Which English Sounds are Difficult? Japanese EFL Learners' Intuitions Versus Their Performance

Charles M. Mueller

Fuji Women's University

Previous research has shown that Japanese learners experience difficulty in developing sensitivity to many English phonemic contrasts. An unexplored area in this research concerns learners' awareness of which contrasts pose the greatest difficulty. The current research seeks to fill this gap in our understanding by comparing EFL learners' (N = 63) ranking of nine problematic contrasts with the ranking determined by their actual performance on a minimal pairs test. Results showed that although the participants were aware of oft-discussed problematic contrasts such as /r/ versus /l/, they underestimated the difficulty of other contrasts such as those that occur between final nasals. Results of a posttest given one month following a brief practice session involving feedback resulted in significant improvement (p = .002). Participants' difficulty rankings were compared with perceptions of native and nonnative English language instructors. Possible explanations for the findings are discussed along with the pedagogical recommendations.

　先行研究によると、日本人学習者にとって英語における音素対立の多くはその弁別が困難であるとされている。一方、音素対立に関する学習者の認識と実際の弁別の難易度との関連は明らかにされていない。本論では、EFL学習者 63名 を対象とし、9つの音素対立について、自身の認識に基づいた難易度と実際のパフォーマンスによって示された難易度を、ミニマル・ペアを用いたテストによって比較した。この事前テストでは、/r/と/l/のように度々議論される難易度の高い音素対立に関しては、被験者はその難しさをよく理解している一方、末尾の鼻音に見られる音素対立のような他の音素対立の難易度については、その認識度の低さが示された。簡単な練習の後にフィードバックを行い、その1か月後に実施した事後テストでは、被験者のパフォーマンスは有意に向上していた (p = .002)。この結果を、英語の母語話者および非母語話者の指導者が持つ、学習者の音素弁別の難易度に関する認識とも比較した。最後に、得られた結果を説明し得る要素および教授法の提案も行った。

An extensive body of research has examined L2 learners' ability to distinguish phonemic contrasts in English. Much of this work has focused on Japanese learners, who are known to experience problems in distinguishing specific English sounds. An unexplored question is the degree to which learners are aware of which sounds pose the greatest difficulty. The current research attempted to bridge this gap by using survey responses to compare participants' awareness of phonemes with their actual ability to distinguish English phonemes, as assessed through a minimal pairs test.

Literature Review

A major hurdle in learning a second language is acquiring sensitivity to target language contrasts that are nonphonemic in the L1. Previous research has shown that for L1 Japanese learners, a number of English sounds are particularly problematic. Perhaps the most infamous among these is the distinction between English /r/ and /l/ (Bradlow, 2008). Japanese speakers who lack intensive input from native instructors have been shown to have virtually no ability to distinguish English /r/ and /l/ sounds (Goto, 1971; MacKain, Best, & Strange, 1981). In part, this appears to be because Japanese speakers who learn English as a foreign language tend to initially assimilate English /r/ and /l/ (and especially /l/) to the Japanese alveolar tap (Aoyama, Flege, Guion, Akahane-Yamada, & Yamada, 2004; Guion, Flege, Akahane-Yamada, & Pruitt, 2000), the intervocalic consonant often heard in the American pronunciation of words such as *better*.

L1 Japanese learners also find it difficult to distinguish English nasals that appear in the coda position, as Japanese sounds in this position are allophones that assimilate to the place of articulation of the following consonant (Labrune, 2012). The /b/ and /v/ contrast is also difficult (Guion et al., 2000). Although Japanese has a voiced bilabial plosive, it lacks any sound akin to English /v/, so /v/ is often assimilated to /b/. Teachers are apparently aware of this. In a survey of 48 Japanese teachers of English, Saito (2011) reported that they listed /v/ along with /θ/ as the most difficult sounds for their students. Further support comes from empirical research (e.g., Hazan, Sennema, Iba, & Faulkner, 2005) that has directly measured learners' discrimination of these sounds.

A similar problem occurs with the distinction between English /f/ and /h/. The Japanese fricative /h/ is realized differently depending on the vowel it precedes. Before /a/, /e/, and /o/, it is similar to the English /h/. However, before /u/ and /i:/, it can be pronounced as a fricative or palatal respectively (Labrune, 2012). As Japanese does not have a sepa-

rate contrasting fricative, Japanese speakers often perceive English /h/ and /f/ as the same sound.

