

Can Japanese Students of English Significantly Improve /l/ Pronunciation?

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One of the most vexing aspects of learning English conversation for students in Japan seems to be mastering the phoneme /l/, and this study sets out to describe the linguistic phenomenon in detail. Just over 100 first-year college students in four conversation classes were recorded speaking in pairs over a three-month period—in pre-, mid-, and post-course tests. The /l/ frequency errors and linguistic environments were tabulated.

It was found that just 10.9% of all /l/s uttered in all environments were deemed unacceptable or non-nativelike. Students made significantly more errors on the pre-course test than on the mid- and post-course tests. But, when just two words which also appear in the Japanese language with katakana pronunciations—*policy* and *complex*—were eliminated from the pre-course test tabulations, the progress made by students during the course was not statistically significant. A final interesting finding was that /l/ was the hardest to pronounce when between vowels (eg., *hello*) or in consonant clusters (eg., *play*). The classroom implications for teachers are described.

BACKGROUND

When trying to learn English conversation, few linguistic phenomena seem to give students in Japan more anxiety than the phoneme /l/. If not learned as children, it is often hard for native Japanese speakers to distinguish /l/ from /r/ (Aoyama et al., 2004), and it is hard to produce (Kinnaird and Zapf, 2004). Thus, “His father’s a pilot” might sound like “His father’s a pirate” and “My climb was great” might come out “My crime was great.” Takagi & Mann (1995) found that even if Japanese citizens live in the US for 12 or more years, they usually cannot distinguish /l/ from /r/ as well as native speakers. Bad /l/ pronunciation can interfere with communication (Yamane, 2015), and can be the target of discrimination if Japanese go abroad (Gluszek and Dovidio, 2010).

Several factors work against good /l/ pronunciation (for a review of the literature, see Piske, MacKay, & Flege, 2001). The first is the fact that the Japanese language does not have an alveolar /l/ or a rhotic /r/, but rather has a flap [ɺ] which is between an /l/ and /r/. The English /l/ requires contact with the alveolar ridge and raising of the tongue dorsum, especially when syllable-final. The Japanese [ɺ] has the tongue briefly touching the roof of the mouth just behind the alveolar ridge. With English /r/, the tip of the tongue never touches the roof of the mouth.

A possible second factor working against Japanese learning /l/ is that people who begin to learn English at a later age—perhaps past the age of 12—often have much more difficulty, because the brains of adolescents and adults seem to lose “neuroplasticity” (Lenneberg, 1967). Known as the critical period hypothesis, or the sensitive period hypothesis, this posits that children are much better at learning pronunciation and grammar

than adults. Other factors affecting /l/ acquisition are English-learning experiences and motivation.

Despite these obstacles, a lot of research also shows that even older Japanese students of English can learn to pronounce /l/ well. Flege et al. (1995) found that 10 out of 12 Japanese learners of English who had lived abroad for at least a dozen years produced /l/ as well as native speakers, and produced /l/ significantly better than a group which had less than 3 years of foreign residence. Yamada (1995) also found that some Japanese citizens who had lived in the US could discriminate between /l/ and /r/ as well as native English speakers. Larson-Hall (2006) found that Japanese abroad improved their /l/ pronunciation even with shorter time residences.

With respect to the perception of /l/, research shows that perception ability can be significantly improved when students get minimal-pair training (eg., *rock/lock*) while listening to multiple speakers (MacKain et al., 1981; Iverson et al., 2003; Lively et al., 1993; Logan et al., 1991; Uther et al., 2008). Lively et al. (1994), for example, found that a three-week training focusing on minimal pairs significantly improved students' abilities to distinguish /l/ from /r/. The students retained some perception abilities three months after training, and a bit less ability six months after training. However, when listening to speakers different from the ones they had learned from during training, the perception accuracy went down.

With respect to production of /l/, there are reports of effective training dating back to Goto (1971). More recently, Hattori (2009) found that native Japanese speakers "approached a 100% accuracy ceiling" when producing /l/ after they received one-on-one training, including explicit instructions and feedback in the form of spectrograms showing their own production.

