

Yanny or Laurel? Proficiency and Perception

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Introduction

In May 2018, a social media influencer posted an audio clip that became a viral phenomenon. Some listeners hear a voice saying "laurel," while some listeners hear something like "yanny." The results are polarizing – most people can only hear one of the words. Only a small minority claim to be able to hear both.

Want to hear the clip? The New York Times has a tool that lets you hear both "yanny" and "laurel."
<https://tinyurl.com/laurelNYT>

The Clip

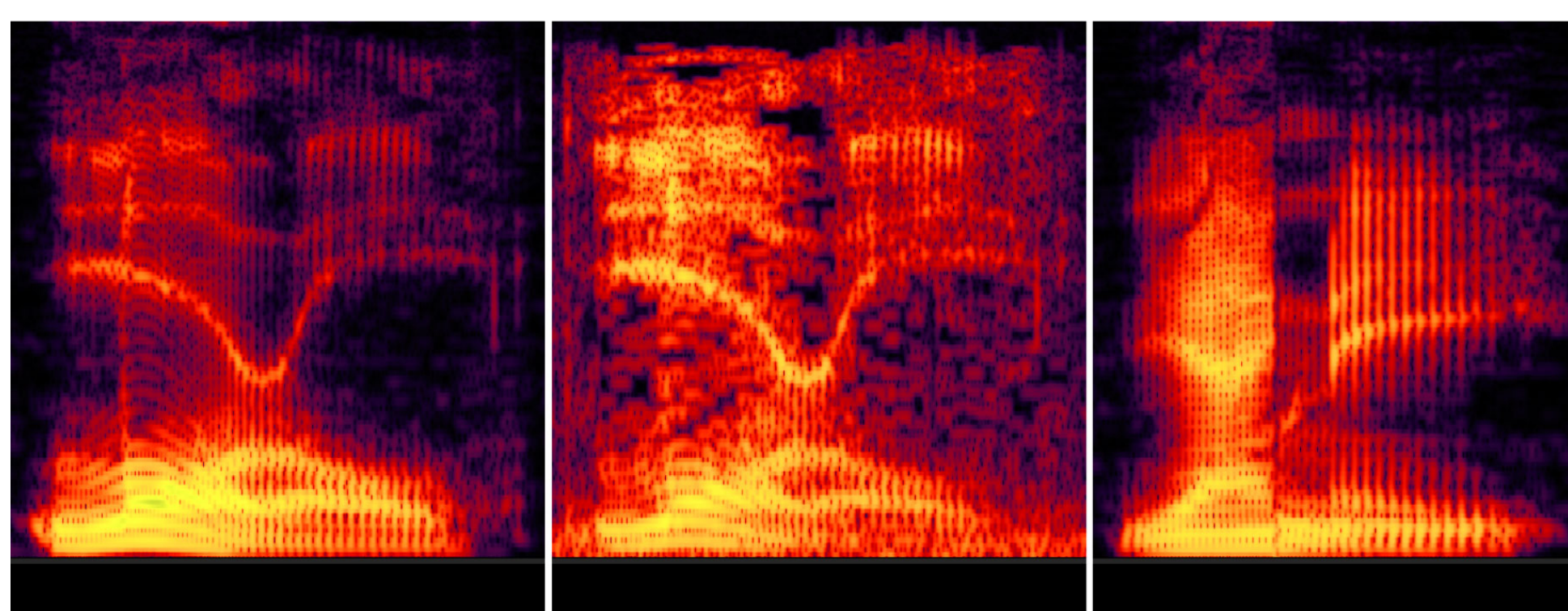


Image from Katz, Corum, & Huang 2018

Left: The original "laurel" clip from vocabulary.com
Center: The ambiguous clip in question
Right: A simulated "yanny" clip

The original audio clip came from vocabulary.com, which has samples read by native speakers (trained opera singers, in fact). All sounds are made up of several frequencies at once, but "laurel" would normally tend to have more low frequencies, as seen on the left spectrogram. At some point extra noise was introduced into the clip, adding more higher frequencies. These frequencies are similar to those that would be found in "yanny," as seen on the right. The result is an ambiguous clip that contains frequencies typical of both words.

What affects which word we hear? Audiologists explaining the phenomenon seem to focus on frequency; playing the clip on headphones or speakers with more bass can facilitate hearing "laurel," while devices with more treble can aid in hearing "yanny." Likewise, older adults tend to have hearing loss at higher frequencies, so children may be more likely to perceive "yanny."

But what about non-native listeners?

Phonemic Comparison

/'lɔ:r.əl/

/l/ and /r/ : two consonants notoriously difficult for Japanese L1 learners to distinguish.

The final syllabic /l/ might be particularly difficult, as Japanese does not include final consonants other than れ.

/'jæn.i/

/j/ and /n/ : two consonants that are naturally found in the Japanese phonemic inventory.

