An Acoustic Analysis Of Plosive Sounds Produced By Indonesian ELF University Students

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ABSTRACT

This research explore the dimensions of acoustic phonetics in linguistic context with a focus on the analysis of sound sounds in a particular language. The purpose of this research to investigate differences in the pronunciations of consonant sounds between native and non-native speakers of the language. Use a phonetic-acoustic approach by analyzing voice data using the Praat application. The data used in this study consisted of recorded from native speakers and non-native speakers of that language. This research uses qualitative method, from use the recording and use Praat to collect the data. Pronunciation by 11 students from East Javanese.

Keywords: *Plosive sounds, Acoustic Phonetics, Consonant sounds*

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1. INTRODUCTION

A plosive is defined as a consonant sound that involves hardness of the mouth which does not allow air to escape from the vocal tract, and compression and inhalation of air. Therefore, there are four stages in plosive production: closure, maintenance, maintenance, and post-release. English has six plosive consonants, there are p, t, k, b, d, g. The sounds /p/ and /b/ are bilateral, that is, the lips are pressed against each other. The sounds /t/ and /d/ are alveolar, so the tongue presses against the gums. The sounds /k/ and /g/ are velar, the back of the tongue pressing against the area between the hard and soft palates. The /p/, /t/, and /k/ sounds are muted. /b/, /d/, and /g/ are usually voiced. The release of a voiceless plosive is followed by an audible explosion and, in the post-release phase, by aspiration. O'Connor (1980:8) explains that the English language consists of a total of 24 consonant sounds. The following consonant sounds are included: [p], [b], [t], [d], [k], [g], [s], [z], [m], [n], [f], [v], [l], [r], [h], [w], [j], [ŋ], [ʒ], [θ], [ð], [ʧ], [ʃ], and [ʤ]. For vowel sounds, the English language includes [l], [e], [æ], [ʌ], [ɑ], [u], [ɔ:], [ɑ:], [i:], [u:], [ə], [ɜ:]. Additionally, diphthong sounds consist of [al], [el], [ɔl], [əu], [iə], [eə], and [uə].

Javanese phonetics have vowel and consonant forms. There are 10 types of vowels, namely vowels [i], [I], [e], [ɛ], [a], [ə], [ɔ], [o], [U], and [u]. All vowels it is related to height of the tongue, the movement of the tongue parts, strictures, and shape of the lips. Second Javanese have 10 consonants, namely consonants bilabial, labio-dental, apicodental, apico-alveolar, apico-palatal, lamino-alveolar, lamino-palatal, medio palatal, dorso-velar, and laryngeal. All of the consonants are there voiced (B) and some are voiceless (T). Based on Uhlenbeck's (1982:27) findings, The Javanese language consists of 6 vowel sounds ([A], [O], [E], [U], [I], [ə]). Additionally, based on Soedjarwo's research (2009:29-56), the Javanese language comprises There are a total of 21

consonant sounds in the language, This includes sounds such as [p], [b], [t], [d], [th], [dh], [k], [g], [m], [n], [ɲ], [ŋ], [s], [h], [c], [j], [l], [r], [w], [y]. These categorizations are established based on factors like the method and location of articulation, as well as vocal position.

According to Mulyani (2007:45), the Javanese languages serves as a means of communication of the Javanese people. It's primarily spoken in central and also eastern regions of Java island. While its not the originally language in Indonesia. Javanese is recognized as a regional language in the three provinces of Java where there is a significant concentration of Javanese speakers. Moreover, the term "plosive" denotes a speech sound that is produced by completely closing the vocal tract and elevating the soft palate. This closure results in increased air pressure, which is then released abruptly and forcefully, as seen in sounds such as /p/, /b/, /t/, /d/, /k/, and /g/. However, the influence of the mother tongue or regional language can sometimes affect the pronunciation of sounds in a foreign language such as English. One example is the influence of Javanese explosive sounds on students' pronunciation of English explosive sounds. Javanese, a widely spoken language in Indonesia, has its own set of unique phonetic features, including distinctive plosive sounds. These plosive sounds differ in terms of articulation and acoustic properties from their English counterparts. When Javanese speaking students of English Literature encounter English words containing plosive sounds, they may encounter difficulties in accurately reproducing these sounds for example when they say "abab", "udud", "budeg," "ujub", "wirid" and "wareg". Previously, research was discussed out by Wardani and Suwartono (2019) investigating the difficulties of pronouncing English sounds by learners with a Javanese mother tongue background. Previous research has agreed on the problem of announcing English explosion sounds posed by Javanese learners. In the previous study, it was also identified the difficulties of Javanese learners in interpreting English consonants and vowels.

