Irregularities in English Phonology: Licensed Paradigm Identity

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Jee, Soo-Wook. 2000. Irregularities in English Phonology: Licensed Paradigm Identity. *Linguistics* 8-1, 297-316. In the paradigmatic identity-based theory, pairs of morphologically-related surface outputs are phonologically identical by output-to-output (OO) identity constraints. One of the purposes of this present study is to demonstrate that this paradigmatic identity-based theory can provide more explicit explanation of some irregular phenomena Sof English phonology which have been treated as mere exceptions. Another is to argue that the traditional affix-controled dichotomy of OO_1- and OO_2-Identity constraints should be modified or extended to that of $OO_{W(eak)}$- and $OO_{S(trong)}$-Identity constraints in order to cover more phonological processes in English. And the third is to suggest that some factors such as parts-of-speech, (in)direct semantic-relatedness, or etymology should licence OOw- and OOs-Identity constraints. **(Dong Yang University)**

1. Introduction

Benua (1995, 1997) argues that morphologically-related words are required to be phonologically identical by ranked and violable constraints on an OO-Identity relation by which pairs of surface forms are linked. This paradigmatic identity-based approach can obviate the need for intermediate stages of serial or cyclic derivation, since the distinct OO-Identity constraints, with direct relation to other phonological constraints, evaluate candidate outputs in parallel in terms of their identity with their corresponding output base from which the relevant word is derived.

In English affixation, the transderivational identity relation is established between the derived word and an output word, which is the base of an OO-Identity relation.[1] Thus, class 1 affixes like *-(ic)al* or *-(a)tion* are subcategorized by an OO_1-Identity relation and class 2 affixes like *-ness* or *-ing* are subcategorized by an OO_2-Identity relation, as shown in (1). Each relation is governed by a set of identity constraints: class 1 paradigms like *resign* ~ *resignation* are evaluated by OO_1-Identity constraints, and class 2 paradigms like *resign* ~ *resigning* are evaluated by OO_2-Identity constraints. Both sets of OO-Identity constraints are ranked in the English hierarchy of constraints, as other markedness and IO-Faith constraints are. These two classes of affixed words pattern differently, since OO_1-Identity and OO_2-Identity constraints have the different rank in the hierarchy of constraints.[2]

(1) Two OO-Identity Relations

Class 1	*resign* ~ *resignation*	Class 2	*resign* ~ *resigning*
Input:	/rɪzaɪgn/ /rɛzɪgn+eyʃən/		/rɪzaɪgn/ /rɪzaɪgn+ɪŋ/
	↓ ↓		↓ ↓
output:	[rɪzaɪn] → [rɛzɪgneyʃən]		[rɪzaɪn] → [rɪzaɪnɪŋ]
	OO_1-Identity		OO_2-Identity

The output base of the paradigms in (1), [rɪzain], does not realize one of the consonant cluster, [g]. This [g] also fails to surface in the class 2 affixed word *resigning*. It is argued that the [g] is not realized in the derived output [rɪzaɪnɪŋ] simply because there is no correspondent in the output base [rɪzain], either. OO_2-Identity constraint is higher-ranked than the IO-MAX, so the deletion of [g] overapplies in this affixed

1. The independently motivated subcategorization is used as a linking device.

2. Benua (1997:245) points out that learnability issues are involved in this meta-ranking (OO_2-Identity >> OO_1-Identity), in that learning is facilitated when a phonological pattern correlates with some other feature such as class membership.

word. On the other hand, the phonological behavior of class 1 affixed words is different, because OO_1-Identity is lower-ranked than IO-Faith. Thus, a word like *resignation* has the consonant [g] into its syllable structure, even if it fails to preserve paradigmatic identity with the source word [rizain].

This interaction of OO-Identity constraints with other phonological constraints accounts for various segmental processes and stress placement in morphologically-complex words of English. Especially, this approach can provide an explicit explanation of some irregular phenomena in English Phonology which have been treated as mere exceptions and thus cannot be accounted for.

In the next section, we will show that, in English, the interaction of these paradigmatic identity constraints and other phonological constraints accounts for the irregular phonological processes explicitly which have been treated as mere exceptions. In the third section, we will propose the modification to OOw- and OOs-Identity to cover other phonological processes, by pointing out that there are other paradigmatic identity-based processes which do not accompany affixes. The final section ends with conclusion and remaining issues.