Bradlow et al. (1997) found that there is a link between perception and production. They showed that perceptual learning generally resulted in better production. In fact, in that study the students from Japan could improve /l/ production without any production practice! Hattori (2009) also found a significant correlation between the ability to identify the difference between /l/ and /r/ and the ability to produce them. Interestingly, Hattori also found that the students were better at producing /l/ than /r/.

The best teaching methods for pronunciation focus on form while engaging in meaningful communication (Lyster, 2007; Ellis, 2006). Schmidt (2010) and Spada and Tomita (2010) say the key to learning features not present in the L1 is attention/awareness, so explicit instruction is crucial. Working with native Japanese students, Saito (2013) found that explicit pronunciation instruction improves comprehensibility, but that work did not specifically deal with /l/.

There are probably other ways to improve /l/ pronunciation, too. For example, some research shows that students who like foreign music are better at pronouncing foreign words (Milovanov and Tervaniemi, 2011). Also, a good, free podcast for learning /l/ pronunciation is Seattle Learning Academy's "American English Pronunciation Podcast."

Alas, textbooks used in secondary schools in Japan do not seem to do a thorough job of teaching /l/ and /r/. Sugimoto and Uchida (2013) looked at pronunciation activities in six textbooks widely used in junior high schools. For example, they found that *One World* (Matsumoto, 2011) simply listed words containing the two consonants. But among the six textbooks, two gave good phonetic guidance. *New Horizon* (Kasashima, 2011) had detailed instructions for learning the difference, and had tongue twister exercises. Also, *New Crown* (Takahashi, 2011) had an explanation along with the following pair-work activity:

Listen carefully to the ‘l’ and ‘r’ in the following words, and practise. Work in pairs and find out what is going on with the tip of the tongue when pronouncing the two sounds: like, leg, live, leave, right, red, river, really (p. 73)

The researchers say that this guiding of students to figure out phonetic differences is good.

English textbooks used at universities also generally do not do well at helping students with /l/. Watts and Huensch (2013) surveyed 11 widely used textbooks, including *Person to Person 2* (Richards et al., 2006) and *World English 2* (Johannsen and Chase, 2010). They found that only one textbook, *Talk It Through 2* (Kozyrev and Baker, 2001), covered /l/ and /r/ well; they concluded that this textbook taught pronunciation topics far better than the other textbooks.

In addition, teacher training is probably insufficient. Ota (2012) claimed that there is almost no pronunciation teaching in Japanese secondary schools, probably because English instructors have not received much training in teaching pronunciation. Shibata et al. (2008) stated that English phonetics teacher training in universities ranges from full-year required courses all the way down to elective semester courses. Thus, regarding English phonetics in junior and senior high schools, Sugimoto and Uchida (2013) conclude “it can be assumed that quite a few teachers teach in the classroom without the necessary knowledge and skills.” This comes despite the fact that students say they want teachers to correct their pronunciation errors (Katayama, 2007).

Finally, it is important to look at the linguistic environments in which /l/ appears. In standard English there are two main types of /l/, called allophones (Roca and Johnson, 1999). The first is a clear /l/, before a vowel, as in *lip*. This is also called a voiced lateral alveolar approximant. The second is a velarized dark /l/, in all other environments, as in *pool or believe* or *play*, and involves a raising of the back of the tongue toward the velum. Thus, an /l/ can occur in four basic phonetic environments: before a vowel, after a vowel, between vowels, or as the final part of a cluster (ie., *problem* and *split*). In a few words such as *lull*, it can occur both before and after a vowel.

