relationship between productivity and relative frequency. Relative frequency means the ratio of the frequency of the derived words to the frequency of the base. They argue that low relative frequency correlates with high productivity. For more details, refer Hay (2000, 2002a, 2002b) and Hay & Baayen (2002).

sequence /ti/ makes a legal juncture and the listeners will be less likely to posit a boundary between *act* and *-ive*.[9] That is, the high probability (or legal) juncture and low probability (or illegal) juncture affect the parsability difference of morphological units in morphologically complex words.

Hay (2000) applies this assumption to the affixes of English and explains the parsability difference between level 1 and level 2 affixes. Let us see the typical level 1 and level 2 affixes in (4)

(4) a. Level 1 affixes: *in-, con-, pre-, en-, be-, -ity, -ic, -ian, -ory, -ary, -ion, -ate, -ive,* adjective forming *-al*, noun forming *-y*

b. Level 2 affixes: *un-, re-, sub-, non-, de-, semi-, anti-, -less, -ness, -hood, -like, -dom, -ful, -ship*, -adjective forming *-ed,* adjective forming *-y*

As we see the list of the typical level 1 and level 2 suffixes in (4), most level 1 suffixes begin with vowels, whereas most level 2 suffixes begin with consonants. In this regard, Raffelsiefen (1999a, b) argued that vowel-initial suffixes and consonant-initial suffixes should be the true criterion for the division of level 1 and level 2 suffixes.

If we summarize the influence of junctural phonotactics on the parsability of morphological units, we can state that the listeners perceive the unit of the stem plus the consonant-initial level 2 suffix to be more parsable or decomposable. To the contrary, they tend to perceive the stem plus the vowel-initial level 1 suffix to be less parsable or decomposable.

As to the relationship between parsability and productivity, Hay (2000) argues that suffixes which create a higher proportion of forms with illegal junctural phonotactics tend to be more productive. That is, affixes which create more parsable forms (i.e level 2 affixes) tend to be highly productive, whereas affixes

9) Hay (2000:221) explains the difference by the fact that, while consonant-initial suffixes usually preserves the syllable structure of the boundary position, vowel- initial suffixes are frequently resyllabified with the base.

which create forms that are not easily parsable (i.e. level 1 affixes) tend to be associated with a low level of productivity (Hay 2000:222).

To back up the argument, Hay and Baayen (2002) analyzes 80 English affixes and show that parsability and productivity are strongly correlated and that more parsable level 2 affixes are more productive. The result summarized in Hay (2002b) is given in (5) below.

(5) Productivity difference between level 1 and level 2 affixes

	level 1 affixes	level 2 affixes
average number of types parsed	34.64	143.81
average type-parsing ratio	0.3	0.61
average number of token parsed	1139.21	3711.44
average token parsing ratio	0.12	0.34
average number of hapaxes(V1)	22.79	77.31
average productivity	0.002	0.030

(Hay 2002b:40)

In (5), if an affix was represented only by words which are unlikely to be parsed, the parsing ratios would be 0. If it was represented only by words which are likely to be parsed, the parsing ratios would be 1.

As we see data presented in (5), level 2 affixes that contain higher type and token parsing ratio (i.e. higher parsability) show the average productivity of 0.030, while level 1 affixes which have lower type and token parsing ratio (i.e. lower parsability) display the average productivity of 0.002. The research result in (5) shows that level 2 affixes that have higher parsability (i.e. parsing ratio) have higher productivity. Summing up, Hay (2002a, b) and Hay and Baayen (2002) provide evidence that level 2 affixes in English are more productive than level 1 affixes.

The characteristics of level 1 and level 2 affixes in English were further researched with regard to their transparency in Uffmann & Callies (2004) and Plag (2004) and they explain that level 2 affixes are more transparent than level 1 affixes. In the next chapter, we will discuss semantic/ phonological transparency of level 1 and level 2 affixes in English and its relationship with morphological

productivity.

3. Transparency of level 1 and level 2 affixes

As mentioned in Chapter 1, semantic transparency refers to the compositionality and recoverability of meaning. For instance, the word *washable* is semantically more transparent than *probable*, because its meaning can be derived by the combination of the morphemes *wash* and *-able*. On the other hand, phonological transparency refers to the degree of phonological integration between morphemes. If we compare the words *excitement* and *decision, excitement* is more transparent phonologically, since the morphemes *excite* and *-ment* remain unchanged phonologically even after morpheme combination. That is, it keeps phonological integrity. In the case of *decision* which is phonologically less transparent, the base morpheme "decide [dɪsayd]" changes into "[dɪsɪʒ]" when the affix *-ion* attaches, and so, loses its phonological integrity.

As to the relationship between productivity and transparency, Hay (2000), Uffmann & Callies (2004), and Plag (2004), among others, propose that there is a correlation between semantic/phonological transparency and morphological productivity. That is, they suggest that more productive affixes are more transparent. If their suggestion is applied to the traits of level 1 and level 2 affixes in English, the derived conclusion would be that more productive level 2 affixes show higher semantic and phonological transparency. From now on, we will provide some evidence for higher semantic and phonological transparency of level 2 affixes in English.