/æ/ : a vowel that does not naturally appear phonemically in Japanese, but can sometimes be heard allophonically in loanwords

/i/ : a vowel that is common in Japanese

Research Questions

Are Japanese learners of English more likely to hear "yanny" than they are "laurel?"

Are higher-proficiency learners more likely to hear "laurel" than lower-proficiency learners are?

Participants

High proficiency group: Two intact classes of second-year university students enrolled in a selective "Intensive English" program, with an average TOEIC score of 532. $n = 49$

Low proficiency group: Two intact classes of second-year students at the same university enrolled in a remedial English program. $n = 29$

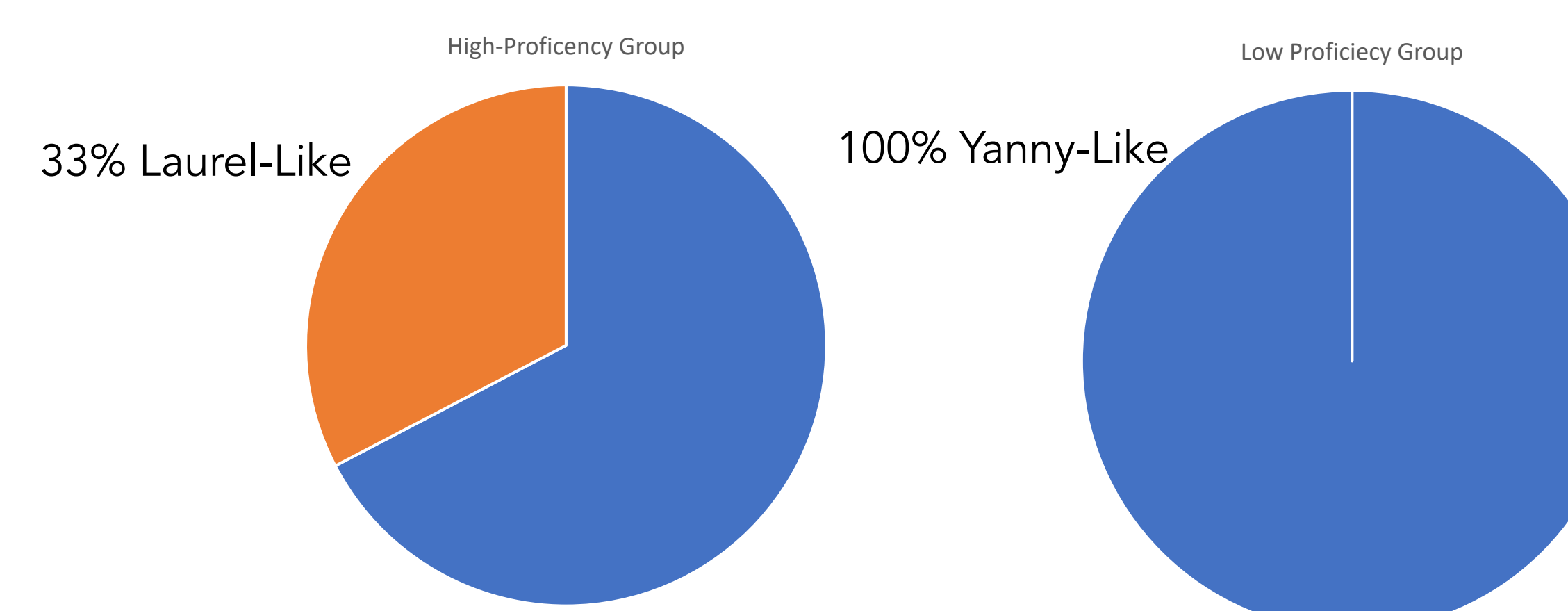
Procedure

The data was collected as an activity during the participants' regular English class time. As an introductory activity, the participants were first shown "The Dress," another viral phenomenon relating to ambiguous perception, and asked to discuss what colors the dress was.

Measure 1: Free Response. The audio clip was played many times. The participants were asked to write what they heard as closely as they could. They were advised that they might not be hearing a familiar word, and that they might not be hearing the same word as other participants.

Measure 2: Pitch-Shifted Binary Choice. Five pitch-shifted versions of the audio clip were played. The participants were asked to circle "Yanny" or "Laurel." Clips 1 and 2 were low-frequency versions, Clip 3 was the original ambiguous clip, and Clips 4 and 5 were high-frequency versions.

Measure 1: Free Response



The responses were categorized, somewhat arbitrarily, into "yanny-like" and "laurel-like" responses. "Yanny-like" responses contained a front- or mid-vowel in the first syllable and a high open vowel in the second word. "Laurel"-like responses usually contained rounded back vowels in both syllables.

