English Dialects and Optimality Theory: Prominent Feature Hypothesis

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Roh, Keun-Young. 2004. English Dialects and Optimality Theory: Prominent Feature Hypothesis. *SNU Working Papers in English Language and Linguistics* 3, #-#. This study investigates variation in Optimality Theory. Variation is the case of a single underlying form being mapped onto multiple outputs. Dialectal variants are realizations of the same input. However, many lexical items of historically and geographically close languages share the same input at the phonological level. Thus, the same input can be mapped onto not only variants of one language, but also those of other languages. However, the way to distinguish variants of one language from those of another language inside phonological theories has never been examined. This paper puts forward the Prominent Feature Hypothesis which states that the variants of a particular language share some features in the contents of change process, and attempts to validate the hypothesis from Optimality-theoretic point of view. **(Seoul National University)**

Keywords: Prominent Feature Hypothesis, the contents of change process, Optimality Theory, variation

1. Introduction

When a single underlying form is mapped onto multiple outputs, variation occurs. Multiple outputs are called variants. Dialectal variation is a synchronic variation in a language, and dialectal variants are realizations of the same input. However, historically and geographically close languages have many lexical items whose phonetic realizations in one language are similar to those of other languages, and we can say these items share the same input at the phonological level. Thus, the same input can be mapped onto not only variants of one language, but also those of other languages. However, the way to distinguish variants of one language from those of another language inside phonological theories has never been examined.

In this paper, I attempt to find if there is any possibility that such

a method exists inside the scope of phonological theory using various dialects of English as data of analysis.

2. Explanation of synchronic variation

In this chapter, we will see how variation is dealt with in rule-based theories and Optimality Theory. Then, we will show that the formal mechanism of each theory is insufficient to distinguish between dialectal variations in one language and cross-linguistic variations. In section 2.3, the Prominent Feature Hypothesis will be presented.

2.1 Rule-based theories

In rule-based derivational theories, the key mechanism in grammar is the rewrite rule to capture the relation between input and output. The format of the rewrite rule is as follows:

(1) Format of context-sensitive rewrite rule
$A \rightarrow B \ / \ X\_\_\_Y$

Element A (focus) is rewritten as element B in the context of element X and Y. Each rule makes precisely one 'structural change' (A→) to the input. For a rule to apply to an input, the input must match the rule's 'structural description' (XAY).

Now let us see how dialectal variation is modelled in the rule-based theory. As Chambers and Trudgill (1980) mention, Rule-based theories assume that a single underlying form is posited for surface forms in related dialects. Multiple output forms witnessed in dialectal variation have been analyzed by means of the notions of rule addition, rule loss, rule re-ordering, and rule inversion (Halle 1962, Schane 1969, Vennemann 1972, Calabrese 1989, and others). The table in (2) illustrates how rules and their ordering relationship give rise to phonological differences among Northern Greek dialects.

(2) Dialectal variation of /Dikosmu/ 'my own'
(Chambers and Trudgill 1980:47)

	Macedonia	Thessaly	Epirus	Euboea
UR	/Dikosmu/	/Dikosmu/	/Dikosmu/	/Dikosmu/
Rules	(A) Dkosm (B) ɵ ɔzm (C) ɵ ɔzim	(A) Dkosm (B) ɵ ɔzm (C) ɵ ɔzim (D) ɵ ɔzum	(A) Dkosm (C) Dkosim (B) ɵ ɔsim	(A) Dkosm (C) Dkosim (B) ɵ ɔsim (D) ɵ ɔsum
SR	[ɵ ɔzim]	[ɵ ɔzum]	[ɵ ɔsim]	[ɵ ɔsum]

Rule (A): High vowel loss: unstressed /i/ and /u/ are lost.
Rule (B): Voicing assimilation: voiceless stops become voiced before voiced stops; voiced stops become voiceless before voiceless stops.
Rule (C): Vowel epenthesis: when the final consonant of a word-final consonant cluster is nasal, an /i/ is inserted before the nasal.
Rule (D): Rounding: /i/ becomes /u/ before a following labial consonant.

