

SEGMENTAL ERRORS INDICATED BY FORMANTS: A PRAAT ANALYSIS

Ade Namira¹⁾, Rahmadsyah Rangkuti²⁾

^{1,2}Universitas Sumatera Utara, Medan, Indonesia

¹adenamiiira@gmail.com

²syahkuti@gmail.com

Abstract

This study aims to find out the segmental error occurred by English students by concerning to their formants. This study used descriptive qualitative method. The subjects were a native speaker whose sound was taken from GStatic and two students whose background were Javanese and majoring English Education Study Program. The data were in the form sound and formants gotten from PRAAT software after input the sounds. The data were analyzed, described, and concluded. The result showed that the segmental error faced by the participants were /t/, /θ/, /e/, /ə/, and /ʌ/. Participants' formants tended to higher or lower than Native speaker's formants.

Keywords: *Formant, PRAAT Analysis, Segmental Error*

1. INTRODUCTION

It is known that the problems faced by non-native speakers in learning a foreign language are in pronunciation skills, especially in pronouncing the vocal system because there are differences in articulating these sounds to their existing language. Lado (1957) argued that those who learn a foreign language will find some of its features are easy and some others are difficult. What is quite similar to their mother tongue will be easy for them and what is different will be difficult.

Learners who studied English in university experienced English environment in the class either from the classroom activity or daily interaction. As the graduates would become a teacher, then it is expected to the graduates would be able to master English language well specifically pronunciation skill. The fact that it is still found errors.

Related to error, James (1998) stated there are three types of phonological errors in pronunciation, namely segmental, suprasegmental, and combinational errors. Segmental error includes vowel and consonant. Then, suprasegmental error includes stress and intonation of the words. Lastly, combinational error, includes cluster consonant combination in pronunciation.

The pronunciation of English is influenced by differences in geographical areas where English is spoken. In this case, Trudgill (1994) stated that people speak a different kind of English depending on where they are coming from and what kind of

social background they come from. For example, Javanese students found it hard to pronounce English because their Javanese accent still stuck with them (Istiqomah, 2016). In addition, Widiyati (2017) reported that one of difficulties they faced was pronouncing vowel as in cat /kæt/ only pronounced /ket/. She explained their accent still influenced their English pronunciation. Moreover, two kinds of vowel namely short and long vowels were also experienced error by students (Idhar, 2017).

In this study, it would answer the question “what segmental errors occurred by English students based on their short vowel formants?”. The segmental error would be discussed. It was the analysis of vowels error made by Javanese students. The writer analyzed the error based on the formants of student’s speech sound. Hence, this study intended to find out the phonological error specifically segmental error of vowels occurred when pronouncing words.

a. Vowel

Kelly (2000) stated that vowels are produced when a voiced airstream carves using the tongue and the lips to customize the mouth's overall shape. Simple Vowels divided into two kinds, there are short vowels and long vowels. Short vowels are vowel sounds pronounced in short form. Short vowel sound is a simple vocalic segment occurring within the nucleus of a syllable (McCully, 2009). This sound created when there is one vowel sound in a word. The way to pronounce is shorter than long vowel sound. Long vowels are that vocals usually pronounced longer than other. In this study, the writer focused on short vowels as below:

Vowel /ɪ/, it is articulated when the part of the tongue slightly nearer the centre. It is raised to just above the half-close position (not as high as in /i/). The lips are spread loosely, and the tongue is more relaxed. The sides of the tongue may just touch the upper molars. The example is fish.

Vowel /ʊ/, it is articulated when the part of the tongue just behind the center. It is raised, just above the half-close position. The lips are rounded, but loosely so. The tongue is relatively relaxed. The example is pull.

Vowel /e/ , it is articulated when focusing on the front of the tongue. The position is between the half-open and half-close positions or in the middle of the mouth. When /e/ is pronounced, the tongue will become more stained than when /ɪ/ is pronounced. It makes the lips spread freely and the sides of the tongue may touch the upper molars. The example is best.

Vowel /ə/, the center of the tongue is between the half-open position. Lips are loose and spread neutrally. the example is about.

Vowel /æ/, it is articulated when the front side of the tongue is lifted to just below the half-open position. Lips are open neutrally. The example is gas.

Vowel /ʌ/, it is articulated when the center side of the tongue is lifted to above with the position is fully opened. Lips are open neutrally. The example is rush.

