

VOWEL DURATION IN ENGLISH AS A SECOND LANGUAGE AMONG JAVANESE LEARNERS

Arum Perwitasari¹, Marian Klamer², Jurriaan Witteman³, Niels O. Schiller⁴

^{1 2 3 4}Leiden University Centre for Linguistics, Leiden University, the Netherlands

^{1 3 4}Leiden Institute for Brain and Cognition, Leiden University, the Netherlands

a.perwitasari@hum.leidenuniv.nl, m.a.f.klamer@hum.leidenuniv.nl,
j.witteman@hum.leidenuniv.nl, n.o.schiller@hum.leidenuniv.nl

ABSTRACT

How Javanese (L1) learners of English (L2) produce durational features of vowels has received increasing interest in the study of second language acquisition because the vowel systems are very disparate. The present production experiment attempts to shed light on the interference by Javanese (L1) on English vowel production (L2). The results are discussed with respect to differences in the vowel systems of English and Javanese. It was found that speech duration of native English speakers is significantly different from Javanese learners of English. Specifically, Javanese learners of English mispronounce all English vowels, both long and short, and fail to produce target L2 vowels. The results are discussed with respect to two hypotheses of L1 interference in second language learning.

Keywords: experimental phonetics, second language acquisition, speech production

1. INTRODUCTION

The question of how L1 interferes with L2 vowel production has received increasing interest. The Feature Hypothesis [10] claims that L2 features that are not contrastive in L1 will be difficult to acquire. The difficulty in producing phonetic features will be reflected in low production accuracy of these features in L2 speech production.

In contrast, the Linguistic Desensitization Hypothesis (LDH) [2] assumes that L2 learners are sensitive to durational cues when perceiving L2 vowels and predicts that vowel duration will be used to differentiate the non-native vowel contrasts. Because vowel duration is easy to access and salient, the hypothesis predicts that L2 learners employ durational information, which is contrastive in the L1.

The present study tested which of these hypotheses can best explain the pattern of English vowel duration production by Javanese learners of English.

2. BACKGROUND

Javanese, one of the most widely spoken local languages in Indonesia, includes 8 vowel phonemes: 6 phonemes and 2 additional allophonic pairs [e] - [ɛ] and [o] - [ɔ] [7] [13]. More recent studies confirm that Javanese vowels are grouped into 6 phonemes, including 4 allophonic pairs [i] - [ɪ], [u] - [ʊ], [e] - [ɛ], and [o] - [ɔ] [4] [6] [14] (as seen in Fig. 1b). The allophones of each vowel frequently occur in closed syllables.

The English vowel system (Figure 1a), especially American English vowels, consists of 10 monophthongs and 5 diphthongs [9][12]. In contrast to Javanese, vowel duration in English plays a major role in its phonological system [8]. Moreover, durational and spectral information is used to categorize vowels as tense or lax [1]. The vowel distinction is treated as tense-lax features [3], in which long vowels are claimed to be *tense* and short vowel are pronounced *lax*. It also reflects the fact that the short vowels are articulated with less muscular tension [5].

Based on the Feature Hypothesis because duration cues are not represented in L1, the L2 learners will have difficulty in producing the target vowel duration. Specifically, Javanese learners of English are predicted to have difficulties in producing longer duration of their L2 vowels /i:/, /ɜ:/, /ɑ:/, ɔ:/, /u:/ and are expected to pronounce L2 short sounds /ɪ/, /e/, /æ/, /ʌ/, /ʊ/ successfully.

In contrast, according to the Desensitization hypothesis, the Javanese learners of English will have no difficulty to pronounce long vowels /i:/, /ɜ:/, /ɑ:/, ɔ:/, /u:/ as they will generally be sensitive to the vowel length of the target language. The durational cues are predicted to be available for the Javanese learners of English, even though the information is not found in their first language.