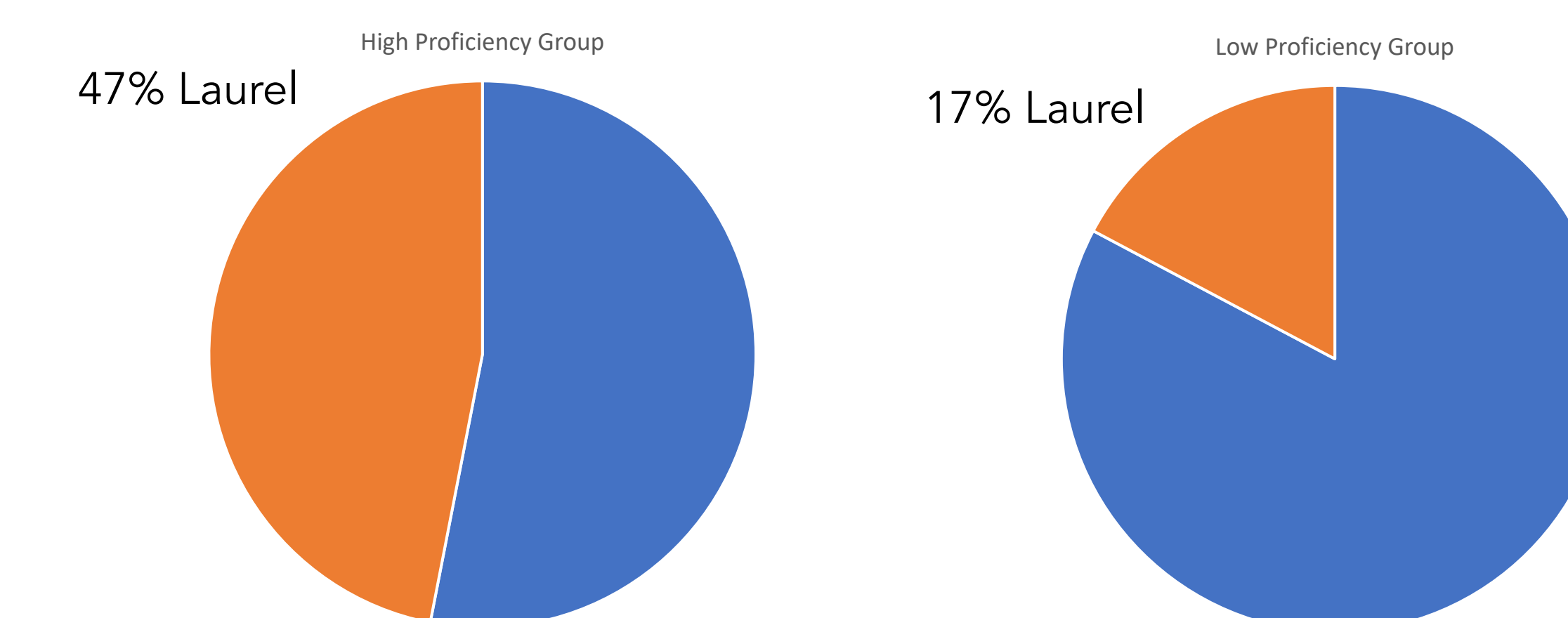
Some "laurel-like" responses from the high proficiency group: laurel (6), molor, molow (2), morol, role, boro, more load
Total "laurel-like" responses: 16

Some "yanny-like" responses from the high proficiency group: yanny (10), yammy (2), nearly (5), yearly (2), ear me, really
Total "yanny-like" responses: 33

Some "yanny-like" responses from the low proficiency group: yanny (2), nearly (8), yanry, yeany (3), yeally (4), really (2), eerie
Total "yanny-like" responses: 29

The low proficiency group did not have any laurel-like responses.

Measure 2: Binary Response



The charts above show the results for the audio clip in the pitch-shifted set that was identical to the original clip. Compared to the free-response measure, participants were more likely to select "Laurel." A chi-square test of independence confirmed that proficiency level is related to the likelihood of hearing "laurel." $\chi^2(1, N = 78) = 6.98, p = .0082.$

Discussion

This was a small study with some design flaws that might have influenced the results. This could explain some of the discrepancies between the results of the two different measures.

Overall, the results do indicate that Japanese L1 learners are more likely to hear "yanny" than "laurel," and that higher-proficiency learners are more likely to hear "laurel" than low-proficiency learners are.

The implication for language teaching is that we can't assume that our students are hearing the same things we are. Even when we think what we're hearing is obvious and unambiguous, there is still a possibility that our students are hearing something completely different.

Listening instruction often focuses on top-down processing strategies, but low-proficiency learners might still lack critical bottom-up processing abilities that allow them to perceive sounds that aren't in their native phonemic inventories.

References

Becker, R., & Lopatto, E. (2018) Yanny or Laurel? The science behind the audio version of the dress. *The Verge*, May 15.

Katz, J., Corum, J., & Huang, J. (2018). We made a tool so you can hear both Yanny and Laurel. *The New York Times*, May 28.

Pressnitzer, D., Graves, J., Chambers, C., de Gardelle, V., Egger, P. (2018) Auditory perception: Laurel and Yanny together at last. *Current Biology* 28(3), pp. R739-R741.