Other sound contrasts are difficult due to their distribution. Japanese has sounds similar to English /s/ and /ʃ/, but because the two sounds do not form a contrast within the Japanese phonemic inventory when they precede the vowel /i:/ (in which case Japanese requires palatalization), Japanese speakers can find it difficult to distinguish the initial sounds in English words such as *seat* and *sheet* (Lambacher, Martens, Brian, & Berman, 2001).

Japanese has sounds equivalent to the English obstruents /k/, /t/, and /p/ (e.g., the final sounds in *hawk*, *hot*, and *hop*), but these sounds cannot occur in the coda position. Hence, it does not allow stops without an audible release (i.e., [p̚, t̚, k̚]). Moreover, Japanese /p/ is relatively rare in terms of frequency of occurrence (Labrune, 2012). Perhaps for these reasons, Japanese speakers sometimes find it difficult to distinguish English unreleased stops.

Among English vowels, Japanese English learners also struggle with certain vowels that are absent from Japanese, particularly the mid and low vowels of American English (Lambacher, Martens, Kakehi, Marasinghe, & Moltholt, 2005). Many find /æ/ (the vowel in *hat*) difficult, for example. In Saito's (2011) research, Japanese English teachers listed this sound as fifth most difficult among 20 sounds. The sounds /ʌ/, /ʊ/, /ɛ/, and /ɪ/ (the vowels in *buck*, *book*, *bet*, and *bit*, respectively) can also be difficult as they are nonphonemic in Japanese.

In summary, in contrast to English, Japanese has a more limited vowel and consonant inventory. The paucity of vowel and consonant phonemes is offset by a distinction between short and long vowels and the use of pitch accent, which are two features that are absent from English. Due to the mismatch between Japanese and English, EFL learners are faced with the challenge of developing sensitivity to many L2 phonemic contrasts that are unfamiliar to them.

Purpose of the Study

The current research examined Japanese EFL learners' perceptions of the learning challenge posed by various phoneme contrasts and then determined whether these perceptions corresponded to the actual difficulty as measured via a phoneme discrimination task. The research thus contributes to research on phonological acquisition by (a) assessing EFL learners' awareness of learning challenges, (b) clarifying phonemes to be included as targets of instruction, and (c) testing the effectiveness of a short in-class minimal pairs task.

Method

Participants (*N* = 63) were from four intact required English classes for first-year students at two Japanese universities. Only participants who completed all stages of the study were included. Participants were asked to rank the difficulty of 10 minimal pair contrasts (see Table 1) from 1 (easy) to 10 (difficult). Following the ranking task, it was found that some participants when responding to the ninth contrast were influenced by the example (i.e., *see* versus *she*), and thus only considered the ninth contrast (i.e., /s/ vs. /ʃ/) when it was followed by /i:/. Due to this apparent confusion among some participants, the ninth contrast was omitted from the analysis related to participants' rankings. The same survey was given to six native English teachers (all but one was a university teacher) with between eight and 30 years of experience teaching Japanese students.

A week after they made the rankings, the EFL participants were given a pretest consisting of 200 items, with 20 items for each of the target contrasts (α = .84). Each set of 20 items targeted only one contrast and was printed on a separate sheet of the test. For each item, two words (i.e., a minimal pair such as *red* and *led*) appeared after the number of the item. The directions asked participants to circle the word that they heard. Correct answers occurred in pseudo-random order with half targeting one of the contrasted sounds (e.g., /r/) and half the other (e.g., /l/). The pretest and all other materials were presented orally by the instructor, who was a speaker of standard American English.

During the intervention following the pretest, participants received an identical blank copy of the test. The instructor then followed the same procedure as during the test, but this time, immediately after each set of 20 items, the instructor went over each item, asking participants if they selected the left or right choice. When participants gave the wrong answer, the instructor repeated the item, rapidly alternating between the two target phonemes until the participant was able to distinguish the target phoneme. Approximately one month after the pretest (29 days for two classes and 31 days for two classes), participants were given a surprise posttest using the same test forms as on the pretest.

Results

Following the training, participants improved slightly, going from a mean score of 165.7 (*SD* = 12.3; range = 130-194) on the pretest to a mean score of 169.7 (*SD* = 10.8; range = 133-191) on the posttest. A paired samples *t*-test showed that this improvement was significant at an alpha of .05 and that the effect

size was from small to medium, $t(62) = 3.22$, $p = .002$, 95% CI: [1.49, 6.36], $d = 0.41$.

Participants' performance on each of the 10 contrasts on the pretest and posttest is shown in Table 1. When interpreting the pretest and posttest scores, it should be noted that a score of 50% correct (a score of 10 for each contrast) would be expected if participants were only guessing.

