The Similarities between /l/ and /r/ Sounds in Vocalization, Intrusion, and Linking of English Words

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１．Introduction

While the /l/ and /r/ sounds are distinguished as different phonemes, they have similar features in their phonological patterns. To cite a few cases, both /l/ and /r/ are vocalized in the final position of a word. Regarding /l/ in 'people' /piːpl/[1], it is usually not clearly pronounced. It is more likely to be pronounced as [o] rather than /l/; here, the /l/ vocalization can be seen. Likewise, /r/ in the final position of 'four' /fɔːr/ will be vocalized and become [fɔːə].

Additionally, /l/ and /r/ are considered to be problematic pronunciations for Japanese speakers[2] since neither of them exists in the Japanese language system. Instead, the *tap* [ɾ] is usually substituted for both /l/ and /r/. As an example, 'really' /riːəli/ becomes [ɾiaɾiː]. Furthermore, speakers of some other languages, apart from Japanese, also get the two sounds confused[3]. Thus, if the fact that /l/ and /r/ are essentially similar sounds is proven, then the reason why the sounds are confusing for certain speakers will be simply understood.

In light of various phonological phenomena, several aspects of /l/ and /r/ are considered in this paper. Afterwards, some features of /l/ and /r/ focusing on the vocalization, intrusion, and linking of English words are outlined and compared so as to prove the similarities between these sounds.

２．The Sounds of /l/ and /r/

In order to compare the /l/ and /r/ sounds, first, /l/ is defined with several formulas and quoted passages in this section.

2.1　Definition of /l/

With regard to the definition of /l/, Cruttenden (2001: xviii) classifies the phoneme of /l/ as the *voiced alveolar lateral approximant* as in 'lay.' As for the articulation of /l/, Roca & Johnson (1999: 71) describe how "air continues to flow out of the mouth through the gap

formed by the side of the tongue and the upper teeth on the side of the mouth." In the chart of Chomsky & Halle (1968: 177), the distinctive features of /l/ are described in Table 1.

Table 1　*Distinctive Features of /l/ (Chomsky & Halle, 1968: 177)*

	/l/
vocalic	＋
consonantal	＋
high	－
back	－
low	－
anterior	＋
coronal	＋
voice	＋
continuant	＋
nasal	－
strident	－

2.2　The Dark /l/

One of the allophones of /l/ called the *dark /l/* ([ɫ]) is recognized in many dialects of English. Brook (1963: 112) states that Irish speakers use the *clear l* in all positions. It is classified as the *voiced alveolar lateral approximant velarization* (Cruttenden, 2001: xviii). It occurs in word-final positions as in 'cool' and 'miracle,' or the position after a vowel followed by a consonant as in 'film' and 'fault.'

As a secondary articulation, "the retraction of the back of the tongue towards the velum" is needed for the pronunciation of /ɫ/ (Johnson & Britain, 2003: 1). Incidentally, in Hughes & Trudgill (1996: 41), the *voiceless l* ([l̥]) is listed as an allophone. The sound occurs after the aspirated /p/ and /k/ as in 'plate' and 'clap.' The rule of the dark /l/ is proposed in (1).

(1)　　　The dark /l/ (based on Davenport & Hannahs, 2005: 139)

　　　　　　'cool' /ku?l/　　/l/ → [ɫ] ／ /uː/ __ #
　　　　　　'fault' /fɔːlt/　　/l/ → [ɫ] ／ /ɔː/ __ /t/

　　General formula
　　　　/l/ → [ɫ] ／　__ #
　　　　　　 [ɫ] ／ V __ C

2.3　Definition of /r/

Cruttenden (2001: xviii) categorizes the phoneme /r/ into the *voiced alveolar trill* as in the emphatic pronunciation of /r/ in Scottish English. Likewise, it is pronounced in German, Dutch, the Swedish language, and others. Moreover, the *voiced alveolar tap* [ɾ] is used in Spanish, the Japanese language, and so on.

Table 2 *Distinctive Features of /r/ (Chomsky & Halle, 1968: 177)*

	/r/
vocalic	＋
consonantal	＋
high	－
back	－
low	－
anterior	－
coronal	＋
voice	＋
continuant	＋
nasal	－
strident	－

However, the common English /r/ is strictly classified into the *voiced post-alveolar approximant,* and [ɹ] can be used for the symbol. For the articulation of [ɹ] (the plain British r), the sound [ɹ] is pronounced, keeping the blade of the tongue flat and leaving a channel open at the front of the mouth for air escape (Roca & Johnson, 1999: 74). According to the chart of Chomsky & Halle (1968: 177), the distinctive features of /r/ are described in Table 2.