2. Paradigmatic Analyses of Irregular Processes

2.1 Zero-morphemic Past Tense and Noun Plural Forms

The identity-based approach can capture the common conspiracy effect of irregular zero morphemes, whether they are past-tense forms or noun plural forms. In the traditional approaches based on the rule ordering or cycles,[3] there is no other way to account for the exceptional patterns which these verbs or noun plural forms of zero

3. In the framework of the standard generative phonology, the phonological rues are considered to apply in a strict order. And, in SPE, the principle of cyclic rule application is expressed in the system of strict rule ordering.

morphemes show, without treating them individually as mere exceptional cases. This is another advantage of the identity-based approach in that it accounts for the exceptional patterns of these irregular verbs and nouns. In some irregular zero-morphemic verb forms, we can account for the alternation by considering the suffixation pattern. With regard to this, let us consider how zero morpheme past-tense forms are realized. Usually, in affixation, morphologically-related words are not identical since the affix strings have no corresponding segments in the base. For this reason, affixation usually violates OO-DEP constraint, which has to be low-ranking in the constraint hierarchy, because affixation is a common process in many languages including English. For example, in the following paradigm (2), affixal segment [-t] in a derived word has no corresponding segment in the base, though the affixed word is related by IOAFFIX-MAX to the input /discuss+t/. Thus, affixation usually satisfies IOAFFIX-MAX constraint, stating that every affixal segment in the input has an output correspondent, while it violates a low-ranking OOAFFIX-DEP constraint, stating that every affixal segment in the derived word has a base correspondent. Table (3) shows the realization process of past-tense forms.[4)]

(2) /dɪskʌs/ *discuss* /dɪskʌs+t/ *discussed*

↓ IO-Faith ↓ IO-Faith

[dɪskʌs] → [dɪskʌst]

OO-Identity

(3) discuss ~ discussed, Ranking: IOAFFIX-MAX >> OOAFFIX-DEP

Candidates: a. discuss ~ discuss b. discuss ~ discussed

/dɪskʌs/ ~ /dɪskʌs+t/	IOAFFIX-MAX	OOAFFIX-DEP
a'. dɪskʌs ~ dɪskʌs	*!	
b'. dɪskʌs ~ ☞dɪskʌst		*

4. In this approach, the same optimal output is obtained, no matter what the input of the past-tense form may be.

The only difference between (3a′) and (3b′) is whether or not the affix gets pronounced. In paradigm (3a), the input affix /-t/ is not provided with an output correspondent, and thus IOAFFIX-MAX is fatally violated. Contrarily, the optimal paradigm (3b) satisfies IOAFFIX-MAX, though it violates the lower-ranked OOAFFIX-DEP constraint.

However, the reverse situation occurs in some exceptional irregular verbs. In English, some verbs have a zero(φ)-morpheme past-tense suffix. In the paradigms like *beat* ~ *beat*, *cast* ~ *cast*, or cost ~ *cost*, etc., the past-tense is represented by a zero morpheme. In the paradigm-based framework, these verbs are accounted for by the reverse constraint ranking of OOAFFIX-DEP >> IOAFFIX-MAX, as shown in (4), on the premise that these irregular zero(φ)-morphemes are subcategorized in some way to have OO-correspondence relation governed by OO-Identity constraints.

(4) beat ~ beat, Ranking: OOAFFIX-DEP >> IOAFFIX-MAX, IOAFFIX-DEP, IOAFFIX-IDENT[Voice]

Candidates: a. beat ~ beat b. beat ~ beated

/bit/ ~ /bit+t/	OOAFFIX-DEP	IOAFFIX-MAX	IOAFFIX-DEP	IOAFFIX-IDENT[Voice]
a′. bit ~ ☞bit		*		
b′. bit ~ bitɪd	*!*		*	*

This situation is also true of irregular noun plural forms like *sheep*, *cattle*, *people*, etc., in which OOAFFIX-DEP is higher-ranked than IOAFFIX-MAX, contrary to the regular alternation pattern, as shown in (5) and (6).