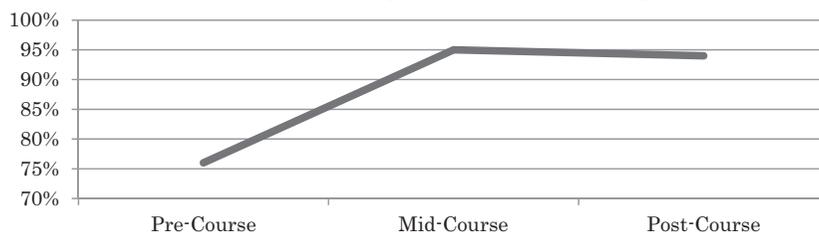
With respect to perception, Lively et al. (1994) found that the Japanese ability to distinguish between /l/ and /r/ depends on linguistic location. The easiest is word final when there is a preceding vowel (eg., *ball*, *cell*). Word initial (eg., *lice*, *leader*) is average in difficulty. The hardest are initial consonant clusters (eg., *cloud*, *glows*) and between vowels (eg., *pillow*, *collect*).

Miura (1979) looked at loanwords with /l/. He found that between vowels the /r/ is often substituted, so *volunteer* becomes /boraNtia/ (p.30). In consonant clusters, native Japanese often use /r/ plus an epenthesis vowel. So, for example, *hustle* becomes /hus:uru/ (p.68). But there are some exceptions.

THE PRESENT RESEARCH

Lauer et al. (2016) conducted a one-semester longitudinal study of 102 Japanese university freshmen to determine which are more effective: podcasts or textbooks. In the end, no significant difference was found for pedagogical materials; textbooks and podcasts seemed equally effective. But significant progress was made on audio recordings of students with respect to their /l/ pronunciation. At the beginning of the course, under 80% of students’ /l/s were deemed acceptable, but by mid-course students were uttering about 95% of their /l/s correctly. (See Table 1.) Did students really make such great progress? If so, why?

TABLE 1. Percent of Acceptable /l/ Utterances among All /l/s



The goal of the present research is to identify why there seemed to be such great improvement in the /l/ pronunciations of the students in the 2016 study. Also, by identifying the troubling vocabulary items and pinpointing the phonetic environments in which the /l/s occurred in that study, some observations might be harvested to give teachers ideas about how they can help Japanese students improve /l/ pronunciation.

METHOD

The data in the 2016 study were analyzed in more detail, and the procedures in that experiment are described in this section. Students in four first-year English conversation courses at Hiroshima University were monitored during one semester to determine their progress in a number of dimensions. Two of the classes, totaling 56 students, were from the Faculty of Science, and the students in the other two classes, totaling 46 students, majored in education. Importantly, based on their entrance exam scores, one class in each faculty had significantly higher English abilities than the other class from the same faculty. One month into the semester these abilities were confirmed with university-wide TOEIC tests: Students in the two courses with the science majors had average TOEIC scores of 467.5 (SD = 85.5) and 629.7 (SD = 80.9), while students with education majors had average TOEIC scores of 419 (SD = 75.1) and 540.6 (SD = 87.5).

At the beginning of the semester, in the middle of the semester, and at the end of the semester each class received a series of three tests: A grammar-vocabulary written test, a listening test similar to TOEIC, and a spoken test in which students spoke in pairs to each other for 3 minutes.

Each spoken test was especially relevant to the present study of /l/. Students, in pairs, were given a list of 25 words, and for three minutes the students had to ask each other questions and to provide answers while using the words. They could choose whichever words they wanted from the list, and their conversations were recorded digitally. On the first day of the course, students were given a practice test so that they could get used to the recording facility and the test format. Then, in the second week of the course, the students took the pre-course test. For that test and for the mid- and post-course tests, students also received three minutes of practice time so that they could get used to the particular lists of words.

Table 2 shows each list of words. The three lists of words were compiled from the JACET 8000 list of most frequent and most important words (*JACET 8000*, 2007). The pre-course list had an average JACET ranking of 1,103.52 (SD = 97.08). The words in the mid-course test had an average JACET ranking of 1,104.32 (SD = 106.35). And the words in the post-course test had an average JACET ranking of 1,104.72 (SD = 77.46). Thus, it can be said that the speaking tests were very similar in difficulty.