Vowel /ɒ/, it is articulated when the back of the tongue is in the fully open position. Lips are lightly rounded. The example is gone.

b. Formants

Vowels have a fundamental frequency and harmonics. Some of them are emphasized depending on the resonant qualities of the vocal tract. These emphasized harmonics named as formants (Ball and Lowry, 2001). Speech analysts are usually concerned mainly with the first and the second formant (F1 and F2). Each vowel has a formant structure which indicates vowel height, tongue advancement and lip shape. The first formant frequency (F1) is inversely related to vowel height. F1 corresponds to tongue height: close vowels have lower F1 values, and open vowels have higher F1 values while F2 usually reflects the front-back position of the tongue, with front vowels having higher F2 values than back vowels. Lip-rounding is indicated by a lowering of all of the formant values formants (Ladefoged, 2011). Formants are acceptable parameters for describing vowel quality because F1/F2 plane correlates with traditional articulatory description of vowels (bark scale). The relationships can be seen when formants are plotted together in traditional articulatory descriptions.

2. METHODOLOGY

This study used descriptive qualitative method that is analysis of phonological error in pronouncing vowels. The data were in the form of sound of native speaker and from two last semester students of English Education Study Program whose professions are teacher. The students were Javanese people who also used Javanese language in their environment. The instrument used to collect the data were firstly, native speaker's sound taken from Google GStatic and secondly, the researcher herself with assisted smartphone to record the participants' sound of given words containing vowels specifically short vowels. The segment of the words would be focused on the second column as follows:

Table 4.1 English Short Vowels

Fish	/ɪ/
Pull	/ʊ/
Best	/e/
About	/ə/
Gas	/æ/
Rush	/ʌ/
Gone	/ɒ/

The recorded data were then analyzed one by one focusing on their formants specifically formant 1 and formant 2 by using PRAAT software. PRAAT is a very flexible freeware program for doing analysis of speech sound (Lieshout, 2003). The results of formants firstly were compared among the native speaker and two English students, then described and finally concluded.

3. RESULT AND DISCUSSION

The result of this study is presented in tables and figures which involve short vowels and Formant 1 and Formant 2 from 3 different speakers. The first speaker is native speaker (NS), the last two are Javanese participants P1 and P2.

Table 4.2 Formants for Short Vowels

Speaker	Formant	/i/	/ɔ/	/e/	/ə/	/æ/	/ʌ/	/ɒ/
NS	F2	2090	1100	2080	1930	1550	1363	1170
	F1	370	400	405	600	860	680	830
P1	F2	2039	1066	1717	1598	1548	1670	1330
	F1	557	776	984	1029	929	1124	881
P2	F2	1842	1296	1236	1653	1307	1284	1097
	F1	954	878	981	1064	1020	1022	949

Based on the table above, it can be seen the differences of formants among native speaker and non-native speakers which is Javanese students. The value of F1 indicates the vowel height or tongue height. It also can indicate open vowel when it has higher F1 and close vowel when it has lower F1. Meanwhile, the value of F2 indicates the back or front vowel when F2 is high then it is front vowel and vice versa.

The value of F1 from NS (370) showed that /i/ involved as half-close vowel. Meanwhile F1 of P1(557) and P2(954) were higher than NS. It means that P1 and P2 tended to pronounce /i/ as open vowel. The value of F2 from NS (2090) showed that /i/ involved as front vowel. The participants also pronounced it as front vowel by looking at their F2 value which quiet near to NS value; P1(2039) and P2(1842).

The value of F1 from NS (400) showed that /ɔ/ involved as half-close vowel. Meanwhile, it was quite far differences from P1 (776) and P2 (878). It means that P1 and P2 did not pronounce the /ɔ/ as close vowel. The value of F2 from NS (1100) showed that /ɔ/ involved as back vowel. It is also the same as P1 (1066) which almost reach the same value as NS rather than P2 (1296) which is quite far from NS.

The value of F1 from NS (405) showed that /e/ involved as half-close vowel. Meanwhile, P1(984) and P2 (981) are almost twice of NS. It means that P1 and P2 did not pronounce /e/ as close-mid vowel but tended to open vowel. The value of F2 from NS (2080) showed that /e/ involved as front vowel. Meanwhile, P1(1717) and P2 (1236) are lower than NS which means the sound was articulated from central or back of tongue.

The value of F1 from NS (600) showed that /ə/ involved as half-open vowel. Meanwhile, P1(1029) and P2 (1064) are almost twice of NS. It means that P1 and P2 did not pronounce /e/ as open-mid vowel but tended to open vowel. The value of F2 from NS (1930) showed that /ə/ involved as front vowel. Meanwhile, P1(1598) and P2

(1653) are lower than NS which means the sound was articulated from central or back of tongue.

The value of F1 from NS (860) showed that /æ/ involved as open vowel. The two participants also have quite similar value; P1 (929) and P2 (1020) which indicate as open vowel. The value of F2 from NS (1550) showed that /æ/ involved as central vowel. The formants of two participants; P1 (1548) and P2 (1307) also indicate /æ/ they pronounced as central vowel.