(5) book ~ books, Ranking: IOAFFIX-MAX >> OOAFFIX-DEP

Candidates: a. book ~ book b. book ~ books

/buk/ ~ /buk+s/	IOAFFIX-MAX	OOAFFIX-DEP
a'. buk ~ buk	*!	
b'. buk ~ ☞buks		*

In this form, the only difference between (5a') and (5b') is whether or not the plural affix *-s* gets pronounced. In paradigm (5a), the input affix is not provided with output correspondent, and thus IOAFFIX-MAX is fatally violated. The optimal paradigm (5b) satisfies IOAFFIX-MAX, though it violates the lower-ranked OOAFFIX-DEP constraint.

However, once again, the reverse situation occurs in exceptional zero-morphemic plural forms. In English, some nouns have a zero morpheme plural suffix: in nouns like *sheep* ~ *sheep*, *cattle* ~ *cattle*, or *people* ~ *people*, etc., the plural is represented by a zero morpheme. In the paradigm-based framework, these nouns are accounted for by the constraint ranking of OOAFFIX-DEP >> IOAFFIX-MAX which is the reversed situation of the regular pattern, as shown in (6).

(6) sheep ~ sheep, Ranking: OOAFFIX-DEP >> IOAFFIX-MAX
Candidates: a. sheep ~ sheep b. sheep ~ sheeps

/ship/ ~ /ship+s/	OOAFFIX-DEP	IOAFFIX-MAX
a'. ship ~ ☞ship		*
b'. ship ~ ships	*!	

In light of these findings, we can capture the common conspiracy effect of irregular zero morphemes, whether they are past-tense forms or noun plural forms. From this, we will conclude that these exceptionally-marked irregular zero affixes are supplied with a subcategorization frame that specifies the OO-Identity relation in some way. And this specification strongly links the zero affixed output in a paradigmatic identity relation. In these irregular forms, contrary to the regular pattern, OOAFFIX-DEP takes precedence over IOAFFIX-MAX and thus to preserve OO-Identity is more important than to obey the regular phonological alternation.

2.2 Crossing over the Heavy Penult

In English, the stress assignment is sensitive to the syllable heaviness. For example, the word *córrigible* has a weak penult and the stress falls on the antepenult, while the word *refrángible* has a stress on the heavy penult. But, unlike these words, both *góvernable*[5] and *bállastable* have the stress on the antepenult even though the penult is heavy. This fact is in direct violation of the heavy or weak cluster principle of English stress, and there is no way to alter the phonological shape of the suffix in such a way as to allow the stress to cross the heavy penult. The SPE analysis cannot account for this asymmetry. However, the paradigmatic identity-based analysis can account for this difference explicitly by the fact that there is *góvern* ~ *góvernable* or *bállast* ~ *bállastable* paradigm, while there is no corresponding paradigm in the form of **corrige* ~ *córrigible* or **refrange* ~ *refrángible* since there are no independent words such as **corrige* or **refrange*. Due to the OO_2-Identity relation triggered by the former paradigm, these morphologically-related words in the *-able* affixation are under the influence of OO_2-Identity constraint, especially ANCHOR, as shown (7).

(7) govern ~ governable, Ranking: OO_2-ANCHOR >> ALIGN-R

/govern/ ~ /govern+able/	OO_2-ANCHOR	ALIGN-R
a. góvern ~ go(vérnable)	*!	*
b. góvern ~ (góvern)able		**

As the suffix *-able* belongs to the class 2 affixes, it does not shift the stress rightward. On the contrary, since there is no paradigm in the form of **corrige* ~ *córrigible* or **refrange* ~ *refrángible*,[6] the stress

5. The words *governable*, *governess*, *governing*, *governor*, and *government* have the same stress pattern. This is attributed to the fact the suffixes like *-able*, *-ess*, *-ing*, *-or*, and *-ment* belong to the class 2 affixes.

assignment of these words containing *-ible* follows that of unaffixed words, as shown in (8).[7]

(8) Ranking: NONFINALITY, FtBin >> ALIGN-R

i) heavy penult *refrángible,*

	NONFINAL	FtBin	ALIGN-R
a'. re.fran(gíble)	*!	*	
b'. (ré.fran)gible . . . μ μ μ		*!	**
c'.☞re.(frán)gible | . μ μ			*

ii) light penult *córrigible*

	NONFINAL	FtBin	ALIGN-R
a'. co.rri(gíble)	*!	*	
b'. co(rrí)gible | μ		*!	*
c'.☞(có.rri)gible | | μ μ			**

Being adjectives, they are under the influence of NONFINALITY. Candidates (8ia') and (8iia') violate NONFINALITY by footing the final

6. If the *-ible* affixed words form a paradigm, as in *respónse* ~ *respónsible* or *convért* ~ *convértible*, these morphologically-related words show OO_2-Identity relation and thus are under the influence of OO_2-Identity constraint.