3.1 Semantic Transparency

First, with regard to semantic transparency of level 1 and level 2 affixes, let us examine the rule of /s/-Voicing.

(6) /s/-Voicing

s→[+voice] /VV ____ (Borowsky 1986:133)

The application result of this rule shows higher semantic transparency of level 2 affixes compared to level 1 affixes. As shown in (7) below, when the level 1 affix is attached, the /s/-Voicing rule applies and the attached level 1 affix loses its semantic as well as phonological transparency. In contrast, when the level 2 affix is added, the rule's application is blocked and the semantic and phonological transparency of the affix is maintained.

(7)a. Level 1 affix is added: the rule applies and semantic/phonological transparency is not maintained
[re+sign] →[ri[z]ain]
[re+solve]→[ri[z]olve]

b. Level 2 affix is added: the rule does not apply and semantic/phonological transparency is maintained
[re]#[sign]→[ri[s]ain] (i.e. sign again)
[re]#[solve]→[ri[s]olve] (i.e. solve again)

That is, when the level 2 affix is attached, the meaning of "*re-*" and "*sign, solve*" in "*resign*(i.e. sign again)" and "*resolve*"(i.e. solve again) remains unchanged and so, semantic transparency of the affix and base is maintained. However, when the level 1 affix is attached, the meaning of the morphemes is not kept and so, semantic transparency is not maintained.

As to semantic transparency of level 2 affixes in English, Kang (1992) also makes the same argument. Kang (1992) argues that level 2 affixes such as *anti-, dis-, un-, non-, de-, mal-* has the meaning of "negative or not", and that *re-* has the meaning of "again", while some level 1 affixes do not have such independent semantic notions. For example, *re-* has a clear meaning when it is used as a level 2 affix (e.g. *re-play*), however, it has no constant meaning when used as a level 1 affix (e.g. *repel, remit, refer*)(Kang 1992:39).

In addition, Hay (2000) provides indirect evidence for higher semantic

transparency of level 2 affixes. On the basis of the research about the relative frequencies and the number of meanings of 9 affixes and 515 words, Hay (2000) contents that, if the derived form is more frequent than the base, it is less decomposable or parsable, and in that case, the derived form tends to show semantic drift and polysemy.[10] That is, the derived forms that have higher relative frequency display the tendency of meaning proliferation, since they are not so closely tied to the meaning of the base. For this reason, they can acquire new meanings relatively freely (Hay 2000:149-152).

If we explain the research result in regard to level 1 and 2 affixes in English, the derived forms that have higher relative frequency (i.e. lower parsability) are the ones with level 1 affixes. The forms with level 2 affixes have lower relative frequencies (i.e higher parsability), as explained in 2.2. Therefore, by combining the research result with the different parsability and relative frequencies of level 1 and level 2 affixes, Hay (2000) explains that the forms with level 2 affixes that have lower relative frequency display higher semantic transparency. That is, they do not acquire new meanings freely. To the contrary, the forms with level 1 affixes which have higher relative frequency have lower semantic transparency. They show a higher tendency of meaning proliferation.

In this section, we have discussed semantic transparency of level 1 and level 2 affixes in English. In the next section, we will examine the different phonological transparency of level 1 and 2 affixes in English and will provide evidence for higher phonological transparency of level 2 affixes.

3.2 Phonological Transparency

As mentioned before, phonological transparency refers to the degree of phonological integration between morphemes. In this section, we will examine phonological transparency of level 1 and level 2 affixes in English and provide some evidence for higher phonological transparency of level 2 affixes.

3.2.1. Nasal Place Assimilation

10) For more detailed research result, refer Hay (2000:149-152)

First, let us see the different application mode of the Nasal Place Assimilation rule in level 1 and level 2. The rule of Nasal Place Assimilation can be stated as (10).

(10) Nasal Place Assimilation
N→[αplace] / ___ [αplace]

(11a) below presents the cases where the Nasal Place Assimilation rule applies when the level 1 affix *in-* is attached to the base. However, as we see (11b), the rule's application is blocked when the level 2 affix *un-* is attached.

(11) a. Level 1 Affixation
in+proper (i[m]proper)
in+congruous (i[ŋ]congruous)

b. Level 2 affixation
un#published (*u[m]published)
un#governable (*u[ŋ]governable)

That is, when the level 1 affix *-in* is attached to the base, the final sound of the affix changes to [m], or [ŋ], so that it loses its phonological transparency. However, the level 2 affix attached remains unchanged and keeps its phonological transparency.

3.2.2 Consonant Cluster Shortening

The rule of Consonant Cluster Shortening which shortens the vowel before the consonant cluster is represented in (12).

(12) V→[-tense] / ____ [+cons] [+cons, -voc] (Chomsky & Halle 1968)

As we see (13) below, Consonant Cluster Shortening applies when the level 1 affix is attached and the rule's application is blocked when the level 2 affix is attached to the base.

