

OT Analysis of Vowel Sounds of RP and GA

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Jin Ho Ryu. 2012. OT Analysis of Vowel Sounds of RP and GA. *SNU Working Papers in English Linguistics and Language X, XX-XX*. This study is dedicated to explain the pronunciation differences between Received Pronunciation (RP) and General American (GA). The pronunciations of vowels of RP and GA are compared by the means of the constraints of Optimality Theory (OT). This study focuses on three sets of vowels from RP and GA: /ɑ/ and /æ/ as in *class*, /ɒ/ or /ɔ/ and /ɑ/ as in *hot* or *thought*, and /ju/ and /u/ as in *tune*. To explain the surface representations of each set in each of RP and GA, OT constraints and their relative ranks were constructed. (Seoul National University)

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1. Introduction

The two most acknowledged variations of English, Received Pronunciation (henceforth RP), the standard British English, or so-called *BBC English* or *Queen's English*, and General American (henceforth GA), the Midwest American English, possess a few notable distinctions. RP has lost rhoticity which GA has managed to maintain. RP pronounces every /t/ whereas GA reduces medial /t/ to a flap. Also, the vowels of RP and GA are quite distinct.

Among the numerous vowel differences, three types of distinctions draw attention. First is the vowel 'a'. In RP, Vowel 'a' of words such as *class* is pronounced as /ɑ/, whereas it is pronounced as /æ/ in GA. Second, the two RP vowels, /ɒ/ as in *hot* and /ɔ/ as in *thought* are both pronounced as /ɑ/ in GA – it is noted that some dialects of GA maintains the distinctions, but the trend is in a steep descend. The last is the insertion of palatal glide before high front rounded vowel /u/ as in

tune or *due* in RP which are pronounced without the glide in GA. These three distinctions are the most remarkable vowel distinctions of RP and GA.

In this paper, these three major distinctions in vowel sounds will be examined through Optimality Theory and the constraints behind the surface representations of these words will also be identified. The results will be interpreted and attempted to be generalized in terms of *markedness* and *faithfulness*¹. Although there have been many studies on phonological differences of RP and GA, not many were done in terms of optimality theory constraints. Unfortunately, Optimality theory has had its prosperous age and now in recess, so there aren't many studies in progress at the present. This study aims to explain the vowel distinction between RP and GA through Optimality Theory Constraints, and thus propose a new or unvisited method of explaining the differences. I hope this study could be an opportunity to bring a new light to Optimality Theory (OT).

2. Data sets and question

The data sets for this study will consist of words whose vowels are pronounced differently in RP and GA. The words are categorized into three groups. Set 1 consists of words with vowel *a* which is pronounced /ɑ/ in RP, but /æ/ in GA such as *class*. Set 2 consists of words with vowel *o* or *au* which are pronounced /ɒ/ or /ɔ/, but /ɑ/ in GA, for example, *thought*. Set 3 consists of words with the vowel sound /u/ with a palatal glide inserted before it, for instance, *tune*. In each data set, the

¹ McCarthy, Roca and Johnson define faithfulness as the identity requirement between input and output structure, meaning surface form and lexical form must be identical. This constraint concerns the sounds and numbers of vowels and consonants. Markedness is defined as violation-marking constraint on output structure, meaning that the unnaturalness of output structure. Marked sounds are less frequent and require more effort in producing.

orthography and IPA transcription (broad) of each word is provided. The data sets are borrowed from Dimitrova's article, *British and American Pronunciation*, and given below.²

2.1 Set 1 RP /æ/, /ɑ/ and GA /æ/

	Received Pronunciation	General American
class	klɑ:s	klæs
last	lɑ:st	læst
ask	ɑ:sk	æsk
answer	ɑ:nsə	ænsəɪ
laugh	lɑ:f	læf
advance	əd.vɑ:ns	əd.væns
can't	kɑ:nt	kænt

2.2 Set 2 RP /ɒ/, /ɔ/ and GA /ɑ/

	Received Pronunciation	General American
box	bɒks	bɑ:ks
hot	hɒt	hɑ:t
clock	klɒk	klɑ:k
bother	bɒðə	bɑ:ðəɪ
honest	ɒnɪst	ɑ:nɪst
knowledge	nɒlɪdʒ	nɑ:lɪdʒ
thought	θɔ:t	θɑ:t
caught	kɔ:t	kɑ:t
daughter	dɔ:tə	dɑ:təɪ
author	ɔ:θə	ɑ:θəɪ

² The data sets provided here are from Dimitrova from University of Reading, Great Britain. These sets were selected as samples of typical pronunciation distinctions of RP and GA. Especially for RP, samples from British English were recruited over other varieties of RP. Roach(2004) was also consulted for the confirmation of the samples.

