

## Five Problems with Phonetic Symbol Usage in English-Japanese Dictionaries

著者	Yuzawa Nobuo
journal or publication title	TOHOKU UNIVERSITY LINGUISTICS JOURNAL
number	16
page range	117-127
year	2007-07-01
URL	<a href="http://hdl.handle.net/10097/00129695">http://hdl.handle.net/10097/00129695</a>

# Five Problems with Phonetic Symbol Usage in English-Japanese Dictionaries<sup>1</sup>

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**Keywords:** phonetic symbol, problem, solution, English-Japanese dictionary

## 0. Introduction

English-Japanese dictionaries (henceforth EJ dictionaries) provide Japanese learners of English with valuable information on English words, such as their pronunciation, meanings, usage, etymology, synonyms, antonyms and frequency of use. There are many kinds of dictionaries targeted at different levels of learners and these dictionaries improve with each new edition. However, there are some major problems with the way phonetic symbols are used. This paper points out five problems and presents solutions for each problem. GA and BBC pronunciation are discussed here because they are transcribed in EJ dictionaries. These problems are also applicable to the English textbooks approved by Japan's Ministry of Education, Culture, Sports, Science and Technology (henceforth MEXT).

## 1. The Problem with the Quantitative Approach

English sounds are transcribed as phonemes in EJ dictionaries, as they are in any English dictionary. The /p/ phoneme, for example, is aspirated syllable-initially, as in 'pot', but when it is preceded by /s/, its aspiration is lost, as in 'spot'. The word-final /t/ may be slightly released or not released at all. It may also be preceded by the glottal stop. Some phonemes are realized as different allophones according to phonetic environments. Such allophonic differences, however, are not represented in dictionaries, except for the voiced /t/ in some dictionaries.

There are three types of phonemic transcriptions in dictionaries. They are known as the quantitative approach, the qualitative approach and the quantitative-qualitative approach.

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<sup>1</sup> No specific names of EJ dictionaries are used in discussing the five problems in this paper. I have no intention of criticizing particular dictionaries in public.

Transcriptions of some vowel phonemes vary, depending on which approach is adopted. Two good examples are the ‘peak’ vowel and the ‘pick’ vowel. They are transcribed as /i:, i/ (quantitative), /i, i/ (qualitative) and /i:, i/ (quantitative-qualitative). Interestingly, /pik/ means both ‘pick’ (quantitative) and ‘peak’ (qualitative). The difference among the three approaches is on what should be made explicit and what can be inferred.

The quantitative approach was used commonly in EJ dictionaries in the past. This approach is still adopted in some EJ dictionaries and in the MEXT-approved English textbooks. The adoption in these textbooks may mean that this approach is the de facto national standard in Japan. In this approach, the difference between the ‘peak’ vowel and the ‘pick’ vowel is transcribed simply by the presence or absence of the length mark. It is true that the ‘peak’ vowel is pronounced longer than the ‘pick’ vowel as the length mark indicates, but this duration or quantity difference is not always significant, as shown in Figure 1. For comparison, ‘pig’ is added.

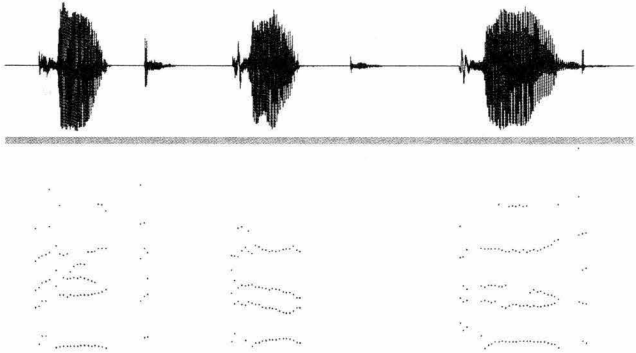


Figure 1: Formants of ‘peak’, ‘pick’ and ‘pig’