7. Here the bound affix *-gible* is analyzed to be a monosyllable consisting of peak and codas. SPE points out that *-able* or *-ible* is phonologically monosyllabic and phonetically bisyllabic by sonorant syllabification.

syllable. Candidates (8ib') and (8iib') have ill-formed feet; (8ib') has three moras, and in (8iib') the foot is monomoraic. The optimal candidates (8ic') and (8iic') are not good on ALIGN-R, but satisfy the higher-ranked constraints NONFINALITY and FtBin, emerging as optimal. Therefore, we can conclude that the different behavior between *góvernable/bállastable* and *córrigible/refrángible* is attributed to their different status, which, in turn, requires the different constraints governing their phonological behavior concerning stress. Whether relevant words form paradigms or not determines what kinds of constraints those words are influenced by. This fact also shows that the paradigmatic identity-based approach is an improvement upon the previous analysis, in the sense that the latter cannot account for this asymmetry.[8)]

2.3 Identity Relation in Unaffixed Paradigms

The fact that the presence or absence of a paradigm determines the governing constraints is seen in another example. The difference between the words of the first and second column in (9) is attributed to the extra cycle in the derivation of the nouns, as shown in (10). And the great difference between the words of the second and third column can be attributed to the fact that the words of the third column are not derived from associated verbs and therefore have never received primary stress on the final syllable. Even though SPE analysis attempts to account for the difference between these words through cyclic derivation, it cannot capture and nor is it intended to capture the close relation between paradigmatically-related words, since the derived

8. Unfortunately, there arise some exceptions, which cannot be accounted for by this OO2-Identity effect, in the words ending in *-able* such as *ádmirable*, *ápplicable*, or *réparable*. However, this problem can be solved if we consider the licensing conditions such semantic relatedness, etymology, or parts-of-speech as proposed later in this paper.

surface form is just a concomitant result of a serial application of rules in the cyclic derivation.

In contrast, the paradigmatic identity-based analysis accounts for this difference explicitly by the fact that there is *torménṭ ~ tórmèṇt, convíct ~ cónvìct,* or *expórt ~ éxpòrt* paradigm, while there is no corresponding paradigm in the word of *tórrent, vérdict,* or *éffort,* as shown in (11).

(9) torménṭ ~ tórmèṇt tórrent
convíct ~ cónvìct vérdict
expórt ~ éxpòrt éffort

(10) [N [V torment]V]N

1	V → [1 stress] / X ____ Co
1 2	V → [1 stress] / X ____ Co σ]N
1 3	Stress Adjustment Rule

(11) [torménṭ]V ~ [tórmèṇt]N

/torment/V ~ //torment/V/N	OO-ANCHOR
a. tor(ménṭ) ~ (tór)ment	*!
b. tor(ménṭ) ~ ☞(tór)(mèṇt)	

The verb output *torménṭ* is not compared to any output base, so it conforms to the regular stress pattern by ALIGN-R. The noun output *tórmèṇt* is subject to paradigmatic identity constraints; in particular, to the OO-ANCHOR triggered by morphologically-related verb *torménṭ.* In (11a), the paradigm *tor(ménṭ) ~ (tór)ment* fatally violates OO-ANCHOR. The optimal form (11b) which has the paradigm *tor(ménṭ) ~ (tór)(mèṇt)* satisfies OO-ANCHOR, though the second syllable of the former has a primary stress and that of the latter has a tertiary stress.

For this reason, there remains a stress on the final syllable of the words in the second column and thus the final vowel of these words is

not reduced to [ə]. On the other hand, the final vowel of the third column in (9) has no corresponding stress and thus is reduced to [ə].[9] Comparing whether these contrasting pairs of words constitute paradigms or not provides the reason for the different behaviors between them. It is evident that this paradigmatic identity-based analysis is superior to the previous analysis which does not provide an adequate explanation of this difference.