2.3 Set 3 Palatal glide insertion before /u/

	Received Pronunciation	General American
tune	tju:n	tu:n
due	dju:	du:
news	nju:z	nu:z
reduce	.ɪdju:s	.ɪdu:s
subdue	səb.dju:	səb.du:
student	stju:dnt	stu:dnt

2.4 Question

This paper aims to find the Optimal Theory constraints behind the different vowel sounds of RP and GA. Through the examination of the samples of different vowels and the analysis through OT constraints, the constraints that produce each vowel sound and the relative ranks among them will be discovered. What are the different constraints of RP and GA and how are they ranked? What can be inferred regarding faithfulness and markedness?

3. OT Analysis

Based on the given data sets, I have formulated constraints that may be applied to the different surface representations of vowels for RP and GA. General phonological constraints – provided by Roca - were examined first to see if they can give reasons to the discrepancy between two sounds. In some cases where new constraints need to be established to justify and give reason to the distinction, I have tried to keep them as simple as possible. After OT analysis, each data set is interpreted in terms of markedness and faithfulness. For the sake of

space, one sample OT tableau will be provided for each data set. All samples in each data sets produced identical results.

3.1 Set 1

It is noted that the vowel in question in this set is ‘a.’ In RP, it is pronounced as /ɑ/, a low back unrounded vowel while it is pronounced as /æ/, a low-mid front unrounded vowel. Roundness is the only feature they share. I have inferred a constraint from the fact that the low vowel /ɑ/ is a back vowel or [+back], but non-low vowel /æ/ is not a back vowel or [-back]. For GA, back vowels cannot be low which is expressed as *[+low, +back]. For RP, vowel æ can be easily ruled out with the constraint *[-low, -high] which requires vowels to be either low or high. In other words, no mid vowels are allowed. Tables 3.1.1 and 3.1.2 are the OT tableaus showing the constraints above.

Table 3.1.1 OT analysis for vowels /ɑ/ and /æ/ for RP

/klas/	*[-low, -high]	*[+low, +back]
☞ klas		*
klæs	!*	

Table 3.1.2 OT analysis for vowels /ɑ/ and /æ/ for GA

/klas/	*[+low, +back]	*[-low, -high]
klas	!*	
☞ klæs		*

As shown above, constraint *[-low, -high] is higher in rank than *[+low, +back] for RP, and the rank is the opposite in GA. All other data in the set yield the same result. It seems that RP does not allow low or high back vowels, but allows mid-back vowels. On the contrary,

GA does not allow mid-back vowel, but allows low-back vowel. In general OT, *[-low,-high] is a high rank constraint, meaning that mid vowel is more marked, and yet, it is preferred in RP as Rocca claims (1997). This data shows that both RP and GA satisfy both markedness and faithfulness constraints. Neither of the two vowels looks seemingly marked, nor do they violate faithful constraint. Both forms of surface representation replicate the lexical form in terms of the number of vowels and consonants.

3.2 Set 2

The vowels in question in this set are: o, ou, au. They are all pronounced as /ɒ/ in GA, but in RP, ‘o’ is pronounced as /ɒ/, and the complex vowels ‘ou’ and ‘au’ are pronounced as /ɔ/. RP distinguishes those two sounds. Apparently, the two RP vowels are both [+round, +back] whereas GA vowel is [-round, +back]. It can easily inferred that GA does not allow non-high (low and mid) back vowels to be rounded which can be expressed as *[-high, +back, +round]. The constraint for RP, on the other hand, would be *[+αback, -αround], because RP does allow non-high back vowel to be rounded. These constraints are illustrated in the following OT tableaux.

Table 3.2.1 OT analysis for vowels /ɒ/ and /ɑ/ in RP

/hɒt/	*[+αback, -αround]	*[-high, +back, +round]
hɒt		*
hɑt	!*	

Table 3.2.2 OT analysis for vowels /ɒ/ and /ɑ/ in GA

/hɒt/	*[-high, +back, +round]	*[+αback, -αround]
hɒt	!*	

☞ hat		*
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Table 3.2.3 OT analysis for vowels /ɔ/ and /ɑ/ in RP

/θɔ:t/	*[+αback, -around]	*[-high, +back, +round]
☞ θɔ:t		*
θɑ:t	!*	

Table 3.2.4 OT analysis for vowels /ɔ/ and /ɑ/ in GA

/θɔ:t/	*[-high, +back, +round]	*[+αback, -around]
θɔ:t	!*	
☞ θɑ:t		*

It is shown that constraint *[+αback, -around] is higher than *[-high, +back, +round] in RP and vice versa in GA. All other data in the set have yielded the same result. Considering that GA pronounces both vowels as /ɑ/, GA seems to be more concerned with markedness than faithfulness. The vowel of GA is more natural or requires less effort to produce than that of RP, which indicates unmarkedness. On the other hand, RP seems to be more concerned with the distinctions between the two vowels probably for better perception. RP keeps the vowel /ɔ/, a more marked sound.