According to Wedhawati et al. (2006: 21-22), the Javanese language, specifically with an East Javanese dialect, is predominantly spoken in various regions of East Java, including Surabaya and its surrounding areas. It is also prevalent in the Horseshoe area, which comprises eastern Pasuruan, Probolinggo, Lumajang, Jember, Situbondo, and Bondowoso. Then, the north side of the East Java section is more inclined to Central Java, while the south side is a possibility only covers the Pacitan, Madiun area and Grobogan. Wedhawati et al. (2001:33) state, furthermore, the Javanese language comprises 6 vowel sounds ([i], [e], [ə], [ɑ], [u], [o]), and in addition to that, it encompasses 23 consonant sounds ([p], [b], [m], [f], [w], [t], [d], [n], [l], [r], [ṭ], [ḍ], [s], [z], [c], [j], [ń], [y], [k], [g], [ŋ], [h]), [ʔ]). It should be noted that this study has certain limitations, as it only focuses on semester 6 students from Surabaya, Bangil, Madiun, Sidoardjo, Tranggalek, and Lamongan.

This study has a problem limitation that focuses on the analysis and understanding of plosive sounds that appear at the end of words with the consonants /b/, /d/, and /g/. In this context, the plosive sound refers to the phonetic characteristic which is indicated by the presence of an 3 explosion of air at the time of pronouncing the final sound of words containing the consonant. This research will study this plosive sound phenomenon in depth, by observing a number of carefully selected word samples. The research focus will be placed on the qualitative differences between the plosive sounds in the consonants /b/, /d/, and /g/ at the end of words.

2. METHOD

This study will employ qualitative research methods. Data will be collected through audio recordings of Javanese-speaking students pronouncing English words containing plosive sounds. The population of this study were 6th semester English literature students. The

sampling procedure was to select a sample of 6th semester English literature students from Madiun, Sidoarjdo, Bangil, Lamongan, Trenggalek, and Surabaya. The data collection technique used is sound recording. The data analysis procedures in this research involved the following steps:

1. Recording the participants voice
2. Save the participant's recording on the laptop
3. Identify the students pronunciations using PRAAT application
4. Showing the spectrogram, and Formant in Praat Application
5. Draw a conclusion

3. RESULT AND DISCUSSION

This analysis of this data has collected. Researcher present findings of the study, focus on the analysis of 9 words, 3 words for sounds /b/, 3 words for sounds /d/ and 3 words for sounds /g/. Analyze the. Specifically examine the occurrence of the phonemes /b/, /d/, and /g/ within the collected data. The analysis provides insights into the participants' language production and potential speech sound error. In this study, researchers used the Praat application as a tool to analyze differences in pronunciation between native speakers and speakers of Javanese. The researcher included spectrogram images from the Praat application as evidence to show differences in the pronunciation of /b/, /d/, and /g/ sounds between native speakers and Javanese speakers. The spectrogram provides a visual representation of the frequency spectrum of sound over time, which can be helpful in comparing the acoustic characteristics between two groups of speakers.

A. Sound /b/ "Absorb"

The word "Absorb", for participant 1 is 0.145Hz for F1, while the native speaker for F1 is 0.138Hz. There is a slight increase in Participant 1. The word "Absorb", participant 2 is 1.103Hz for F2, while native speakers F2 is 0.117Hz for F2. There is a significant difference in the frequency of form F2 between participant 2 and native speaker. For the word "Absorb," Participant 3 is 0.070Hz for F2 and 0.140Hz for F1. While Native Speaker is while the native speaker for F1 is 0.138Hz and is 0.117Hz for F2. There is a slight increase in Participant 3. For the word "Absorb," Participant 4 has a value of 1.109Hz for F2 and 0.122Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz there is a slight increase in Participant 4. For the word "Absorb," Participant 5 has a value of 1.109Hz for F2 and 0.122Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz for F1. Participant 5 shows higher values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 6 has a value of 1.190Hz for F2 and 1.134Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz for F1. Participant 6 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 7 has a value of 0.023Hz for F2 and 0.095Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz for F1. Participant 7 shows significantly lower values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 8 has a value of 1.109Hz for F2 and 1.543Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz for F1. Participant 8 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 9 has a value of 1726Hz for F2 and 1142Hz for F1, while the native speaker has a value of 0.117Hz for F2 and 0.138Hz for F1. Participant 9 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 10 has a value of 1126Hz for F1 and 1212Hz for F2, while the native speaker has a value of 0.138Hz for F1 and 0.117Hz for F2. Participant 10 shows significantly higher values for both F1 and F2 compared

to the native speaker. For the word "Absorb," Participant 11 has a value of 1.211Hz for F1 and 1.123Hz for F2, while the native speaker has a value of 0.138Hz for F1 and 0.117Hz for F2. Participant 11 shows significantly higher values for both F1 and F2 compared to the native speaker.