3. OOw-/OOs-Identity Constraints and Licensing

3.1 OOw(EAK)- and OOs(TRONG)-Identity Constraints

Further investigation of English phonology will reveal that the simple dichotomy of OO_1- and OO_2-Identity constraints based on the traditional criteria of English affixes is not enough. This section proposes that the affix-controled bifurcation of OO_1- and OO_2-Identity constraints should be extended to that of OOw(EAK)- and OOs(TRONG)-Identity constraints, and that there are some factors such as parts-of-speech, semantic relatedness or etymology which licence OOw(EAK)- and OOs(TRONG)-Identity constraints.

Obviously, the data investigated in 2.3 are not involved in any kind of affixes, but they show the paradigmatic identity effects. English truncation is another example. In English, truncated words are not influenced under the constraints on vowel quality in syllables closed by [r], as described by Kahn (1976). Ordinarily, the low front vowel [æ] does not appear in English words before an [r] that precedes another consonant or a pause. In this case [ɑ] appears at that position, as

9. In the case of the word like *tórrent*, we get the following result.

/torrent/N	NONFINALITY	ALIGN-R
a. ☞ (tór)rent		*
b. tor(rént)	*!	

shown in the word *car* [kɑr], *hard* [hɑrd], or *lark* [lɑrk]. However, truncated words behave exceptionally; the truncated names such as *Lar*, *Har*, or *Sar* have [æ], not [ɑ], in spite of the fact that these vowels precede a tautosyllabic [r]. The constraint prohibiting tautosyllabic [-ær] sequences does not apply to truncated forms. As a result, the truncated forms become identical to the initial string of their source words; in this way identity between morphologically-related words is preserved; and preserving the identity between the truncated word and its source word is more important than following regular phonological patterns.

There is further example which shows that the mere classification of OO_1- and OO_2-Identity constraints cannot account for the paradigmatic identity effects. In English a large majority of words of three or more syllables have the main stress on the antepenultimate vowel and the tertiary stress on the final vowel, as shown in (12).

(12) húrricàne, ánecdòte, pédigrèe, níghtingàle, báritòne,
énvelòpe, hypótenùse, cándidàte, Árkansàs

MSR[10] will account for the words[11] such as *Tennessée*, *attaché*, *chandelíer*, *kangaróo*, *chimpanzée*, etc., but not for a number of words listed in (12), which would incorrectly receive final primary stress by case (ii), under condition (e) of MSR (see fn 10).

In order to account for forms such as those in (12), another rule called the Alternating Stress Rule(ASR) is needed. ASR applies after

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10. Main Stress Rule (SPE:84)

$$V \rightarrow [1\text{stress}] \; / \; \_\_\_ \; \begin{cases} \{ C_0 \; [V, -\text{tense}] \; (C) \; \} & \text{(i)} \\ \{ C_0 \} & \text{(ii)} \end{cases} \; \begin{cases} [[V, -\text{tense}] \; C_0 \;]_N \; \} & \text{(b)} \\ [\;] \; \} & \text{(e)} \end{cases}$$

11. Almost all words of this pattern end in certain suffixes like *-eer*, *-ier*, *-ee*, or *-ette*.

MSR and assigns main stress to the antepenultimate syllable.

Now let us consider a typical example *húrricàne*. By MSR, primary stress is assigned to the final vowel by case (ii), under condition (e) of MSR, producing *hurricÁn*. By ASR, primary stress is assigned to the first vowel, and the stress on the final vowel is automatically reduced to secondary. To obtain the correct final form, we need a subsidiary rule called the Stress Adjustment Rule(SAR).

Thus, in the case of *hurricane*, these rules generate *húrricÀn* with [13] stress contour. The other examples of (12) can be dealt with in exactly the same way. On the other hand, some exceptional words like *Tennessée*, *attaché*, *chandelíer*, *kangaróo*, or *chimpanzée* must be lexically marked in some way so as to apply only MSR and to prevent application of both ASR[12] and SAR, as (13) shows.

(13)

hurricane ---MSR---> hurricáne ---ASR & SAR---> 1 3 húrricàne

Tennessee ---MSR---> Tennessée ----x----> [-ASR, -SAR] *Ténnessèe

Next let us consider the phrase in which these exceptionally-marked words are included. In isolation, the word *fifteen* or the adjective form *abstract* has main stress on the final syllable. But, in the phrase *fifteen men* or *abstract art*, we have the stress contour 231. The Nuclear Stress Rule converts the phrase *fifteen men* or *abstract art*, [1#1] contour pattern, to *fifteen men* or *abstract art*, [2#1] contour pattern, respectively. And then, to avoid the stress clash, the resulting [2#1] contour pattern is converted to [23#1] contour pattern, as shown in (14). To do this, SPE sets up the rule of Pretonic Weakening(PW).[13]

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12. Incidentally, for some words such as *refugee* or *magazine*, the application of ASR is optional. Thus, these words receive main stress on the first syllable when ASR applies and on the final syllable otherwise.