2.4   Rhotic Accent

Rho is a name for the letter *r* in the Greek language, and the label *rhotics* includes a class of sounds that are *r-like* (Roca & Johnson, 1999: 74). English accents can be divided into two types: rhotic or non-rhotic. Whereas non-rhotic speakers pronounce /r/ only when it is followed by a vowel, rhotic speakers pronounce the written r in almost all positions. Most British, Australian, and New Zealand English speakers are regarded as non-rhotic, although most speakers of American English, and some speakers of British English count as rhotic (Radford, Atkinson, Britain, Clahsen, & Spencer, 1999: 41); e.g. in Australian English, 'poor' will be [pʊə] (without /r/).

2.5   Comparison between /l/ and /r/

The /l/ and /r/ sounds are both classified as *liquids*. What these liquids have in common is that they are produced with unobstructed air flow; therefore, they can be typically sonorant and voiced (Davenport & Hannahs, 2005: 31). /l/ is the voiced alveolar lateral approximant, and /r/ is the voiced alveolar trill. With respect to the allophones of /r/, [ɹ]: the voiced post-alveolar approximant is the common English /r/; furthermore, [ɾ]: the voiced alveolar tap is recognized as the substitution of Japanese speakers'/l/ and /r/. As an aside, the tap [ɾ] might be more similar (than /r/) to /l/ because in their articulation, both [ɾ] and /l/ require contact between the tongue and the alveolar ridge.

If comparing of the distinctive features (Chomsky & Halle, 1968: 177) between /l/ and /r/, the only difference is that whereas the *anterior*[4] of /l/ is '＋,' the anterior of /r/ is '－.' In other words, as for /l/, the position of the tongue is nearer to the front of the mouth; in contrast, with /r/, the tongue does not need to be in the front position. With respect to the phonological observation, it seems that the sounds of /l/ and /r/ are relatively similar.

３．The Vocalization

With regard to the vocalization of /l/ and /r/, the characteristics are observed using some examples. Some phonological phenomena are compared using charts and certain previous studies.

3.1　The History

From the historical point of view, concerning the beginning of the /l/ and /r/ vocalization, it might be said that they are similar. The /l/ vocalization started in the 16th century. Evidence of this vocalization in the north and especially in Yorkshire in the 17th to 18th century is shown by Ihalainen's report. The influence of the current wave of the /l/ vocalization in south-eastern England is a recent phenomenon (Johnson & Britain, 2003: 3).

Originally, all dialects of English retained /r/ in the post-vocalic position in 1700; however, the /r/ vocalization started gradually (Trudgill, 1999: 26). It started in the south-east of England and gradually spread to the north and west afterwards (Hughes & Trudgill, 1996: 60). Johnson & Britain compare the distribution maps of Ellis's survey of 1889 and Trudgill's of 1998, and indicate the increase in non-rhoticity. The area of England inhabited by non-rhotic speakers was approximately 30% in 1889, but had grown to more than half in 1996. Because omitting the /r/ sounds came to be regarded as educated speech, no one was criticized for dropping them (Trudgill, 1999: 28). The distribution by major region (Wells, 1982: 76) is shown in Table 3.

Table 3　*Distribution of Accent by Major Region (adapted from Wells, 1982: 76)*

Non-rhotic	Rhotic
Mostly in England	Some in England
RP	Scotland
Wales	Ireland
Australia	North America
New Zealand	Canada

3.2　The /l/ Vocalization

The characters of the /l/ vocalization and dark /l/ are remarkably similar. As Johnson & Britain (2003: 1) point out, the /l/ vocalization is equivalent to the vocalization of dark /l/ in

syllable rhymes. /l/ in a syllable rhyme can become like a vowel or an approximant; e.g. it will be [u], [o], or [w] as in 'feel' and 'table.'

The /l/ vocalization is a natural phenomenon in view of the fact that children tend to substitute the dark /l/ for [u]. As a matter of fact, in some dialects of English, /l/ is sometimes regarded as a vowel in some situations. Even though the dark /l/ is regarded as a complex segment with both dorsal and coronal gestures, the loss of the coronal gesture leads to a simpler segment (Johnson & Britain, 2003: 7). The rules of the /l/ vocalization are shown in (2).