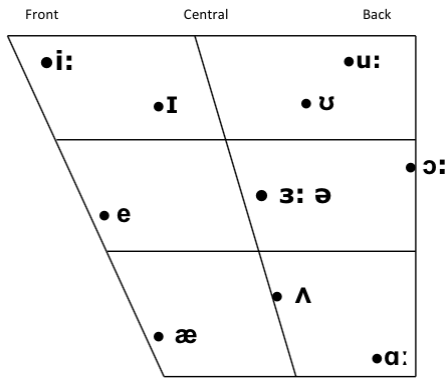


Fig. 1a. English vowel chart

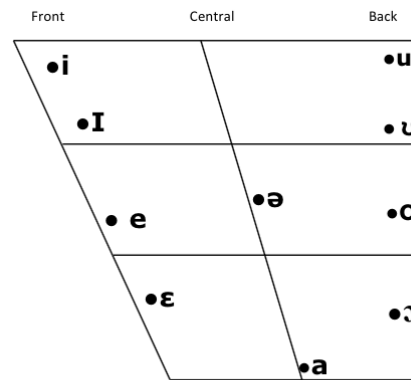


Fig. 1b. Javanese vowel chart

Figure 1: The comparison of English and Javanese vowel systems

3. METHOD

3.1 Participants

The control group included 10 native speakers of American English (50% male) who were 21-30 years old (mean age: 26.2) and did not have significant exposure to Javanese language. Twenty Javanese L2 learners of English (age= 21-25, mean age: 20.95; including 10 females and 10 males) were additionally included. None of them have ever visited or lived in an English-speaking country. At the time of recording, all 20 participants resided in Yogyakarta. Participants were excluded from the research if they (a) were not native speakers of Javanese and/or English, (b) pronounced target stimuli incorrectly, or (c) showed any form of speech disorder.

3.2. Stimuli

All participants produced a standardized set of target words. The target words comprised 10 monophthongs such as *bead*, *bid*, *bed*, *bad*, *bird*, *bud*, *body*, *bawd*, *Buddhist*, *booed* [9], and were embedded in monosyllabic /bVd/ contexts and inserted in a carrier sentence “*I say (bVd) again*” (Table 1). During the recording, participants repeated the sentences twice. The stimuli were digitized and loaded into Stimuli Experiment 1.0.

IPA Symbols	bVd	IPA Symbols	bVd
i:	bead	ʌ	bud
ɪ	bid	ɑ:	body
e	bed	ɔ:	bawd
æ	bad	ʊ	buddhist
ɜ:	bird	u:	booed

Table 1: English Monophthongs in /bVd/ context [9]

3.3. Procedures

First, each participant completed a consent form, a brief sociolinguistics questionnaire, which provided information about his or her demographics, native language, and second language background. Second, participants were instructed to perform an English [11] and Javanese proficiency test. Subsequently, participants received a short introduction monologue which contained words simulated for the recording. In order to get accustomed to the target stimuli, they were given the proper time to read and practice.

Participants were familiarized with the experiment and the procedures of recording. Each participant took a seat in front of a computer display with active mode recording tools (audio, video recorders, and headset microphone). Once the stimuli appeared on the screen, participants started to produce the sentences. All of the stimuli were presented in random order. Speech production was recorded in a sound-attenuated room and stored on a computer. Both audio and video recording were treated confidentially and used for acoustic analysis. Last, the recorded speech sounds were annotated and segmented.

3.4. Analysis

Using Praat 5.3.51 [15] vowels were segmented and used to measure vowel duration. Two repetitions of each target vowel were used to get mean duration of each vowel from both groups. Using SPSS version 16 [16], an independent t-test for the two groups was applied to test whether vowel duration was significantly different between groups.