13. PW: [2stress] → [3stress] / ___ Co[V, 1stress]

(14)

	fiftéen mén		
	1 1		
→	*fifteen men*		
by Nuclear Stress Rule	2 1		
→	*fiftéen men,*	* *fiftéen men*	
by Pretonic Weakening	2 3 1	3 2	1
→	*fiftéen men*		
by SAR	3 4 1		

However, in the case of *Tennessee Valley* and *Tennessee Williams*, the phonetic output is [43#1] contour, not the canonical [34#1] contour. Therefore, before SAR applies, the previous contour must be 321, unlike most of the other usual 231 contours. This difference can be attributed to the paradigmatic OOs-Identity. Due to the paradigmatic OOs-Identity, as shown in (15), the final primary stress of *Tennessee* in *Tennessee Valley* or *Tennessee Williams* is not reduced to the canonical [3stress] pattern, but only to [2stress], because the primary stress is placed on the final syllable in the isolated form *Tennessée*, (not the ill-formed **Ténnessèe*), and PW does not apply to the phrase *Tennessee Valley* or *Tennessee Williams*.

(15)

Tennessee Valley	→	*Tennessee Valley*			
2 1	OOs-Identity	3	2	1	
	No PW	**Tennessee Valley*			
		2	3	1	

Here we can temporarily conclude that this pattern occurs, if ever, in several words only like *Tennessée, attaché, chandelíer, kangaróo,* or *chimpanzée,* which must be lexically subcategorized in some way so as to prevent application of PW. However, if we assume that these words must be lexically marked in some way in order to prevent application of ASR and SAR, it is obvious that these lexically marked words have a certain characteristic property or, at least, show an

invariance of some property: these words are exceptions to ASR, SAR and PW, due to the property of preserving OOs-Identity between paradigmatically-related words or phrases. These exceptional words should be marked in some way to guarantee OOs-Identity preservation. One of the devices is to use independently motivated subcategorization frame. In this sense, the paradigmatic identity-based approach is superior in that the OO-Identity constraint accounts for a kind of paradigm uniformity effect and misapplication of phonology in these lexically marked words, which the other approaches cannot account for.

3.2 Licensing

The OOw- and OOs-Identity constraints can have an influence on English phonology, only when they are licensed by the real existence of the paradigm. And the factors such as (in)direct semantic-relatedness, etymology, or parts-of-speech change (e.g., the change of verbs into nouns, as in *torménT~ tórmèntN*, *convíctV ~ cónvictN*, or *expórtV ~ éxpòrtN*) licence OOw- and OOs-Identity constraints. With regard to this point, let us consider the following data.

(16)a. compáre ~ compárable 'that can be compared'
b. compáre ~ cómparable 'roughly equal'
c. repáir ~ repáirable 'that can be repaired'
d. repáir ~ réparable '(of a loss, etc) that can be made good'
e. applý ~ ápplicable 'that can be applied'
f. dený ~ denîable 'that can be denied'
g. admîre ~ ádmirable 'that can be admired'

The stress assignment of the paradigm *compáre ~ compárable* is under the influence of the OOs-Identity constraints, since the output base and the derived output have a direct semantic-relatedness and thus this OOs-Identity relation is licensed. Contrarily, the paradigm *compáre*

~ *cómparable* shows the different behavior concerning the stress assignment. In the paradigm *compáre* ~ *cómparable*, the meanings of the output base *compáre* and the derived word *cómparable* are not directly related, which does not license the OOs-Identity. (17) shows the stress assignment of the paradigm *compáre* ~ *compárable* and *compáre* ~ *cómparable*, respectively.