The durations of the three vowels are: 189 ms (‘peak’), 185 ms (‘pick’), and 277 ms (‘pig’).<sup>2</sup> The difference between the first two is negligible – only 4 ms. Unless learners are familiar with a quality difference or have a keen enough ear to detect this, they will be confused by not being able to find any difference between the two words. On the other hand, Figure 1 tells us that there is an evident quality difference between the ‘peak’ vowel and the other two. The F1/F2 values (Hz) measured at the vowel center are 337/2312 (‘peak’), 576/1833 (‘pick’), and

<sup>2</sup> It may also be helpful to teach learners a mechanism known as pre-fortis clipping to explain what is going on in Figure 1.

504/1917 ('pig'). One major drawback about the quantitative approach is that this quality difference cannot be made explicit, and this is a serious problem for Japanese learners of English. In April 2007, I conducted a questionnaire. About 100 university students majoring in Economics were surveyed and nobody was aware of the qualitative difference between the 'peak' vowel and the 'pick' vowel. Many said that the difference is duration and the most common reason they presented was that the only difference in transcription is the length mark. In standard Japanese, there are only five vowel phonemes and only one vowel phoneme occupies the close front region. In English, however, there are two phonemes in this region. In speaking and understanding Japanese, the ability to distinguish between the 'peak' vowel and the 'pick' vowel is unnecessary. Japanese speakers need only to be sensitive to vowel duration in the close front region, as in 'ojisan' and 'ojiisan'. Coupled with this phonological difference, age may also be another factor. Language acquisition is not as easy for these learners as it is for children.

The qualitative approach makes explicit quality differences among vowels. Quantity differences are treated secondarily. This approach is commonly used in dictionaries published in America. This is probably related to the fact that GA is less dependent on quantity differences than BBC pronunciation, as Roach et al. (2006: ix) states that, 'vowel length in American English is generally considered to be conditioned by phonological environment, so the long/short distinction described for BBC English is not usually present.'

The quantitative-qualitative approach combines the merits of the two approaches. Both quantity and quality differences can be clearly represented. Under Japan's current English teaching system, where almost all students begin to learn English around the critical period, I believe that this is the best approach in transcribing English phonemes for Japanese learners. It is fortunate that many EJ dictionaries have shifted to this approach from the quantitative approach, but the problem is that the MEXT-approved English textbooks still adopt the quantitative approach. Many Japanese learners of English may be confused by the different uses of phonetic symbols between their textbook and their dictionary. An editor in a publishing company once told me that the quantitative-qualitative approach is not used in their school textbooks because he believes that it is unfamiliar and confusing to teachers and learners. My view is entirely different: if two sounds are phonologically different, they should be transcribed in a way that helps learners to better understand this fact. This is a more educational approach.

## 2. The Problem with the Italic /r/

EJ dictionaries use symbols that are unique in Japan. One of them is the italic /r/. I think that this symbol confuses Japanese learners of English, as Takebayashi (1996: 294-295) claims. The italic /r/ was introduced in Japan to make it possible to transcribe GA and BBC pronunciation in limited spaces, and it means that /r/ is pronounced in GA but not in BBC pronunciation. For example, ‘bird’, ‘start’, ‘north’, ‘near’, ‘square’, ‘cure’ and ‘letter’ are transcribed as /bɔ́:rɪd/, /stá:rt/, /nó:rθ/, /níər/, /skwéər/, /kjúər/ and /létər/. They mean /bɔ́:rd | bɔ́:d/, /stá:rt | stá:t/, /nó:rθ | nó:θ/, /níər | níə/, /skwéər | skwéə/, /kjúər | kjúə/ and /létər | létə/, where GA is shown on the left and BBC pronunciation on the right. Learners must be familiar with the following rules to understand the italic /r/: /ə:r/ = /ə:r | ə:/, /a:r/ = /a:r | a:/, /ɔ:r/ = /ɔ:r | ɔ:/, /ɪər/ = /ɪər | ɪə/, /eər/ = /eər | eə/, /ʊər/ = /ʊər | ʊə/ and /ə/ = /ə/ | ə/. Obviously, it is much more straightforward to transcribe them separately, as in /stá:rt | stá:t/ rather than /stá:rt/. In addition, /ər, ər/ may be misleading though these symbols are perfectly all right in phonology. Unlike /a:r, ɔ:r, ɪər, eər, ʊər/, these two phonemes have the same quality from beginning to end, but some learners, especially beginners, may not notice this. Likewise, they may fail to learn the true meaning of /ɪər, eər, ʊər/, by thinking that they are pronounced by adding /r/ to the diphthong phonemes /ɪə, eə, ʊə/.