Then, how is cross-linguistic variation accounted for in rule-based theories? Rule-based theories assume that rule sets are language-specific. Suppose that a single input /I/ is realized as three variants of English, E1, E2 and E3, and the same input is realized as one variant of German, G1. Suppose also that a rule set that leads to E1, E2, E3, and G1 is R1, R2, R3, and R4 respectively. The diagram showing input-output mapping is as follows:

(3) /I/ → E1 (by English-specific Rule set 1)
→ E2 (by R2 = derived from R1)
→ E3 (by R3 = derived from R1)
→ G1 (by R4 = German-specific Rule set)

R2 and R3 leading to E2 and E3, respectively, are derived from R1 by applying rule addition, rule loss, rule re-ordering, and rule inversion to English-specific Rule set 1. Here, let us consider G1 and its rule set R4. G1 shares the input with E1, E2, and E3, and its rule set R4 is similar to R2 or R3. Thus, G1 seems like the fourth variant of English, and R4 seems like the derivative rule set like R2 or R3. However, rule-based theories say R4 is a German-specific rule set, and is not derived from R1. As the diagram in (3) shows, rule-based theories make a distinction between derivative rule sets such as R2 & R3 and independent language-specific rule set such as R4, and thereby between English variants E2 & E3 and German variant G1. But we cannot say that such distinction is explained inside the scope of rule-based theories. Such distinction relies on the fact that G1, the form which is led to by R4, is a German form. But the only way we may acknowledge that G1 is a German form is to look at extra-linguistic factors.

In short, outputs from dialects of one language are not differentiated from similar outputs from another language by 'formal mechanism' of rule-based theories.

2.2 Optimality Theory

Optimality Theory (henceforth OT) is a theory of constraints and the rankings to govern the well-formedness of the output. It consists of two components: Generator (Gen) and Evaluator (Eval).

Gen is a function that, when applied to some input, produces a set of candidates, all of which are logically possible analyses of this input, and submits these candidates to Eval. Eval is the set of universal constraints, which evaluates output candidates as to their harmonic values, and selects the optimal candidate.

The following tableau (4) shows how the optimal output is selected by ranked constraints.

(4) A 》 , /input/→ :and1

candidates	A	B
☞ :and1		*
cand2	*!	

In tableau (4), constraint A on the left side dominates constraint B on the right side. The star mark represents the violation of a constraint, and the exclamation mark means the fatal violation. Cand2 marked with exclamation mark is ruled out, and fails to be an optimal output. The optimal output is cand1, which is indicated by index.

Now let us see how dialectal variation is modelled in OT. One main mechanism invoked in OT is constraint reranking. With constraint reranking, one ranking produces one output form and an alternative ranking produces another output form. Multiple output forms for a single underlying form are thus explained by different tableaux with different rankings.

Then, how is cross-linguistic variation accounted for in OT? OT assumes that cross-linguistic variations result from different permutations of the set of universal constraints. As Prince and Smonlensky (1993) say, every permutation of the constraints is predicted to be a possible human language and the grammar of every observed human language must be one of those permutations. That is, each language is distinguished by a different ranking of constraints.

However, it may not be clear-cut to differentiate reranking and permutation. Let us consider /ng/ cluster in coda for an example. See tableaux in (5).

(5) /ng/ in coda → ŋ (E), ŋ (E), ŋ (G)

/ng/	A	B	C
a. ŋ	*		
b. ☞ ŋ			*
c. ŋ		*	

/ng/	C	B	A
a. ☞ ŋ			*
b. ŋ	*		
c. ŋ		*	

reranking

/ng/	A	C	B
a. ŋ	*		
b. ŋ		*	
c. ☞ ŋ			*

German permutation

In the first tableaux, [ŋ | in English is selected by the ranking A >> B >> C. In the second tableaux, however, reranking occurs and the ranking becomes C >> B >> A, which leads to [ŋ in English. Dialectal variation in English is dealt with this way. On the other hand, when we explain the German form [ŋ |, which is cross-linguistic variation, we say that it is obtained by German permutation A >> C >> B, which differs from English permutation A >> B >> C or C >> B >> A.