(17) i) Stress Assignment of the output *compárable*

/compare/ ~ /comparable/	OOs-Identity	FtBin	ALIGN-R
a. compáre ~ (cóm)pa.rable μ μ	*!		**
b.☞compáre ~ com(pá)rable μ		*	*

ii) Stress Assignment of the output *cómparable*

/comparable/	FtBin	ALIGN-R
a. com(pá)rable | μ	*!	*
b.☞(cóm)pa.rable || μ μ		**

In (17i), the direct semantic-relatedness licenses the OOs-Identity, which preserves the stress in the second syllable. On the contrary, the indirect semantic relatedness of the paradigm *compáre* ~ *cómparable* disrupts the OOs-Identity and thus the word *cómparable* behaves as if it is monomorphemic: it has a weak penult and the stress falls on the antepenult, as shown in (17ii). And the same explanation is possible in the different pattern of the paradigm *repáir* ~ *repáirable* (16c) and

repáir ~ *réparable* (16d). This asymmetry cannot be accounted for by the simple OO_2-identity relation.

In the case of the paradigm *applý* ~ *ápplicable*, the unexpected appearance of the segment 'c' in the word *ápplicable* disrupts the OOs-Identity relation and cannot license the OOs-Identity. This difference can be partly attributed to etymology. On the contrary, the paradigm *dený* ~ *deníable* is under the influence of the OOs-Identity constraint, as expected, since there is no factor which can disrupt the OOs-Identity relation. The word *ápplicable* of the unlicensed paradigm behaves as if it is unaffixed: it has a weak penult and the stress falls on the antepenult, as shown in (18i). As compared with this, (18ii) illustrates the stress assignment of the word *deníable* which follows the expected pattern.

(18) i) Stress Assignment of the word *ápplicable*

/applicable/	FtBin	ALIGN-R
a. æ(plɪ)kəbl | μ	*!	*
b. ☞(æ.plɪ)kəbl | | μ μ		**

ii) Stress Assignment of the word *deníable*

/deny/ ~ /deniable/	OOs-Identity	FtBin	ALIGN-R
a. denɣ ~ dɪnaɪ.əbl	*!		**
b. ☞ denɣ ~ dɪnáɪ.əbl		*	*

Interestingly enough, there is another factor which can disrupt the OOs-Identity relation and trigger unexpected stress assignment. In the paradigm *admíre* ~ *ádmirable*, the stress would be assigned to the second syllable of the word *ádmirable*, if it were pronounced as [ədmaɪə rəbl]. But the de-diphthongization which occurred to the word *admirable* does not license the OOs-Identity relation and shifts the stress to the

first syllable, as shown in (19).

(19) Stress Assignment of the word *ádmirable*

/admirable/	FtBin	ALIGN-R
a. æd(mɪ́)rəbl | μ	*!	*
b. ☞(æd)mərəbl :| μ μ		**

4. Conclusion and Remaining Issues

In English, the different behaviors of class 1 and class 2 affixed words are triggered by the differential rank of identity constraints on two distinct OO-Identity relations: OO_2-Identity constraints are ranked higher than OO_1-Identity constraints. Thus, in class 2 affixation, to preserve OO_2-Identity is more important than to obey phonological pattern. This meta-ranking of OO_2-Identity >> OO_1-Identity, which is conceived to be closely related with language learners' learnability, accounts for many irregular as well as regular phonological phenomena in English.

But there are many processes for which the mere classification into OO_1- and OO_2-Identity constraints cannot account. Those cases can be accounted for if we set up the OOw- and OOs-Identity constraints, which cover the various phonological processes, as shown in (20).

(20) Coverage of OOw- and OOs-Identity constraints in English Phonology

i) OOw-Identity constraints: processes occurring to the class 1 affixed words

ii) OOs-Identity constraints:

a. processes occurring to the class 2 affixed words

b. processes triggered by zero-morphemes
c. truncation
d. stress pattern of some nouns derived from corresponding verbs, e.g., *torment ~ tormènt, convict ~ cónvict*, etc.
e. non-occurrence of expected stress shift in phrases, e.g. *Tennessee Valley*

And the superficial existence of the members of a given paradigm does not always guarantee the OO-Identity relation, as discussed in the paradigm *compáre ~ cómparable*. The semantically indirect relation does not licence the OOs-Identity constraint and thus the derived output behaves as if it is monomorphemic. (In)direct semantic-relatedness, etymology, or certain processes such as de-diphthongization are factors which licence OO-Identity constraints.

However, this argument is not conclusive. For the present, it suffices to point that there exist some factors which disrupt OO-Identity relation. Many different types of English phonology need to be investigated further on the exact nature of those unlicensing factors. Broader cross-linguistic investigation will provide a clue to the solution of this problem.

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