Some EJ dictionaries take effective measures to rid themselves of the shortcomings of the italic /r/. In place of /ə:r, ər/, they use /əː, əː/, which can clearly show qualitative uniformity of these vowels. These dictionaries also adopt the viewpoint that the postvocalic ‘r’ has a vowel-like quality. They also transcribe the rhyme of ‘near’, ‘square’ and ‘cure’ as /ɪəː/, /eəː/ and /ʊəː/ and classify them as diphthongs. In this method of transcription, the seven words mentioned above are transcribed as /bɔ́:d | bɔ́:d/, /stáːt | stá:t/, /nóːθ | nó:θ/, /níəː | níə/, /skwéəː | skwéə/, /kjúəː | kjúə/ and /létːə<sup>3</sup> | létə/. This type of transcription is more helpful to Japanese learners.

But there is a better method of transcription. First, it is better to transcribe the post-vocalic

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<sup>3</sup> The original small dot below /t/, which indicates the voiced /t/, is changed to the subscript wedge here. This wedge type of representation is also adopted in Roach et al. (2006) and Wells (2000).

‘r’ as /r/. Wells (1982: 122) states that ‘the matter of presence or absence of /r/ means that we also get a correspondence between the RP diphthong /ɪə/ (which we interpret as monophonemic) and the GenAm sequence /ɪr/ (which we interpret as biphonemic).’ Ladefoged (2006: 38) states that ‘the major difference between the two (= American English and British English) is that speakers of American English pronounce [r] sounds after vowels, as well as before them, whereas in most forms of British English [r] can occur only before a vowel.’ Cruttenden (2001: 85) states that ‘unlike in RP, where /r/ occurs only before vowels, GA /r/ can occur before consonants and before pauses.’ They argue that sounds in the rhyme of ‘near’, ‘square’ and ‘cure’ are not diphthong phonemes. I believe that native speakers’ mental perceptions of their language are very important in language learning and teaching. Transcribing the post-vocalic ‘r’ as /ɹ/ is not recommendable.

Second, it is better not to use /ɝ:/ in GA and /ə:/ in BBC pronunciation. These symbols without the length mark are only used for weak syllables. There is a phonetic similarity between the ‘bird’ vowel and the weak vowel of ‘mother’, both in GA and in BBC pronunciation. However, strong syllables and weak syllables should be clearly differentiated because they are important concepts in stress, elision, intonation and strong/weak forms.<sup>4</sup> English dictionaries published in Britain tend to use /ɜ:/ in GA and /ɜ:/ in BBC pronunciation, instead. These two symbols have never been used in EJ dictionaries, but they are worth introducing to help Japanese learners of English to better understand the English phonological system.

### 3. The Problem with the Italic /ə/

In addition to the italic /r/, some EJ dictionaries use the italic /ə/<sup>5</sup>, as in /-ɪə-, -eə-, -ʊə-/. Contrary to the italic /r/, this italic /ə/ means that it is pronounced in BBC pronunciation (i.e. /-ɪə-, -eə-, -ʊə-/), but not in GA (i.e. /-ɪr-, -er-, -ur-/). This makes the use of italics much more difficult to understand. For example, ‘hearing’, ‘various’ and ‘jury’ are transcribed as /hɪəɪŋ/, /vɛəriəs/ and /dʒʊəri/, and they mean /hɪrɪŋ | hɪəɪŋ/, /vɛriəs | vɛəriəs/ and /dʒʊri | dʒʊəri/. Japanese learners of English must be familiar with this complicated rule to

<sup>4</sup> See Roach (2000: 81) for more information.