3.3 Set 3

The last set consists of words with or without a palatal glide before the high back rounded vowel, /u/. In RP, when the vowel /u/ is preceded by coronal consonants such as /t/, /d/, and /n/ in words like *tune*, a palatal glide /j/ is inserted before it, and the vowel is pronounced as /ju/. On the other hand, GA does not exhibit the insertion of a palatal glide

before the vowel in the same environment. From this, a constraint is formulated for GA: *[glide]_____ .
 [+high, +back, +round]

On the contrary, for RP, the constraint would not allow the glide in between: *[coronal]_____.
 [glide][+high, +back, +round]

The following tableaus are the OT analysis of above constraints.

Table 3.3.1 OT analysis for vowels /ju/ and /u/ in RP

/tju:n/	*[glide] _____ [+high, +back, +round]	*[coronal] _____ [+high, +back, +round]
tu:n	!*	
☞ tju:n		*

Table 3.3.2 OT analysis for vowels /ju/ and /u/ in GA

/tju:n/	*[coronal] _____ [+high, +back, +round]	*[glide] _____ [+high, +back, +round]
☞ tu:n		*
tju:n	!*	

The distinction of glide insertion between RP and GA may be represented by OT as above tableaus. It is noted that, for RP, constraint *[glide][+high, +back, +round] is higher than *[coronal][+high, +back, +round] and vice versa for GA. All other data in the set yield the same result. It is observed that markedness constraint is ignored in RP. The insertion of a glide before a vowel is clearly against the markedness constraint because /u/ with no glide before it is more unmarked. In addition, for ‘new’, it seems more reasonable to pronounce as /nju/ to rhyme with ‘few’ or ‘skew’.

4. Discussion

Overall, RP and GA have different tendencies in terms of the constraints. It seems that the constraints of RP are leaning toward faithfulness constraint than markedness. The first and second set of data provides the evidence for this claim. However, the third set of data suggests that RP is not so much concerned with faithfulness because it inserts a glide before /u/ that follows alveolar sounds such as /t/ /d/ and /n/. Also, the insertion of a glide is a marked behavior of language. On the other hand, GA seems to be more concerned with markedness, the easiness of sound production. The lack of mid vowel and rounded back vowel is a strong evidence of preference for markedness, because those sounds demand more effort to produce than their GA counterparts. The third set also reinforces the markedness claim for GA selects less marked sound, /u/ with no glided inserted before it. One thing to keep in mind is that the analysis and constraints given by the current study could exhibit errors.

The constraints formulated so far have a certain degree of credibility although they may seem somewhat rough and incomplete. The constraints for data sets 1 and 2 are, in a way, counteracting. For data set 1, GA chose vowel /æ/ over /ɑ/ which was chosen over /ɔ/ or /ɒ/ in data set 2. The constraints were formulated so that they can satisfy both sets, and they were *[+low, +back]. However, it is acknowledged that these constraints are very limited in application. The constraints for data set 1, *[-low, -high] and *[+low, +back] could be misleading when applied to other vowels. For instance, /ɛ/ is rejected by the constraint *[-low, -high] in RP which, of course, does have that vowel. In order to solve this problem, another constraint will have to be formulated which could lead to another constraint for another vowel. Data set 2 also poses a problem, for vowel /ɔ/ still exists in some dialects of GA although the usage of which is saliently decreasing. However, those dialects that do

have the sound tend to keep it rather stubbornly. Moreover, what could be called the standard GA, the English that TV news anchors use, still has the mid-vowel. The constraints for data set 3 is troubling in that the constraint is too vague despite the vagueness help eliminate exceptions or counterexamples. It could be argued that the constraints only work for the specific vowels that were to be compared. There could be other vowels that are counterexamples of the constraints of data set 3.

5. Conclusion

Without a doubt, there have been numerous attempts to explain the discrepancy in the two most prominent varieties of English, Received Pronunciation and General American. Nevertheless, Optimality Theory has hardly been the major method or theory of such attempts. The application of Optimality Theory in an attempt to discover the basis of the distinct pronunciations of RP and GA was focused on three vowel sets: RP /ɑ/ versus GA/æ/ as in grass, the alternation of /ɒ/ or /ɔ/ in RP versus GA /ɑ/ as in top or author, and RP /ju/ versus /u/ as in due. In order to provide an explanation for the differences, OT constraints have been formulated and applied. The constraints have managed to select appropriate surface representations and rule out the surface representations that are not in use. Moreover, faithfulness and markedness constraints were also considered in analyzing these difference vowels. GA seems to put more weight on markedness constraint avoiding marked sounds considering GA has more vowels that are more unmarked than their counterparts. On the other hand, RP seems to take more importance on faithfulness constraint considering that it sometimes chooses more marked representation. However, the constraints turned out to be target vowel specific. That is, they presented very limited application range, which made it difficult and troubling to apply to other vowels. I could also be argued that the

author's claim regarding faithfulness and markedness constraint may be misleading as well. If these constraints could be upgraded to be more suitable for other vowels, the discrepancy in pronunciation of RP and GA may well be explained through OT thoroughly.

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