But, as we see in the example above, participating constraint sets are almost identical or at least much similar when dialectal variants and cross-linguistic variants share the same input. Then, it is impossible to differentiate among possible orders of constraints which one is reranking of other ranking of constraints and which one is language-specific permutation. Thus, in this situation, we may say cross-linguistic variations from different permutations and dialectal variations from reranking of one permutation are not distinguished by OT's 'formal mechanism' such as reranking and permutation.

2.3 Prominent Feature Hypothesis on dialectal variations

It is observed in the preceding sections that formal mechanisms are not able to determine which variant belongs to which language both in rule-based theories and in OT. Thus, if there is any possibility that such distinction can be expressed inside the scope of phonological theories, the contents of change process will be the only place in which it will be revealed. When formal realization procedures are not distinguishable, the only location where we can look for differences is what the procedures are operating on. In accordance, we can build up a hypothesis from this assumption:

(6) The variants of a particular language share some features in the contents of change process, and the language of a variant can

be identified by inspecting whether the variant has these features that all the variants of the language share.

Let us call the above statement Prominent Feature Hypothesis. We will call these shared features language-specific prominent features because all variants of the language share the features. If such language-specific prominent features[1] exist and we can verify their existence, we can therefore determine which variant belongs to which language.

Language-specific prominent features can be studied both in rule-based theories and OT. However, I choose OT as the theoretical framework. That is because OT is preferable in two aspects: both practical aspect and theoretical aspect.

In the practical aspect, OT is superior to rule-based theories. In OT, every variant is in one tableaux and is compared with others in parallel. We can see the contents of change process of every variant at a glance, and therefore finding shared features is relatively easy.

Also in the theoretical aspect, OT is more suitable for explaining variation than rule-based derivational theories as Reynolds (1994) addresses. First, OT has more potential to explain the reason why variations occur. Second, constraints are theoretically violable, and thereby flexible while rules and rule orderings are inflexible.

3. Scope

In this chapter, I will present the scope of the thesis. First, the process to figure out the features of English will be presented in section 3.1. In section 3.2, English dialects to be investigated will be shown. Following this, chapter 4 offers analyses of the data.

3.1 The process to figure out the features of English

First, I select several cases where variants appear. In consonantal

1 Furthermore, if the features are unique to that language, one can safely state that indeed the variant belongs to the language. However, we cannot judge whether a feature is unique to a language or not here because it can only be acknowledged by comparing that language's features with other languages' features.

phonology, the following cases are analyzed: consonant /t/, consonant /p, k/, and consonant /l/ in coda. In vocalic phonology, the vowel system in English is investigated.

Next, case by case, I identify variants of each case. On the basis of variants found, I will figure out relevant constraints. I start with the constraint sets which have been suggested in the previous studies. When new variants are found, I will add additional constraints to the set if there are already constraints which can be used in this case, or I will propose new constraints if there exists none at all. Then, I will justify constraint rankings for all variants I have identified.

Then, case by case, I will find the constraints all variants which we have listed in each case satisfy. I will regard these constraints as the prominent feature that is specific to English in each case. The reason for this is that these constraints are always satisfied by all identified variants although constraint rankings change for each variants.

3.2 English dialects

English dialects according to J.C.Wells' (1982) classification are to be investigated.

(7) a. The British Isles
- England: RP, London (London Regional Standard, Cockney),
  The south (Norwich, Bristol),
  The north (Birmingham, Leeds)
- The Celtic countries: Wales, Scotland, Ireland (Southern, Northern)

b. Beyond the British Isles
- North America: General American, Canada, New York City, New England, The south, Black English
- The southern hemisphere: Australia, New Zealand

4. Consonantal phonology: Consonant /t/

In this chapter, consonant /t/ only will be dealt with. The rest of the other cases will be summarized in the conclusion of the paper.