<sup>5</sup> Some EJ dictionaries use parentheses to indicate this kind of /ə/.

understand what these symbols actually mean. Some EJ dictionaries transcribe the three words in GA as /híəriŋ/, /véəriəs/ and /dʒúəri/. However, either /ə/ or /r/ is enough because both of them are phonetically identical.<sup>6</sup> Some EJ dictionaries represent the three words in GA as /hí<sup>ə</sup>riŋ, vé<sup>ə</sup>riəs, dʒú<sup>ə</sup>ri/ from the viewpoint that a vowel with ‘r’ always includes /ə/.

In GA, ‘nearer’ rhymes with ‘mirror’ (Wells 1982: 153) and they are transcribed as /nírə/ and /mírə/<sup>7</sup>. In EJ dictionaries, they are usually transcribed as /níəɾ/ and /mírə/ to mean /nírə | níəɾ/ and /mírə | mírə/. The rhyming relation between the two words in GA is transcribed successfully, but because of the two different uses of italics, learners are likely to misinterpret the two different types of rules and may fail to understand that the two words rhyme in GA. The use of the superscript /ə/ makes the situation worse. The two words are transcribed as /ní<sup>ə</sup>rə/ and /mírə/. This cannot represent the rhyming relation properly.

Some EJ dictionaries use the italic /ə/ in another way, which makes its meaning much more confusing. For example, ‘camera’ is transcribed as /kæməɾə/. This never means \*/kæmrə | kæməɾə/. Instead, this shows that in both GA and BBC pronunciation, this word is realized in three types: (1) [kæməɾə], where the first schwa is not deleted, (2) [kæmɾə], where /r/ becomes syllabic, and (3) [kæmrə], where the word becomes bi-syllabic. Likewise, ‘marvellous’ is transcribed as /má:rvələs/, which means (1) [má:rvələs | má:-], (2) [má:rvləs | má:-] and (3) [má:rvləs | má:-]. This type of italic /ə/ may be useful for advanced learners, but the italic /r/ and the first type of italic /ə/ should be abolished.

#### 4. The Problem with BBC Pronunciation Transcription

It appears that in EJ dictionaries BBC pronunciation is treated secondarily in relation to GA. Two cases are reported here to show this imbalanced treatment. First, the diphthong ‘oh’ is not properly transcribed in BBC pronunciation. The pronunciation of this word is different depending on whether GA and BBC pronunciation is used, as shown in Figure 2.

<sup>6</sup> See Takebayashi (2002: 83) for more information.

<sup>7</sup> Wells (1982: 153) and Wells (2000) transcribes them as /<sup>1</sup>nɪrə, /<sup>1</sup>mɪrə/ and /<sup>1</sup>nɪr<sup>ə</sup>r, /<sup>1</sup>mɪr<sup>ə</sup>r/, respectively.