The value of F1 from NS (680) showed that /ʌ/ involved as half-open vowel. Meanwhile, P1(1124) and P2 (1022) are almost twice of NS. It means that P1 and P2 did not pronounce /ʌ/ as half-open vowel but tended to open vowel. The value of F2 from NS (1363) showed that /ʌ/ involved as central vowel. Meanwhile, P1(1670) is higher than NS which means the sound was articulated from the front. However, P2 (1284) is quite similar to NS.

The value of F1 from NS (830) showed that /ɒ/ involved as open vowel. The two participants also have quite similar value; P1 (881) and P2 (949) which indicate as open vowel. The value of F2 from NS (1170) showed that /ɒ/ involved as back vowel. The F2 of two participants; P1 (1330) and P2 (1097) also indicate /æ/ they pronounced as back vowel.

These following figures are charts of NS, P1, and P2 formants. It showed the differences of the position of each short vowel articulation.

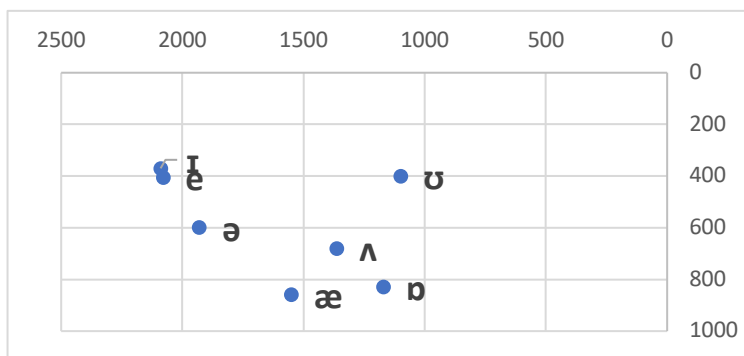


Figure 4.1 Chart of NS Short Vowels

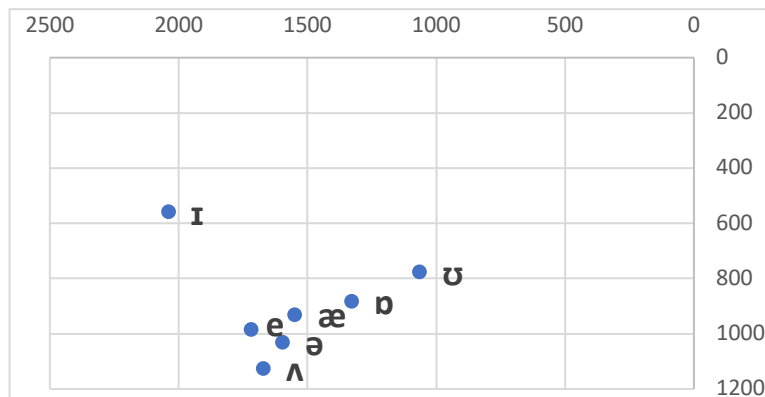


Figure 4.2 Chart of P1 Short Vowels

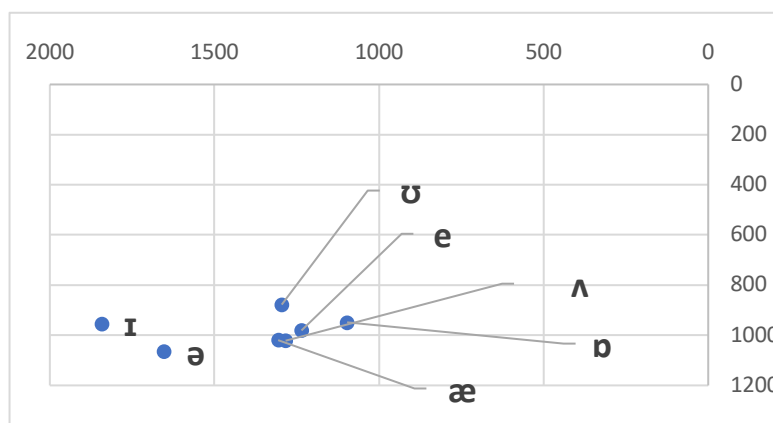


Figure 4.3 Chart of P1 Short Vowels

4. CONCLUSION

After analyzing the sound and comparing NS and two participants by concerning to the formant 1 and formant 2, it was found that the error faced by the participants were /ɪ/, /ʊ/, /e/, /ə/, and /ʌ/. Participants' formants tended to higher or lower than NS. They tended to pronounce the half-close vowel became open vowel and front vowel became back vowel and vice versa.

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