The consonant /t/ is often glottalized into the glottal stop [ʔ in some dialects of English. The effect of the glottalization of /t/ to [ʔ can be formulated as in (8), according to Wells (1982). The expression 'true C' (true consonant) covers obstruents and nasals, but not liquids or semi-vowels. 'L' stands for non-syllabic liquids, 'S' for semi-vowels. The distinction between word-internal and word-final is suggested by B.-J. Koo (2003).

(8) t → ʔ / V (L or nasal) ____ [a. through h.]

environment after /t/	/t/ in word-internal/ final	examples
a. ___ # true C	word-final (coda)	quite [kwaɪ now quite good
b. ___ # L or S	word-final (coda)	at [æ last quite likely
c. ___ # V	word-final (onset)	get [gɛʔ up quite easy
d. ___ pause	word-final (coda)	Quite!
e. ___ true C	word-internal (coda)	football [fʊʔ ɔ witness [wɪ ɪ
f. ___ L or S	word-internal (coda)	scotland [skɔʔ æ ɖ] mattress [mæ ɪ
g. ___ [m`, n`, N, l`]	word-internal (onset)	bottom [bʌʔm`] button [bʌʔn`] bottle [bʌʔl`]
h. ___ V	word-internal (onset)	later [lɛɪ ɹ butter [bʌʔə

The dialects showing glottalization are illustrated in (9):

(9)

environment after /t/	dialects
a. ___ # true C	RP, parts of American English, Cockney, New York city
b. ___ # L or S	RP, parts of American English, Cockney, New York city
c. ___ # V	RP, Cockney, New York city
d. ___ pause	Cockney, New York city
e. ___ true C	RP, Cockney, New York city
f. ___ L or S	Cockney, New York city
g. ___ [m`, n`, N, l`]	parts of American English, Cockney, Canada
h. ___ V	Cockney

Also, /t/ is in England preceded in certain syllable-final environments by [ʔ it is referred to as Preglottalization or Glottal Reinforcement (Wells 1982). The effect of Preglottalization can be formulated as (10) by Wells:

(10) Ø→ ʔ / V (L or nasal) ____ [t]

environment after /t/	/t/ in word-internal/ final	examples
a. ___ # true C	word-final (coda)	quite [kwaɪ now quite good
b. ___ # L or S	word-final (coda)	at [æ last quite likely
c. ___ # V	word-final (onset)	get [gɛʔ up quite easy
d. ___ pause	word-final (coda)	Quite!
e. ___ true C	word-internal (coda)	football [fʊʔ ɔ witness [wɪ ɪ
f. ___ L or S	word-internal (coda)	scotland [skɔʔ æ d] mattress [mæ ɪ
g. ___ [m`, n`, N, l`]	word-internal (onset)	bottom [bʌʔ m`] button [bʌʔ n`] bottle [bʌʔ l`]
h. ___ V	word-internal (onset)	later [lɛɪ ə butter [bʌʔ ə

The environments for preglottalization in (10) are same as those for glottalization in (8) above.

The dialects showing preglottalization are illustrated in (11):

(11)

environment after /t/	dialects
a. ___ # true C	RP, Cockney
b. ___ # L or S	RP, Cockney
c. ___ # V	Cockney
d. ___ pause	RP, Cockney
e. ___ true C	RP, Cockney
f. ___ L or S	RP, Cockney
g. ___ [m`, n`, N, l`]	Cockney
h. ___ V	Cockney, Northern England

Now let us turn to an OT account of /t/ variation involving glottalization and preglottalization. The constraint set related to /t/ is in (12):

(12) a. Ident-IO(place): A place feature in input has a correspondent in output.

b. Ident-IO(place/Ons): A place feature of onset in input has a correspondent in output.

c. Coda-Condition: Features for place are not licensed in coda.

$$\begin{array}{c} * \ C]\sigma \\ | \\ [\text{place}] \end{array}$$

d. Dep(C): Output segments must have input correspondents.

e. Max(voice/perception): Maximize the voicing contrast of stops in coda perceptually.