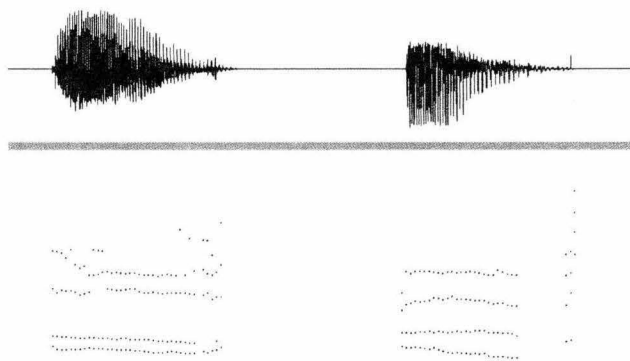


Figure 2: Formants of ‘oh’ in GA and BBC pronunciation

To compare how the two pronunciations are different, the F1/F2 values (Hz) are measured at the initial point and the final point. The result is that the values are 659/1139 (initial) and 528/935 (final) in GA, while they are 696/1294 (initial) and 325/1246 (final) in BBC pronunciation. There are four main differences between the two pronunciations. First, at the initial point, the BBC pronunciation ‘oh’ is slightly more front than the GA ‘oh’ (i.e. because of differences in F2), but there is not much difference in height (i.e. F1). Second, at the final point, the BBC pronunciation ‘oh’ is much higher than the GA ‘oh’. Third, the difference in height between the two points is almost three times greater in the BBC pronunciation ‘oh’ than in the GA ‘oh’. Fourth, the difference in the front-back distance between the two points is about four times greater in the GA ‘oh’ than in the BBC pronunciation ‘oh’. These differences support that the GA ‘oh’ is qualitatively different from the BBC pronunciation ‘oh’. From an educational point of view, this quality difference should be shown as /oʊ | əʊ/, but many EJ dictionaries simply explain this difference in the introductory pages by saying, for example, that /ou/ used in this dictionary means /ou | əʊ/<sup>8</sup>.

Second, the ‘pot’ vowel is not properly transcribed. In EJ dictionaries, this vowel is transcribed as /ɔ/, which appears to be a short version of the ‘port’ vowel. However, these two vowels are different in both quantity and quality, just like the difference between the ‘pick’ vowel and the ‘peak’ vowel and between the ‘full’ vowel and the ‘fool’ vowel. The ‘pot’ vowel is a low vowel and is close to the cardinal vowel No.13 [ɒ], while the ‘port’ vowel is a mid vowel and is located between the cardinal vowel No.6 [ɔ] and the cardinal vowel No.7

<sup>8</sup> It is better to represent them as /oʊ | əʊ/.



[o] (i.e. between [ɔ] and [o]) (Cruttenden (2001: 117-119)). In order to make such differences explicit, British English dictionaries use /ɒ/ to transcribe the ‘pot’ vowel, but not a single EJ dictionary uses this symbol. Even EJ dictionaries adopting the quantitative-qualitative approach transcribe this vowel in the quantitative approach. This double standard method should be abolished.

## 5. The Problem with Stress Mark Placement

Just as morae are important units in Japanese, syllables are important units in English. But there seems to be no unified view on syllable boundaries. For example, Roach et al. (2006) and Wells (2000) adopt different views. The former adopts a phonological view, where following the maximal onsets principle, as many consonants as possible between the two vowels are assigned to the onset, as long as the phonotactic constraints are not violated. Stress can only be assigned to a heavy syllable. In English, short vowels are not allowed in the syllable-final position, except for three weak vowels (i.e. /ə, ɪ, ʊ/), as in ‘de.vel.op’. Another exception of syllable boundaries is in compounds, as in ‘hard.ware’. On the other hand, in Wells (2000), a phonetic view is adopted. There are five basic principles (Wells 1990: 76-86). First, consonants are syllabified with the more strongly stressed of two flanking syllables. Second, where adjacent syllables are of equal grade, consonants are syllabified with the leftward syllable. Third, in polymorphemic words, consonants belong to the syllable appropriate to the morpheme of which they form a part. Fourth, phonotactic constraints on syllable structure are not violated. Finally, affricates (i.e. /tr, dr, tʃ, dʒ/) are not split between syllables, but are treated as indivisible. The following examples show how differently syllable boundaries are marked between the two dictionaries: ‘cri.sis, cris.is’, ‘ban.ker, bank.er’, ‘tea.cher, teach.er’ and ‘matt.ress, mattr.ess’. Examples from Roach et al. (2006) are shown on the left, and those from Wells (2000), on the right.