4. RESULTS AND DISCUSSIONS

4.1. Results

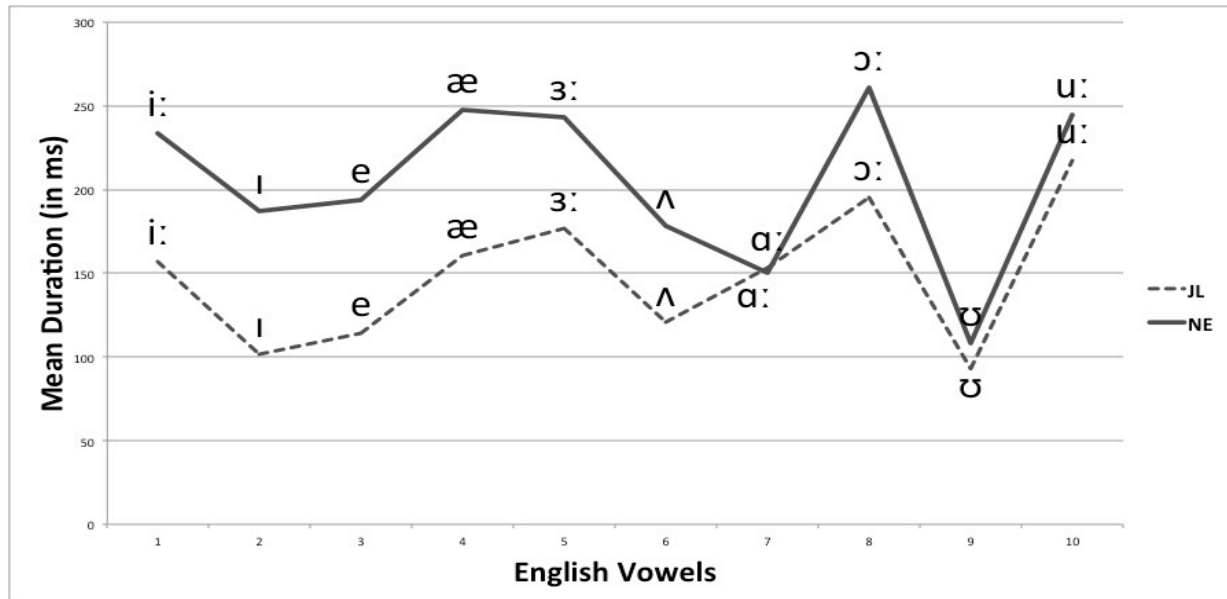


Chart 1: The vowel duration of Javanese learners of English compared to Native speakers of American English in /bVd/ context (NE=Native English; JL= Javanese Learners of English)

Chart 1 shows the mean duration of English vowels for Javanese Learners of English and English native speakers in /bVd/ context. As can be inferred from the chart, Javanese Learners generally produced vowels with a shorter vowel length compared to the native speakers.

Vowels	Group	Mean	SD	df	t	p
i:	JL	.157	.052	28	-3.850	.001
	NE	.233	.046			
I	JL	.102	.048	28	-4.903	.000
	NE	.186	.032			
e	JL	.114	.038	28	-5.391	.000
	NE	.194	.036			
æ	JL	.161	.063	28	-3.414	.002
	NE	.248	.069			
ɜ:	JL	.177	.071	28	-2.572	.016
	NE	.243	.053			
ʌ	JL	.121	.061	28	-2.691	.012
	NE	.178	.036			
ɑ:	JL	.154	.074	28	0.161	.874
	NE	.150	.020			
ɔ:	JL	.195	.060	28	-2.853	.008
	NE	.261	.058			
ʊ	JL	.092	.057	28	-0.767	.450
	NE	.108	.041			
u:	JL	.218	.100	28	-0.790	.436
	NE	.245	.058			

Table 2: The variation difference of each vowel duration of Javanese learners of English compared to Native English in /bVd/ context.

Table 2 presents the result of a T-test on the difference between Javanese learners and Native speakers of English. Differences between JL and NE are statistically significant in long vowels /i:/ [t(28)=-3.850], /ɜ:/ [t(28)=-2.572], and /ɔ:/ [t(28)=-2.853] and short vowel /I/ [t(28)=-4.903], /e/ [t(28)=-5.391], /æ/ [t(28)=-3.414], /ʌ/ [t(28)=-2.691], indicating that Javanese learners show significantly reduced vowel duration as compared to English native speakers (for all: p < 0.05).

However, the differences are not statistically significant for the long vowels /ɑ:/ [t(28)=0.161] and /u:/ [t(28)=-0.790] and the short vowel /ʊ/ [t(28)=-0.767].

4.2. Discussion

The results indicate that all vowel durations produced by Javanese learners of English were significantly shorter as compared to native speakers. From the results, two main findings stand out.