(2)　　　The /l/ vocalization

'table' /teɪbl/, 'gamble' /gambl/　　　/l/ → [u]　/　/b/ __ #

'people' /piːpl/, 'example' /ɪgzampl/　/l/ → [o]　/　/p/ __ #

'feel' /fiːl/, 'meal' /miːl/　　　　　/l/ → [w]　/　/iː/ __ #

'film' /film/　　　　　　　　　　　/l/ → [u]　/　/i/ __ /m/

General formula

/l/ → V　/　__ #

→ [w]　/　__ #

→ V　/　V __ C

3.3　The /r/ Vocalization

When it comes to the /r/ dropping, some dialects of British English originally used to pronounce all /r/s in words such as 'arm,' 'cart' or 'far'; however, /r/ came to be dropped where it occurred before a consonant as in 'arm' after the middle of the 18th century, although it was retained before a vowel as in 'track' (Trudgill, 1999: 26). Likewise, it is dropped in the word-final position (Wells, 1982: 218). Here is a clear example: a word like 'tar' will be pronounced as [tɑː] in some parts of England. Trudgill (1999: 27) gives a map which shows areas with the pronunciation distinguished by the presence or absence of /r/. Wells proposes the rule of the /r/ dropping as shown in (3). This shows that /r/ will be deleted in the environment of a following consonant or word boundary.

(3)　　　The /r/ dropping (Wells, 1982: 218)

$$r \rightarrow \varnothing \ / \ \_ \left\{ \begin{array}{c} C \\ \# \end{array} \right\}$$

It is possible to recognize that the /r/ vocalization and /r/ dropping are almost the same phenomena. Knowles (1987: 79) states that "what has happened is that a short vowel has coalesced with a following /r/ to produce new varieties of long vowel, whilst a long vowel has developed a schwa glide from the vowel to /r/, and this has replaced the /r/ itself."
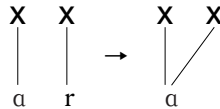
It has been found that the /r/ vocalization is the phenomenon of a sound change from /r/

to [ə] or a long vowel; examples are: 'near,' which will be [nɪə], 'four': [fɔːə], 'far': [fɑː], and 'cart': [cɑːt] (without /r/). The rules of the /r/ vocalization can be described in (4). '**X**' represents the unit on the timing tier in autosegmental phonology.

(4)　　　The /r/ vocalization

　　　　　　　　'near' /nɪər/　　　/r/ → [ə]　╱　/ɪ/ __ #
　　　　　　　　'four' /fɔːr/　　　/r/ → [ə]　╱　/ɔː/ __ #

　　　　　　　　'far' /fɑːr/, 'cart' /cɑːrt/ (based on Roca & Johnson, 1999: 209)

$$\begin{array}{ccc} \text{X}\quad\text{X} & \rightarrow & \text{X}\quad\text{X} \\ |\qquad| & & |\quad\diagup \\ \alpha\quad r & & \alpha \end{array}$$

　　　　General formula

$$r \rightarrow V \quad \Big/ \quad \underline{\quad} \left\{ \begin{array}{c} C \\ \# \end{array} \right\}$$

3.4 Similarities between /l/ and /r/ in Vocalization

　　The vocalization of both /l/ and /r/ occurs in a syllable rhyme. To give clear examples: 'fall' /fɔːl/ will become [fɔːʊ]. These phenomena also occur after a vowel, followed by a consonant; e.g. 'cold' /kould/ will be [koːud]. The phenomena of vocalization of /l/ and /r/ are described in Table 4 and 5.

Table 4　*The /l/ Vocalization*

Phenomenon	The /l/ vocalization			
Position	1st sound	2nd sound	1st sound	2nd sound
Sound	vowel	consonant	any	#
Example 1	cold		bottle	
Example 2	fault		fall	
Example 3	milk		people	

Table 5　*The /r/ vocalization*

Phenomenon	The /r/ vocalization			
Position	1st sound	2nd sound	1st sound	2nd sound
Sound	vowel	consonant	vowel	#
Example 1	arm		near	
Example 2	cart		four	
Example 3	term		tar	

4．The Intrusive and Linking /l/ and /r/

In this section, the intrusive and linking /l/ and /r/ are overviewed by referring to some former studies, and the similarities are pointed out.