The constraints for glottalization (12a) to (12c) are proposed by B.-J. Koo (2003). I propose the constraints for preglottalization (12d) and (12e).

Let us begin with word-initial /t/. As seen in (8) and (10), word-initial glottalization and preglottalization does not occur.

(13)

tea /ti/	Ident-IO (place/Ons)	Ident-IO (place)	Dep(C)
a. ☞ ti			
b. ʔ	*!	*	
c. ʔ			*

The only winner [ti] satisfies Ident-IO(place/Ons), Ident-IO(place), and Dep(C). These three constraints are shared constraints, and thereby they are prominent features for English word-initial /t/ as the cells with thick border line represent.

Now, we will examine /t/ in word-internal or final position focusing on the syllabic position of /t/. In word-internal or final position, both glottalization and preglottalization occur. Let us first see /t/ in the coda as in (8a, b, d, e, f).

The following ranking results in coda /t/ glottalization:

(14)

bet /bɛt/	Ident-IO (place/Ons)	Coda-Cond	Ident-IO (place)	Dep(C)	Max(voice/perception)
a. bɛt		*!			*
b. ☞ bɛʔ			*		
c. bɛʔ		*!		*	

Both candidate (a) and (c) violate highly-ranked Coda-Cond since [t] in coda has the [place] feature. On the other hand, the candidate (b) satisfies Coda-Cond because the glottal stop [ʔ in coda lacks the [place] feature. Therefore, [bɛʔ is selected as optimal.

The ranking in (15) leads to coda /t/ preglottalization:

(15)

/bɛ ˈ	Ident-IO (place/Ons)	Ident-IO (place)	Coda-Cond	Max(voice/perception)	Dep(C)
a. bɛ			*	*	
b. bɛʔ		*!			
c. ☞ ɔɛʔ			*		*

The candidate (b) violates highly-ranked Ident-IO(place), and is ruled out. Between candidate (a) and (c), the candidate (c) is chosen. As shown in (15), the candidate (c) satisfies Max(voice/perception) while the candidate (a) violates it. Let us see how [bɛʔ is selected. A voiceless stop /t/ in coda position are non-release. A voiced counterpart /d/ in that position are also non-release, and even partially devoiced. Therefore, voiceless stops and voiced stops in the coda come to be 'less distinct perceptually' (Steriade 2000) or 'perceptually poorly cued' (Wilson 2001). In this situation, the voicing contrast of stops in coda position is established by the length of a preceding vowel rather than the voicing of stop in coda position. In other words, the length of a preceding vowel is the perceptual cue to the voicing contrast of stops in coda. The vowel before voiceless stops is shorter than that before voiced ones (S.-B. Jeon 1995). For example, the vowel in *bet* is shorter than that in *bed*. If we assume the inserted voiceless stop [ʔ before a voiceless stop /t/ can reinforce the relative shortness of the preceding vowel, then we can say that the perceptual cue to the voicing of stops in coda position can be reinforced. This assumption is supported by Hughes A. and Trudgill P. (1996: 39), who say "the glottal stop is used by some speakers to reinforce /p, t, k/ in syllable-final position". Based on this assumption, let us compare [bɛʔ ɛ ɛ ɛ | pair for an example. The voicing contrast of stop [t/d] in the first pair is greater than that in the second pair because the relative shortness of the preceding vowel before voiceless stop [t] is reinforced by inserted [ʔ before it:

(16) a. voicing contrast hierarchy in coda:
voiceless stop preceded by [ʔ 》 ɔiceless stop
ex) [bɛʔ 》 ɛ ɛ |

In sum, preglottalization in coda position is a phenomenon that is affected by perceptibility factors, and it increases the voicing contrast of stops in coda position. Therefore, I have proposed a perception-based constraint in (12e) above. Max(voice/perception) is satisfied by [t] in [bɛʔ ɛ .