Firstly, the data provide consistent support to the Feature Hypothesis, which states that L2 learners have difficulties in producing duration in native like manners if the durational information is not found in their L1. Javanese learners of English had problems producing the correct duration of long vowels /i:/, /ɜ:/, /ɔ:/ and /u:/, which can be explained by the fact that these features are not prominently exploited in their first language. This finding confirms the prediction that contrasting categories in

second language would be difficult to acquire once the phonetic features do not exist in the first language.

Secondly, the Javanese learners of English produced significantly shorter L2 vowels /ɪ/, /e/, /æ/, /ʌ/, /ʊ/ than native speakers of English. These results challenge the desensitization hypothesis. Instead of over relying on durational cues as would be predicted by this hypothesis, the learners have unexpectedly produced shorter target vowels, even for the English short vowels. From these two main findings, the Javanese learners of English seemed unaware of long and short duration of English vowels.

5. CONCLUSION

Javanese learners of English have no references to the set of long and short (tense and lax) and no vowel length attribute in their L1 phonetic features. They are predicted to produce vowels differently compared to native English speakers due to the interference by their L1 in the second language learning process. Taken together, the results support the feature hypothesis' prediction that the L2 learners' failure in producing L2 vowels is related to the absence of duration as a contrastive feature in L1.

6. ACKNOWLEDGEMENTS

The authors would like to thank the Directorate General of Higher Education, Indonesian Ministry of National Education, who in partnership with Leiden University funded this article. Any of the opinions, findings, statements and conclusions expressed in this article are solely the responsibilities of the first author and do not necessarily expose those of the Directorate General of Higher Education, Indonesian Ministry of National Education.

7. REFERENCES

- [1] Bohn, O.S. & Flege, J.E. 1992. The production of new and similar vowels by adult German learners of English, *Studies in Second Language Acquisition* 14,2: 131-158
- [2] Bohn, O.S. 1995. Cross-language Speech Perception in adults. First Language transfer doesn't tell it all. In Strange, W. (ed.), *Speech perception and linguistic experience: Issues in cross-language research*. Tomonium, MD: York Press, 279-304.
- [3] Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.
- [4] Dudas, Karen. 1976. *The Phonology and Morphology of Modern Javanese*. Ann Arbor, Mich.: University Microfilms.
- [5] Gimson, A. C., and Cruttenden, A. 1994. *Gimson's Pronunciation of English*. 5th ed. London: Edward Arnold.
- [6] Hay ward, Katrina. 1999. Lexical phonology and the Javanese vowel system. *SOAS Working Papers in Linguistics*, 9:191-225.
- [7] Horne, Elinor C. 1961. *Beginning Javanese*. Vol. 3: Yale Linguistics Series. New Haven, London: Yale University Press.
- [8] Jones, D. 1957. *Outline of English Phonetics*. Cambridge: UK.
- [9] Ladefoged, Peter. 2001. *Vowels and Consonants: an introduction to the sounds of languages*. Blackwell.
- [10] McAllister, R. & Flege, J. - Piske, T. 2002. The Influence of L1 on the Acquisition of Swedish quantity by Native Speakers of Spanish, English, Estonia. *Journal of phonetics* 30, 229-258.
- [11] Meara, Paul. 2010. *EFL Vocabulary Tests: Second edition*. Swansea University: Swansea.
- [12] Roach, Peter. 2004. British English: Received Pronunciation, *Journal of the International Phonetic Association*, 34 (2): 239-245
- [13] Uhlenbeck, E. M. 1963. *Review of Beginning Javanese*, by Eleanor C. Home. *Lingua*, 12:69-86.
- [14] Wedhawati *et al.*, 2006. *Tata Bahasa Jawa Mutakhir*. Yogyakarta: Kanisius.
- [15] Boersma, Paul & Weenink, David. 2013. *Praat: doing phonetics by computer [Computer program]* Version 5.3.51, retrieved 5 July 2013 from <http://www.praat.org/>
- [16] IBM Corp. Released 2013. *IBM SPSS Statistics for Windows*, Version 22.0. Armonk, NY: IBM Corp.