As can be seen, the most difficult phonemic contrasts involved final nasals, the /r/ versus /l/ distinction, and, to a lesser extent, the /v/ versus /b/ distinction. These distinctions were also relatively less amenable to improvement following the intervention.

A key concern in the present study was learners' awareness of the relative difficulty of phonemic contrasts. Figure 1 shows the comparison between the ranking of phoneme contrasts based on participants' scores on the pretest with the ranking provided by the participants (the gray bars). As was expected, participants were aware that the /r/ vs. /l/ distinction is extremely difficult for Japanese learners. On the other hand, there were notable discrepancies related to final nasals. Whereas the participants rated these as being only somewhat difficult, they proved to be extremely challenging. On both tests, the distinction between /ŋ/ and /n/ was clearly the most difficult contrast with participants scoring only 66% on the posttest.

The six English instructors surveyed also ranked the /r/ vs. /l/ distinction as the most difficult. In contrast with learners' actual performance, they reported the /v/ vs. /b/ distinction as the second most

difficult, and ranked the two contrasts involving final nasals as moderately difficult. In other words, they showed the same tendency as the EFL participants to underestimate the difficulty of final nasals.

Discussion

The current study examined learners' awareness of difficulties in discriminating various target phonemes known to be challenging to Japanese learners. The results show that although learners are conscious of certain difficult contrasts (e.g., /r/ vs. /l/), they underestimate the difficulty of final nasals, as do both foreign and native instructors. What could explain this? One possibility is that learners' perception of difficulty is closely tied with their awareness of pronunciation difficulties. Learners are likely to be consciously aware that their production of /l/ and /r/ (and /r/ in particular) sounds different than native speakers' production of these sounds. The final nasals present a different problem. Japanese learners produce sounds indistinguishable from the English final nasals constantly when speaking Japanese. However, they do not need to produce different nasals within the same phonological environment because these sounds are nonphonemic in Japanese. Moreover, Japanese loan words often use epenthesis to discriminate final nasals occurring in English loan words. In the case of final /m/, this appears to be invariably followed by /ɯ/ in English words entering Japanese (e.g., English balsam is rendered as *barusamu* in Japanese), and it also appears after /n/ (e.g., Madeleine cake is rendered *madore-nu*). Because the vowel /ɯ/ is most likely to

Table 1. *Targeted Phonemic Contrasts and Participant Scores on These Contrasts*

	Target A	Example	Target B	Example	Pretest Score M (SD)	Posttest Score M (SD)
1.	/æ/	bat	/ɛ/	bet	17.6 (1.9)	18.0 (1.9)
2.	/ɪ/	hit	/i:/	heat	17.3 (1.9)	17.0 (1.7)
3.	/ʌ/	buck	/ʊ/	book	16.9 (2.2)	17.9 (2.1)
4.	/f/	fat	/h/	hat	19.1 (1.7)	19.4 (1.0)
5.	/k/*	sack	/t/*	sat	18.2 (2.0)	19.2 (0.9)
6.	/m/*	same	/n/*	sane	14.9 (2.4)	14.9 (2.4)
7.	/ŋ/*	sing	/n/*	seen	13.6 (2.3)	13.2 (2.2)
8.	/r/	red	/l/	led	13.8 (3.8)	14.0 (4.0)
9.	/s/	see	/ʃ/	she	18.4 (2.2)	19.0 (1.2)
10.	/v/	vat	/b/	bat	15.8 (3.2)	17.0 (2.3)