4.1　The Intrusive and Linking /l/

It seems that the *intrusive /l/* is a minority phenomenon as compared with the *intrusive /r/* (which will be discussed in 4.2). In accordance with Gick (2002), it is regarded as occurring in just a few American dialects in Philadelphia, most of western Pennsylvania, northern Delaware, southern Oklahoma, northern Maryland, southern and eastern Ohio north-eastern Kentucky, and all of West Virginia. Gick divided it into two principal patterns: MAtl. (Mid-Atlantic states) and NTex.-Okla. (Northern Texas and Oklahoma). The difference between these patterns is that although the final vowel that frequently overlaps with the vocalized /l/ will be [ɔ] in the MAtl. pattern, the *schwa* [ə] is overlapped with /l/ in the NTex.-Okla. pattern (Gick, 2002: 177).

The intrusion of /l/ in the MAtl. pattern occurs between [ɔ] (or [ɔː]) and a following vowel such as /ɪ/. The following are typical examples: 'saw it' becomes [sɔːlɪt], and 'drawing,' [drɔːlɪŋ] as shown in (5).

(5)　　　The intrusive /l/
　　　　　The MAtl. pattern (based on Gick, 2002: 177)
　　　　　　　　'sa<u>w it</u>'　→ [sɔːlɪt]　　　∅ → [l]　／　/ɔː/__ /ɪ/
　　　　　　　　'dra<u>wing</u>' → [drɔːlɪŋ]　　∅ → [l]　／　/ɔː/__ /ɪ/
　　　　　　　　'br<u>a is</u>'　→ [bralɪz]　　 ∅ → [l]　／　/a/__ /ɪ/

A characteristic sociolinguistic phenomenon in Bristol in the UK is mentioned by Wells (1982: 344). It is described as the *inserted /l/*. [ɫ] is added in a word-final position if the word ends with /ə/; e.g. 'area' will be [ɛːɹjəɫ] as presented in (6).

(6)　　　The Bristol inserted /l/ (Wells, 1982: 344)
　　　　　　　　'area' → [ɛːɹjəɫ]

It seems to be old-fashioned; Wells gives example of some wisecracks and says that "Thus derided and stigmatized, the intrusive /l/ seems always to have been a pretty local phenomenon, not occurring beyond the boundaries of Avon." Wells also hypothesizes that some people in Bristol may have hypercorrected after the loss of the final /l/ after /ə/, like [æpə] for 'apple.' Incidentally, the spelling of 'Bristol' itself was originally spelled 'Bristow.' "The dark /l/ in Bristol is very dark, that is, the raising of the back of the tongue to the soft palate is most marked." (Hughes & Trudgill, 1996: 78)

On the other hand, the *linking* /*l*/ may be a more general phenomenon than the intrusive /l/. It occurs after a word which ends in a non-high vowel such as /ɔː/, /ɑː/, or /ə/, if the next word begins with a vowel. It might be said that the reason why the linking /l/ is more common than the intrusive /l/ is that the first word of the linking /l/ essentially involves the /l/ sound (and the spelling 'l'). Examples of linking /l/ using phonetic symbols are shown in (7).

(7)　　　The linking /l/

      'fall into'　　　→ [fɔːlɪntə]　　　(/l/) → [l]　／　/ɔː/ __ /ɪ/

      'small engine' → [smɔːlɛnʒən]　(/l/) → [l]　／　/ɔː/ __ /ɛ/

      'cruel idea'　　→ [kruːwəlaidiːə]　(/l/) → [l]　／　/ɔː/ __ /a/

      General formula

      ∅ → [l]　／　[non-high vowel] __ V

4.2　Intrusive and Linking /r/

The intrusive /r/ occurs after a word which ends in a non-high vowel if the next word begins with a vowel. The use of an intrusive /r/ is characteristic of the speech of a large number of English speakers; it is especially common in south Midland dialects (Brook, 1963, 97). Examples that come most quickly to mind are: 'id<u>ea of</u> it,' 'vanill<u>a i</u>ce-cream,' and 'l<u>aw an</u>d order.' Examples of the intrusive /r/ are shown in (8).

(8)　　　The intrusive /r/

      'id<u>ea of</u> it'　　　→ [ɑɪdiːərəvɪt]　　∅ → [r]　／　/ə/ __ /ə/

      'vanill<u>a i</u>ce-cream' → [vənɪlərɑɪskriːm]　∅ → [r]　／　/ə/ __ /a/

      'l<u>aw an</u>d order'　　→ [lɔːrənɔːdə]　　∅ → [r]　／　/ɔː/ __ /ə/

      General formula

      ∅ → [r]　／　[non-high vowel] __ V

By contrast, there is a phenomenon called the *linking* /*r*/. Most non-rhotic speakers do not pronounce /r/ in the final rhyme; however, if a following word begins with a vowel, /r/ will be pronounced. For instance, even though /r/ is not pronounced in 'here they are,' it will be pronounced in 'h<u>ere I</u> am.'