Let us next look at /t/ in the onset such as (8c, g, h). The dialects having the glottalized /t/ in the onset, are assumed to allow ambisyllabicity. Ambisyllabicity represents the double-linked status of a consonant between vowels. Therefore, intervocalic /t/ is considered as not only onset but also coda. As a result, [t] in onset position violates Coda-Cond due to ambisyllabicity, but [ʔ in that position satisfies it. The ranking for the onset /t/ glottalization is as follows:

(17) Tableau for *Peter*

/pitə	Coda-Cond	Dep (C)	Ident-IO (place/Ons)	Ident-IO (place)
a. ☞ pi.ʔə			*	*
b. pi.tə	*!			
c. piʔ ə		*!		

The ranking for the onset /t/ preglottalization is as follows:

(18)

/pitə	Coda-Cond	Ident-IO (place/Ons)	Ident-IO (place)	Dep (C)
a. pi.ʔə		*	*	
b. pi.tə	*!			
c. ☞ piʔ ə				*

Candidate (a) [pi.ʔə violates Ident-IO(place/Ons) and Ident-IO(place) while candidate (b) [pi.tə violates highest-ranked Coda-Cond. As a result, preglottalized candidate (c) is selected as optimal. Although candidate (c) [piʔ ə ʔ ə due to [ʔ insertion, and thereby satisfies Ident-IO(place/Ons),

Ident-IO(place), and Coda-Cond. Onset [t] in [piʔ ə remains intact, so Ident-IO(place/Ons) and Ident-IO(place) are satisfied. Coda [ʔ ʔ ə makes Coda-Cond satisfied. Another possible candidate [pi.ʔ ə is suboptimal to candidate (c) [piʔ ə because it violates both Dep(C) and *Complex^{ons}[2].

The complete constraint ranking for /t/ variation is summarized in (19):

(19) The complete constraint ranking for /t/ variation

a. Word-initial (no glottalization and preglottalization)

Ranking: Ident-IO(place/Ons) 》 ep(C)

Feature: Ident-IO(place/Ons), Ident-IO(place) and Dep(C)

b. Word-internal/final

i. /t/ in coda position (with Max(voice/perception) in the ranking)

- ithful realization:

Ident-IO(place/Ons) 》 》

Coda-Cond, Max(voice/perception)

- ottalization:

Ident-IO(place/Ons) 》 》

Ident-IO(place), Dep(C), Max(voice/perception)

- eglottalization:

Ident-IO(place/Ons) 》 》 》

Max(voice/perception) 》 ep(C)

ii. /t/ in onset position

- ithful realization:

Ident-IO(place/Ons) 》 》

Coda-Cond

- ottalization:

Coda-Cond, Dep(C) 》 》

Ident-IO(place)

2 This constraint means that onsets must be simple.

- eglottalization:
  Coda-Cond 》 》 》
  Dep(C)

As indicated in (19a), English-specific features for word-initial /t/ can be captured: Ident-IO(place/Ons), Ident-IO(place) and Dep(C).

5. Conclusion

This paper has put forward the Prominent Feature Hypothesis which states dialectal variations in one language share some features in the contents of change process, and attempted to validate this hypothesis in OT. I have dealt with various dialects of English and several cases as data of analysis, and attempt to identify English-specific prominent features from the Optimality theoretic point of view. Language-specific prominent features in OT are represented as the constraints all variants satisfy in each case because these constraints are always satisfied by all identified variants although constraint rankings change for each variant.

English-specific prominent features figured out in each case are shown in (20):

(20) English-specific prominent features

- Consonantal Phonology

a. Consonant /t/
   word-initial:
   Ident-IO(place/Ons), Ident-IO(place) and Dep(C)

b. Consonant /p, k/
   word-initial:
   Ident-IO(place/Ons), Ident-IO(place) and Dep(C)

c. Consonant /l/ in coda:
   * Mid-low or low vocoids for vocalized l in coda

- Vocalic Phonology

Vowel system: Maintain 9 V Contrasts

It should be concluded, from what has been said above, that there is possibility that language-specific prominent features exist, and are identifiable in OT. Therefore, there is possibility that variants of one language are distinguishable from those of other languages inside the scope of phonological theories.

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