Note. * In final position only.
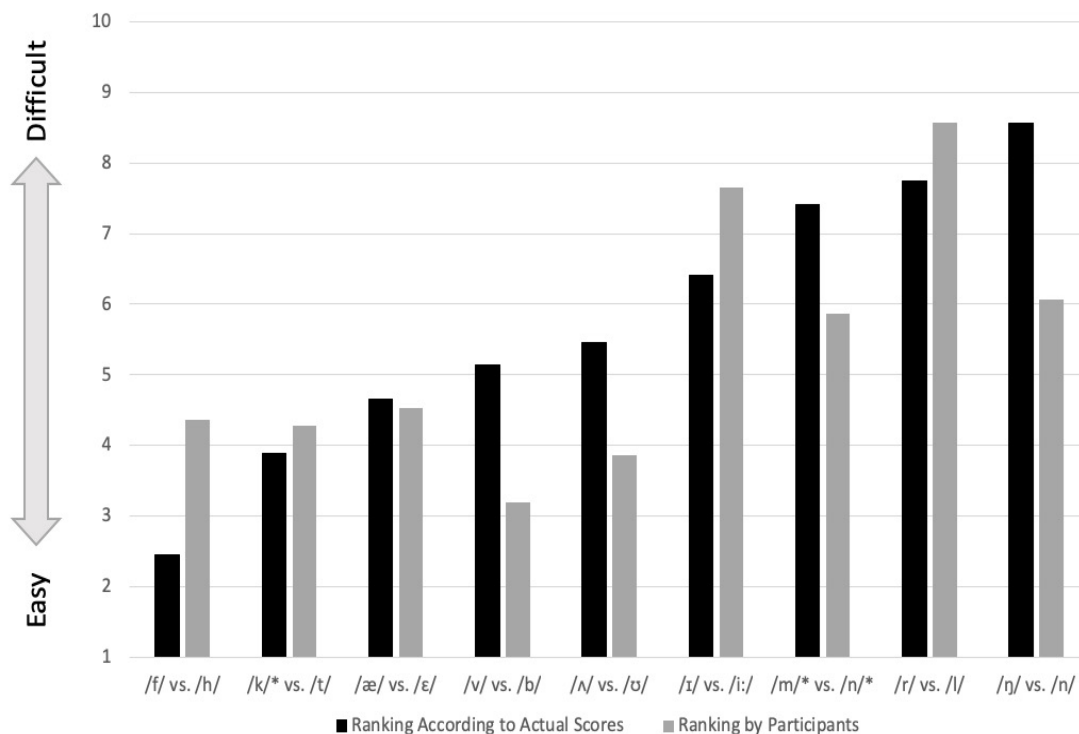
Note. * The target phoneme only occurred in coda position.
Figure 1. Comparison of ranking of the 10 item contrasts as determined by participants' scores with participants' subjective ranking of difficulty.

undergo devoicing among Japanese vowels (Lovins, 1975), the result is that many Japanese speakers might get into the habit of pronouncing English words ending with /m/ and /n/ with a short /ɯ/ and be unaware that the pronunciation of native speakers is different. They might therefore underestimate the difficulty in distinguishing final nasals.

Turning to pedagogical recommendations, the results should be considered in light of functional load (Brown, 1988), that is, the degree to which the distinction is important to distinguish words in the target language. As Brown mentions, the first rule of thumb should be to focus on sounds that are common, and more precisely, sound *contrasts* that are common. For example, the distinction between /ɪ/ and /i:/ would be a candidate for focus of instruction as the cumulative frequency of these two vowels account for over a quarter of all vowels in English. At the same time, instructors would need to consider the probability of each member of the pair. In this case, /ɪ/ is about four times more likely to occur. This imbalanced distribution makes it less likely that the pair will create problems for learners. In short, phoneme contrasts in which the

cumulative frequency of phonemes is high and the probability of occurrence of each phoneme roughly the same represent the most important contrasts for learners.

Other factors can make certain contrasts less problematic. For example, the /ɪ/ and /i:/ pair is also highly constrained by particular environments. This is true for some of the nasal contrasts as well: /ŋ/ only occurs in syllables containing short vowel phonemes and is thus less likely to be conflated with /n/ within all phonological contexts (Brown, 1988).

Limitations
The current research has several limitations. First, the set of contrasts investigated was limited, and the sample was limited to EFL Japanese first-year university students. Moreover, a control group was not used, so it is possible that improvements are due to maturation or greater familiarity with the test format on the posttest.

Future research should examine the effects of more prolonged training. Previous research has demonstrated that training in the perception of L2

sounds can lead to medium-sized improvements in perception and can also lead indirectly to improvements in pronunciation (Sakai & Moorman, 2018). Two types of training appear to be very promising. Logan, Lively, and Pisoni (1991) have shown that high variability phonetic training (intensive exposure to natural tokens produced by many speakers) is highly effective. They found significant gains that were extended to untaught exemplars and that were sustained over time. Other researchers have shown that acoustically enhanced input can be highly effective. McCandliss, Fiez, Protopapas, Conway, and McClelland (2002), using this "adaptive" training, showed that it enhanced learning even when feedback was not provided, whereas non-enhanced input only promoted learning when it was accompanied by feedback. They interpret their results as showing that improvement in this domain critically requires that learners are able to distinguish sounds successfully during training.