The audio recordings were analyzed by two native English speakers: the author, from the US, and a

TABLE 2. The Speaking Test Vocabulary Items

Pre-course test —military, observe, element, function, structure, aim, hang, blow, feature, expert, complex, policy, prevent, admit, bill, journey, burn, edge, gain, audience, argue, branch, behavior, cell, represent.
Mid-course test —union, flow, pack, association, atmosphere, breath, detail, focus, region, tiny, nod, ignore, article, soldier, evidence, unless, recognize, invite, experiment, destroy, empty, physical, judge, publish, operation.
Post-course test —apply, neighbor, root, contract, replace, solution, fair, seek, relative, chemical, path, tax, benefit, collect, generation, fit, examine, hide, ordinary, spot, ancient, struggle, survive, escape, worth.

(Note: The actual tests had clear instructions and easy-to-read formatting, with lots of white space and larger fonts.)

colleague from Britain. When they heard /l/ pronunciations differently, the recordings were re-analyzed until agreements were reached. Whenever a student began an utterance but then backtracked to correct him/herself, those first words were ignored. If a word had two /l / sounds in it (eg., *little*), it was classified as two instances of the word (but the numbers of these words were very few).

The aims of each of the courses was to improve general English speaking abilities; improving /l/ pronunciation was quite a small part of each course. The author taught the two courses with education majors, and the above-mentioned colleague taught the two courses with science majors. Each teacher used combinations of textbooks and podcasts as teaching materials. For more details, see the 2016 study.

With respect to /l/ training, the author gave the students only about 40 minutes of practice, half of it occurring one week before the mid-course test, and the remainder occurring one week before the post-course test. Those practices each consisted of three parts: /l/ modeling by the teacher, a couple of minutes of pair work in which students asked each other questions using the words containing /l/, and then a game in which students had to differentiate between /l/ and /r/, first listening then speaking.

The other teacher’s /l/ training totaled about 90 minutes, spread over about seven class periods. Students used their smartphones in classes to access three sites: eslcommando.com, eslcafe.com, and English-online.org. The first two sites offer some funny L-R tongue twisters, and the third site has some /l/ practice activities. The teacher tried to make the activities game-like, with students competing in pairs.

RESULTS AND DISCUSSION

One of the main findings of this study is that the /l/ production of students was quite good. This statement is supported by three statistics. First, only 10.9% of all /l/s uttered by all students (137 of 1,256) were deemed unacceptable. Second, each student made only an average of 0.49 /l/ errors per three minutes of speaking in pairs. Thus, a 3-minute recording of pair work had an average of about one /l/ error. And third, 27% of the students (28 out of 102) never had any /l/ errors in any recordings (although seven of these students were each absent one time).

Even among “low-level students,” there were only 1.33 errors per student per three minutes (SD =1.30) on the pre-course test. And 11 out of the 46 low-level students had no errors during nine minutes of recordings (three recordings times three minutes each), plus two students had no errors during six minutes (they were each absent once). If we eliminate the words *policy* and *complex*, this number jumps to 20 out of the 46 low-level students never having any /l/ errors (although seven of these students were each absent one time).

The second major finding of this study was that most of the /l/ errors occurred in words which have katakana equivalents, so that in Japanese they are pronounced similar to English but using the Japanese sound system. As Table 3 shows, 100% of the 12 most perplexing words have katakana equivalents: オーストラリア (Australia), ポリシー (policy), コンプレックス (complex), ハロー (hello), プロBLEM (problem), ボール (ball), アプライ (apply), イングリッシュ (English), プレー (play), ミリタリー (military), コレクト (collect), and セル (cell). Yet, despite this important finding, it cannot be said that all katakana words pose problems. For example, the words *chemical* and *life* also have katakana equivalents. But students produced *chemical* 55 times with 100% accuracy, and *life* 15 times, with 100% accuracy.