Although there are such differences in syllable boundaries between these two dictionaries, the onset of a word-medial stressed syllable is identically marked, as in /brɪ'twi:n/ ‘between’ and /ə'plai/ ‘apply’. These syllable boundaries clearly show that the /w/ and /l/ are pronounced voiceless.<sup>9</sup> Clear marking of syllable boundaries can provide learners with useful phonetic

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<sup>9</sup> A similar example is ‘nitrate’ vs. ‘night-rate’, where only the /r/ in ‘nitrate’ is pronounced voiceless (International Phonetic Association (1999: 15)).

information. When these two words are transcribed as /bɪtwí:n, əpláɪ/ as in EJ dictionaries, many Japanese learners of English may fail to put syllable boundaries at the right place, as in \*/bɪ.twí:n, əp.láɪ/. Not only may these incorrect syllable boundaries prevent the learners from understanding that the /w/ and /l/ are pronounced voiceless, but they are more likely to pronounce \*[bɪtowí:n, əpuláɪ] because of the Japanese common habit of vowel insertion. Traditionally, stress marks are assigned to the peak of a stressed syllable in EJ dictionaries. If this tradition is difficult to change, dots or space can be used to indicate syllable boundaries, as in /bɪ.twí:n, ə.pláɪ/ or /bɪ twí:n, ə pláɪ/. This can clearly show where the stressed syllable starts. Placing a stress mark before a stressed syllable is also useful in transcribing intonation. Both accented syllables and tones can be transcribed at the same place, as in 'and then 'nearer to the \front || on the /left | there's a 'bit of \forest | 'coming 'down to the \waterside || and then a 'bit of a /bay'<sup>10</sup>. It is possible to transcribe accented syllables and tones with separate markings, but this type of transcription becomes complicated and difficult to read. In words presented before this section, stress was placed on the peak of a stressed syllable, following the Japanese tradition. There is no doubt, however, that the placement should be switched to the beginning.

## 6. Concluding Remarks

In this paper, five problems with the way the phonetic symbols are used in EJ dictionaries were presented along with their solutions. The five problems are (1) the quantitative approach, (2) the italic /r/, (3) the italic /ə/, (4) the BBC pronunciation transcription, and (5) stress mark placement. To solve these problems, I have suggested that (1) the quantitative-qualitative approach be used; (2) GA and BBC pronunciation be transcribed separately without using the italic /r/; (3) these two accents be transcribed separately without using the italic /ə/; (4) /əʊ/ and /ɒ/ be introduced; and (5) the stress mark be placed before the stressed syllable. During the discussion, the use of /ɜ:/ (GA) and /ɜ:/ (BBC pronunciation) was proposed instead of using /ɝ:/ and /ə:/. It was also mentioned that the italic /ə/ can be used, for advanced learners, to represent variations under compression. In the same way, the MEXT-approved English

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<sup>10</sup> This example is quoted from Roach (2000: 166).

textbooks should stop clinging to old tradition and start considering these suggestions seriously for the sake of Japanese learners of English.

My principal philosophy about phonetic symbols in EJ dictionaries is to transcribe English phonemes faithfully and clearly according to native speakers' mental perceptions. It is important to understand the English phonological system accurately as a first step to improve spoken communication skills in English. This is particularly true when the phonological system of the target language is very different from that of the learner's native language, as English is for Japanese learners.

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## 【日本語要旨】

### 英和辞典の発音記号に関する 5 つの問題点

湯澤伸夫

英和辞典は日本人が英語を学習するのに大切な情報源である。新しい版が出版されるごとに、内容は充実してきているが、発音記号に関してはまだ問題点がある。本論文では、英和辞典の発音記号に関する 5 つの問題点を挙げ、日本人英語学習者の学習効果を高めることを目的として、その解決法を提示する。5 つの問題点とは、量的要素重視型の問題、イタリック *r* の問題、イタリック *ə* の問題、イギリス発音表記の問題、強勢記号位置の問題である。

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