Because training is highly effective, it is essential that researchers provide language teachers with more information about the particular sounds that carry the most functional load in English, and which of these sounds their particular population of learners is likely to find challenging. Coursework should then be designed to foster learner awareness of ideal targets of learning, which can then be targeted in pedagogical activities. Because phoneme discrimination can be practiced without visual information, much of this training might be done as homework outside of class, ideally with online materials that provide exposure to high variability tokens along with immediate feedback on student responses. Finally, learners are likely to be even more motivated to undertake such training if instructors give them ongoing feedback on their improvement while highlighting areas requiring greater attention.

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Charles M. Mueller received his Ph.D. in Second Language Acquisition at the University of Maryland. His language teaching experience includes several years teaching Korean in the U.S. and two decades of teaching English in Korea, Japan, and the U.S. His research has been primarily conducted within the usage-based theoretical approach associated with the Cognitive Linguistics tradition. At Fuji Women's University, he teaches seminar courses on second language acquisition (SLA) and Cognitive Linguistics, and serves as advisor for students who are writing their graduate theses in these two areas.

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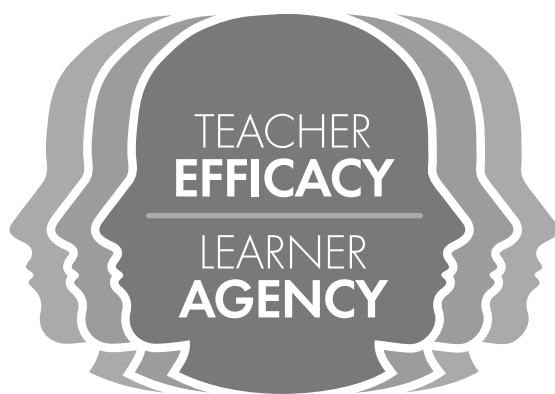
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JALT2019 • *Teacher Efficacy, Learner Agency*

Coming of Age

Every day we meet, work with, teach, and learn from people who are potential change agents. Just think about your favorite teacher, and the impact that teacher had on your learning, or an attentive and innovative student in your classroom, and how that student took ownership of their learning. As teachers and as learners, our beliefs play a key role in the kinds of action we take. JALT2019 offers an ideal opportunity for meaningful discussions and lively debates about better ways to have a positive impact on learning and teaching. Herein lies the core of the theme for this year – *Teacher Efficacy, Learner Agency*.

Teacher Efficacy

Emerging from the work of Albert Bandura on self-efficacy (I believe I can have an impact on my future), teacher efficacy focuses on how much teachers believe that they can have an impact on students' learning. Recently, research has emerged leading to a new concept called collective teacher efficacy. John Hattie explains, "Teachers' Collective Efficacy means teachers working together, building mindsets that all students can make appreciable progress, and then reinforcing these efficacy beliefs with evidence that students do indeed learn by these teachers causing learning." Whether you're working with young learners, elementary, or high school students, educating university students, or assisting adults with business English, efficacy beliefs have a major impact on learning. Ultimately, our job as teachers is more rewarding as we explore how we can help our learners be the best they can be.

Learner Agency

Described as learners "having ownership over their learning" or "having the power to act", the concept of learner agency addresses the increasing need for learners to be able to do more than simply receive instruction. The explosion of information that the Internet continues to make available means that today's learners will need to develop the ability to constantly learn throughout their lives; they need to know when they require new learning, when to unlearn something, and when they need to relearn something to be successful.

Teachers working to increase learner agency are promoting a range of skills and strategies for independent learning: personalizing one's learning, being proactive, learning to choose appropriate resources for one's learning, reflecting on one's learning choices, setting "smart" goals, and ultimately being responsible for creating their own learning for a successful and meaningful life.

Teacher Efficacy and Learner Agency: A Winning Combination

Current research advocates that teachers have an impact well beyond the classroom: think back to some of those influential teachers in your life. Imagine the power of combining collective teacher efficacy and learner agency.

Collective teacher efficacy is argued to have the highest overall effect on student achievement. When students get the same messages from a collaborating team of teachers, learning improves dramatically. The second highest impact on learning is a student's own expectations for themselves, a direct result of improving learner agency. Many approaches we currently promote such as active learning, project-based learning, CLIL, CALL, communicative approaches, and balanced 4-skills programs encourage students to take ownership of their learning.

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Encouraging teacher efficacy and increasing learner agency is clearly a winning combination, and winning combinations are what we hope to deliver in 2019 when the Japan Association for Language Teaching brings the 45th Annual International Conference and Education Materials Exhibition to the WINC in Nagoya City, Aichi Prefecture. We look forward to you joining us as we work together to explore the best possible environment for our teachers and learners to grow and thrive.

Steven Herder and Catherine Littlehale Oki
JALT2019 Conference Co-Chairs