The difference between the intrusive /r/ and the linking /r/ is that, in the environment of the intrusive /r/, the final sound in the first word does not include any /r/ sounds, but regarding the linking /r/, the sound (and the spelling 'r') is essentially included in the word. Examples of the linking /r/ using phonetic symbols, and the rules of the linking /l/ are shown in (9).

(9)   The linking /r/

      'he<u>re</u> I am' → [hɪəɹɑɪ æm]   ∅ → [r] / /ə/ __ /ɑ/

    General formula

      ∅ (/r/) → [r] / [non-high vowel] __ V

    BUT:

      'he<u>re</u> they are' → [hɪəðeɪɑː]   ∅ → ∅ / /ə/ __ /ð/

4.3　Similarities between the Intrusive and Linking /l/ and /r/

    Even though the intrusive /l/ occurs in limited circumstances, the rules of the phenomena are similar to the intrusive /r/. Both require vowels (or approximants) in the final sound in a previous word and also in the first sound in a following word. The most noticeable examples are found in Gick (2002: 167). Whereas the intrusive /l/ occurs in 'draw [l]ing' and 'bra[l]is' as in the pronunciation of southern Pennsylvania, at the same positions, the intrusive /r/ occurs in 'draw[ɹ]ing' and 'bra[ɹ]is' in *RP* (Received Pronunciation). Likewise, the linking /l/ and /r/ are also similar features because the rules of phenomena are almost the same. A chart showing the phenomena of the intrusive and linking /l/ and /r/ is shown in Table 6 and 7.

Table 6　*The Intrusive /l/ and /r/*

Phenomenon	The intrusive /l/		The intrusive /r/	
Position	1st sound	2nd sound	1st sound	2nd sound
Sound	vowel	vowel	non-high vowel	vowel
Example 1	draw	ing	idea	of
Example 2	law	is	law	and
Example 3	saw	it	vanilla	ice-cream

Table 7　*The Linking /l/ and /r/*

Phenomenon	The linking /l/		The linking /r/	
Position	1st sound	2nd sound	1st sound	2nd sound
Sound	vowel	vowel	non-high vowel	vowel
Example 1	cruel	idea	car	ignition
Example 2	fall	into	four	ideas
Example 3	small	engine	here	I am

６．Conclusion

The purpose of this paper has been to indicate the remarkable degree of similarity between the /l/ and /r/ sounds regarding the vocalization, intrusion, and linking of English words, and thereby achieve a better understanding of their phonologically distinctive aspects.

It was found that the features of the vocalization of /l/ and /r/ are remarkably similar. The phenomenon usually occurs in a syllable rhyme, and the same can also be said of /r/, especially when a vowel is followed by a consonant. Furthermore, in some dialects of English, the dark /l/ becomes like a vowel even when it occurs after a vowel followed by a consonant. Thus, it seems that the environments of the /l/ and /r/ vocalization are almost the same.

With regard to the intrusion, both the intrusive /l/ and /r/ are absolutely identical phenomena, although the intrusive /l/ is a minority phenomenon compared with the intrusive /r/. The intrusive /l/ occurs in only a few American dialects. The phenomenon occurs with a word that ends in a non-high vowel which is followed by a word that begins with a vowel. The similarities are clearly illustrated in the following examples: 'draw[l]ing' and 'bra[l]is' in southern Pennsylvania, and 'draw[r]ing' and 'bra[r]is' in RP. Likewise, the environments of the linking /l/ and /r/ are also similar in nature.

Be that as it may, it is probably safe to conclude that /l/ and /r/ have phenomena in the vocalization, intrusion, and linking that are particularly similar. Since /l/ and /r/ share similar features, it is reasonable to assume that Japanese speakers find it difficult to differentiate between /l/ and /r/. Pronunciations change with the passing of time; therefore, to deal fully with the phenomena and to discover current tendencies, further research is necessary.

Notes

1　In this paper, stress marks are not displayed if unnecessary.

2　In previous research (Sato, A. 2011), /r/ was regarded as one of the five most difficult phonemes (/f/, /v/, /θ/, /ð/, and /r/) by Japanese learners of English.

3　According to Swan & Smith (1987), the pronunciations of /l/ and /r/ are often confused for speakers of the following languages: Chinese, Korean, Swahili, and West African language.

4　It indicates that the sound is created near the front area of the mouth.

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