TABLE 3: The 12 Most Troubling /l/ Words in the Entire Data Base

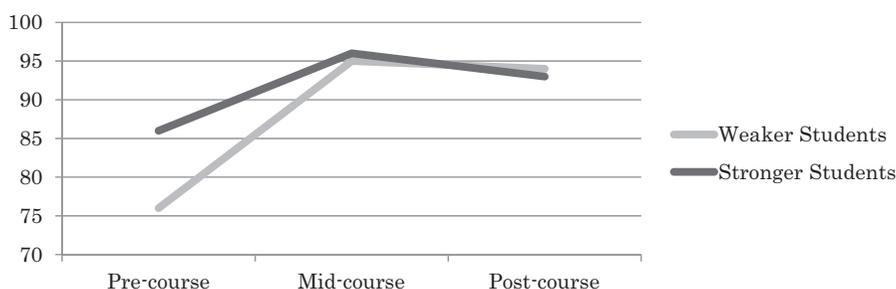
(Note: Minimum of 3 errors)

	Total Errors	Total Utterances	Error Rate
Australia	4	5	80%
policy	25	38	66%
complex	20	31	65%
hello	6	11	55%
problem	5	11	45%
ball	4	10	40%

	Total Errors	Total Utterances	Error Rate
apply	3	10	30%
English	3	12	25%
play	6	27	22%
military	3	14	21%
collect	4	21	19%
cell	3	19	16%

Table 4 shows the students' /l/ performances during the courses, with respect to their general English abilities as measured by entrance exams and TOEIC scores. Students in lower-level English classes made statistically significantly more errors with /l/ on the pre-course test ($p < .05$). But very surprisingly, by mid-course there was no significant difference in /l/ performance with respect to general English abilities. Table 5 shows the actual /l/ tabulations for the most difficult vocabulary items, differentiated according to general language ability and course test.

TABLE 4. Percent of Acceptable /l/s among All /l/s, Separated according to General English Ability



**TABLE 5: Unacceptable /l/ Vocabulary Items Uttered at Least 2 Times
Among All Utterances of That Word on Each Particular Test**

WEAKER STUDENTS			
<u>Pre-Course</u>		<u>Mid-Course</u>	<u>Post-Course</u>
Australia = 2/2	like = 4/26	hello = 2/2	apply = 2/4
basketball = 2/2	military = 2/4		hello = 2/2
complex = 12/17	play = 3/5		
kilometer = 2/2	policy = 17/28		
STRONGER STUDENTS			
<u>Pre-Course</u>		<u>Mid-Course</u>	<u>Post-Course</u>
complex = 8/14	policy = 8/10		collect = 4/18
element = 2/4			problem = 4/5

These tables show the third important finding in this study: 52% of all the /l/ errors on the pre-test (45 out of 87) occurred in just two words—*policy* and *complex*. If these two words are eliminated from the data, then improvement during the course with respect to /l/ production becomes statistically insignificant.

Linguistically, Table 6 shows that the largest percentage of unacceptable /l/ utterances occurred between vowels. Thus, words such as *policy*, *collect*, and *hello* were difficult. Also the table shows that /l/ after obstruents caused frequent difficulties. So, words like *complex*, *problem*, and *apply* were relatively hard. The good news is that pre-vowel /l/ words such as *like*, *language*, and *listen*, and post-vowel /l/ words such as *detail*, *difficult*, and *will* posed almost no problems. Interestingly, as stated above, Lively et al. (1993) found similar results with Japanese perception of /l/. Importantly, the current study found it with production of /l/.

TABLE 6: The Linguistic Environment Frequencies in which the /l/s Occurred

	Unacceptable /l/s	Total /l/s	Rate Unacceptable
Pre-vowel	11	261	4.21%
Post-vowel	16	414	3.68%
Between vowels	54	213	25.35%
Consonant clusters	58	367	15.80%

Looking at individual students during the courses, some students made big improvements. For example, one lower-level student in the pre-course test made /l/ errors in all five words containing /l/ which he spoke: *complex*, *basketball*, *listen*, *like*, and *application*. But in the mid-course test, he had only one error, *club*, and acceptably pronounced six other words containing /l/, including the word *like*. And, on the post-course test, he acceptably pronounced all six /l/ words which he uttered, including the word *like*. Another low-level student had four out of six /l/-word errors on the pre-test—namely, *policy*, *complex*, *festival*, and *well*. But on the mid-course and post-course tests combined, he made no /l/ errors in nine /l/-words uttered. There were other students who similarly improved.