(13) a. Level 1 : Consonant Cluster Shortening applies
keep~kept, leave~left, deal~dealt, heal~health, deep~depth, wide~width, perceive~perception, receive~reception, intervene~intervention, retain~retention

b. Level 2 : Consonant Cluster Shortening does not apply
keep~keeping, perceive~perceiving, loud~loudness

That is, while the level 1 affixes influence phonological integrity of the base morpheme, level 2 affixes do not exert such effect. Therefore, we can state that the level 2 affixation does not influence phonological transparency of the morphemes.

3.2.3 Consonant Degemination

The rule of Consonant Degemination provides another example of the different phonological transparency between level 1 and level 2 affixes. As we see (14), when the level 1 affix is attached to the base, phonological transparency of the affix is not kept. That is, the consonant of the affix is deleted in the case of level 1 affixation. However, level 2 affixes maintain their phonological integrity, and thereby, keep phonological transparency.

(14) Consonant Degemination

a. Level 1 : Consonant Degemination Applies
innumerable [inu...] *[innume...]
immutable, commutation, [imyu...] [comyu...]
irreverent [irevərənt] *[irrevərənt]

b. Level 2 : Consonant Degemination does not apply
unnatural [ʌnnaečərəl] *[ʌnae...]
nonneutral [nannutrəl] *[nanu...]
ennoble [ɛnnobl] *[ɛnobl]

(Borowsky 1986:119-120)

In other words, in the case of level 1 affixation, the final consonants /n, m, r/ of *in-, im-,* and *ir-* are deleted, and so, the affixes lose their phonological transparency. In contrast, the consonant /n/ of *un-, non-,* and *en-* remains unchanged, and so, maintains its phonological transparency in phonological rule applications.[11]

3.3 The Correlation between Productivity and Transparency

Up to now, we have discussed the characteristics of level 1 and level 2 affixes in English in terms of their morphological productivity and semantic/phonological transparency. In other words, we have shown and explained that level 2 affixes in English are more productive and transparent. In this section, we will discuss the correlation between productivity and transparency. That is, we will attempt to explain why more transparent level 2 affixes are more morphologically productive.

Let us think about the *-th* affixation in English, which is generally regarded as an unproductive rule. We explain that its lower productivity is closely related to its lower semantic/phonological transparency. Specifically speaking, the words with the suffix *-th*, such as "*depth, breadth, length, youth*" are not phonologically transparent. That is, the base morphemes do not maintain their underlying phonological forms. Furthermore, the words with the suffix *-th* are not semantically transparent. For example, the meaning of "wealth" is not just "being well" (Haspelmath 2002). This feature of lower phonological and semantic transparency is inevitably related to the productivity of rules or affixes.[12]

As explained in Chapter 2, productivity is defined to be the ability to create new words (neologisms), and it is the strong requisite of new words that their pronunciation and meaning should be clearly understood by the speakers. In this regard, if the morphological rules or affixes produce new words that are easily

11) Szpyra (1989) and Booij & Rubach (1984, 1987) provide some more instances of rule applications that show phonological transparency of level 2 affixes.

12) Haspelmath (2002) explains the productivity difference of affixes in terms of the concept "regularity", which is almost the same as the concept of "transparency" in this paper.

pronounceable and comprehensible, they can be productive. In other words, if the new words are semantically and phonologically transparent, the chance for creating such new words will be much higher. Therefore, as was discussed in the previous sections, the level 2 affixes that have higher degree of phonological and semantical transparency will have more chances to be used in the creation of new words and we can explain their higher productivity in terms of their higher transparency.

4. Conclusion

This paper has discussed the relationship between morphological productivity and semantic/phonological transparency of affixes in English. Hay (2000, 2002a, 2002b) and Hay & Baayen (2002) argue that level 2 affixes in English are more productive than level 1 affixes and provided evidence for their argument. In addition, Hay (2002), Uffmann & Callies (2004), and Plag (2004) propose that more productive level 2 affixes exhibit higher semantic and phonological transparency.

Adopting the suggestions of Hay (2000, 2002a, 2002b), Uffmann & Callies (2004), and Plag (2004) on the productivity and transparency of level 1 and level 2 affixes in English, we, in this paper, provided more evidence for higher semantic and phonological transparency of level 2 affixes in English. In addition, we tried to provide an account for why more transparent level 2 affixes in English are more productive in word formation. Since the new words that are transparent semantically and phonologically can be understood more clearly by speakers, transparent affixes have higher chance for the creation of new words. That is, speakers have a tendency to create new words that are easily pronounceable and comprehensible. To the contrary, if the words are not transparent semantically and phonologically, the chance for neologisms would be greatly reduced. On the basis of transparency difference of level 1 and 2 affixes in English discussed in 3.1 and 3.2, we provided an explanation for the higher productivity of level 2 affixes in English. By providing an explanation and more evidence for higher semantic and phonological transparency of level 2 affixes in English, we could

affirm more clearly that level 2 affixes in English are more productive than level 1 affixes.

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논문접수일자: 2007. 6. 10
게재확정일자: 2007. 7. 20