CONCLUSIONS AND IMPLICATIONS FOR TEACHERS

The major conclusion to this research is that it seems like most Japanese students of English, indeed, *can* improve their /l/ pronunciation, but it is not easy. Numerous studies have found that with explicit attention to the phoneme, significant progress can be made. Also, in the Lauer et al. (2016) data, students significantly improved their /l/ pronunciation during the semester. But if the words *complex* and *policy* are removed from that pre-course data, the improvement becomes notable, but not statistically significant.

Importantly, the present study showed that /l/ pronunciation among Japanese freshmen is quite good, in that about 90% of /l/ utterances were deemed native-like.

It was also found here that most of the students' /l/ errors occurred in the following three linguistic environments: A) In words which have katakana equivalents (eg., *Australia*), B) In words between vowel sounds (eg., *really*), and 3) In consonant clusters (eg., *English*). If students and teachers focus on these three phenomena, success can often be achieved.

A limitation of this study is that only two people evaluated the acceptability of the /l/ pronunciation, and those two people were the teachers-researchers themselves. Thus, there may have been bias in that they wanted to see improvement from the students. A second limitation is that, even though there was improvement during the semester, the improvement might not have been long-lasting; students were in the experiment for only one semester, and there was no re-test a few months later.

More research into /l/ pronunciation problems and solutions is needed in the future. Also, /r/ pronunciation should be studied more, because it is related, and it may even be a bigger problem than /l/ for students of English in Japan.

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ABSTRACT

Can Japanese Students of English Significantly Improve /l/ Pronunciation?

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One of the most vexing aspects of learning English conversation for students in Japan seems to be mastering the phoneme /l/, and this study sets out to describe the linguistic phenomenon in detail. Just over 100 first-year college students in four conversation classes were recorded speaking in pairs over a three-month period—in pre-, mid-, and post-course tests. The /l/ frequency errors and linguistic environments were tabulated.

It was found that just 10.9% of all /l/s uttered in all environments were deemed unacceptable or non-nativelike. Students made significantly more errors on the pre-course test than on the mid- and post-course tests. But, when just two words which also appear in the Japanese language with katakana pronunciations—*policy* and *complex*—were eliminated from the pre-course test tabulations, the progress made by students during the course was not statistically significant. A final interesting finding was that /l/ was the hardest to pronounce when between vowels (eg., *hello*) or in consonant clusters (eg., *play*). The classroom implications for teachers are described.

要 約

英語を学ぶ日本人学生は音素 /l/ の発音を 簡単に取得できるか？

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日本人学生の英語会話学習において最も厄介な問題のひとつは音素 /l/ の発音習得であろう。本研究ではこの言語学的現象の詳細な記述を試みる。4つの会話クラスのあわせて100人あまりの大学1年生に対し、3ヶ月以上の期間にわたり、事前テスト、中間テスト、事後テストにおけるパートナー作業での発話を録音した。また、音素 /l/ の発音において頻繁に起こる誤りとその言語学的な出現環境の一覧を表の形でまとめた。

本研究により判明したのは、音素 /l/ の全出現環境における全発音の10.9%だけが容認できない、あるいは母語話者のようではないと判断されたことである。学生たちは、中間テストや事後テストに比較して事前テストにおいて明らかに多くの誤りを犯している。しかし、日本語でもカタカナ表記で使われる「ポリシー」と「コンプレックス」という2語を事前テストの表から削除すると、統計的には授業期間中における学生の進歩は見られない。最後の興味深い発見は、音素 /l/ は母音の間（例：Hello）や子音連鎖の中に（例：play）現れる時、発音するのが最も難しいということである。授業を行う教員のための、本研究から得られた教育上の示唆についても記述した。