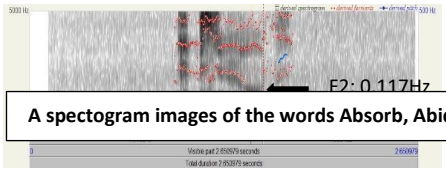
B. Sound /d/ “Abide”

For the word "Abide," Participant 1 has a value of 0.080Hz for F2 and 0.086Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 1 shows slightly lower values for both F2 and F1 compared to the native speaker. For the word "Abide," Participant 2 has a value of 0.110Hz for F2 and 0.012Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 2 shows higher values for both F2 and F1 compared to the native speaker. For the word "Absorb," Participant 3 has a value of 0.070Hz for F2 and 0.140Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 3 shows slightly lower values for F2 and higher values for F1 compared to the native speaker. For the word "Abide," Participant 4 has a value of 1.129Hz for F2 and 1.122Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 4 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Abide," Participant 5 has a value of 1.132Hz for F1 and 1.623Hz for F2, while the native speaker has a value of 0.076Hz for F1 and 0.084Hz for F2. Participant 5 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Abide," Participant 6 has a value of 1.109Hz for F1 and 1.111Hz for F2, while the native speaker has a value of 0.076Hz for F1 and 0.084Hz for F2. Participant 6 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Abide," Participant 7 has a value of 1.211Hz for F1 and 1.276Hz for F2, while the native speaker has a value of 0.076Hz for F1 and 0.084Hz for F2. Participant 7 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Abide," Participant 8 has a value of 1.056Hz for F2 and 1.109Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 8 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Abide," Participant 9 has a value of 1.121Hz for F1 and 0.982Hz for F2, while the native speaker has a value of 0.076Hz for F1 and 0.084Hz for F2. Participant 9 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Abide," Participant 10 has a value of 1.077Hz for F2 and 1.255Hz for F1, while the native speaker has a value of 0.084Hz for F2 and 0.076Hz for F1. Participant 10 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Abide," Participant 11 has a value of 1.290Hz for F1 and 1.129Hz for F2, while the native speaker has a value of 0.076Hz for F1 and 0.084Hz for F2. Participant 11 shows significantly higher values for both F1 and F2 compared to the native speaker.

C. Sound /g/ “Analogue”

For the word "Analogue," Participant 1 has a value of 0.163Hz for both F1 and F2, while the native speaker has a value of 0.160Hz for F1 and 0.162Hz for F2. Participant 1 shows slightly higher values for both F1 and F2 compared to the native speaker. For the word "Analogue," Participant 2 has a value of 1.145Hz for F2 and 1.080Hz for F1, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 2 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Analogue," Participant 3 has a value of 1.110Hz for both F1 and F2, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 3 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Analogue," Participant 4 has a value of 1.180Hz for F2 and 1.169Hz for F1, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 4 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Analogue," Participant 5 has a value of 1.125Hz for F1 and 1.178Hz for F2, while the native speaker has a value of 0.162Hz for F2 and 80 0.160Hz for F1. Participant 5 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Analogue," Participant 6 has a value of 1.109Hz for F1 and 1.228Hz for F2, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 6 shows higher values for both F1 and F2 compared to the native speaker. For the word "Analogue," Participant 7 has a value of 1.135Hz for F2 and 1.132Hz for F1, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 7 shows significantly higher values for both F2 and F1 compared to the native speaker. For the word "Analogue," Participant 8 has a value of 1.115Hz for F1 and 1.152Hz for F2, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 8 shows significantly higher values for both F1 81 and F2 compared to the native speaker. For the word "Analogue," Participant 9 has a value of 1.121Hz for F1 and 1.109Hz for F2, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 9 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Analogue," Participant 10 has a value of 1.212Hz for F1 and 1.121Hz for F2, while the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 10 shows significantly higher values for both F1 and F2 compared to the native speaker. For the word "Analogue," Participant 11 has a value of 1.134Hz for F1 and 1.143Hz for F2, while

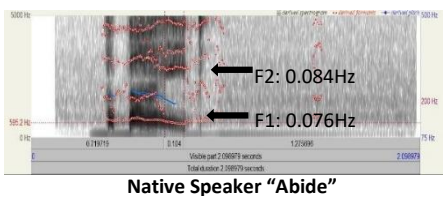
the native speaker has a value of 0.162Hz for F2 and 0.160Hz for F1. Participant 11 shows higher values for both F1 and F2 compared to the native speaker.



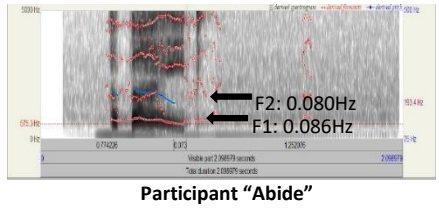
Native Speaker "Absorb"

Participant "Absorb"

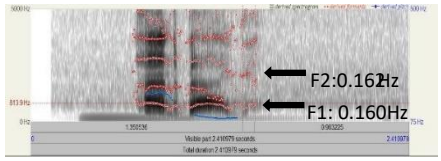
A spectogram images of the words Absorb, Abide, and Analogue "Native Speaker and Participant"



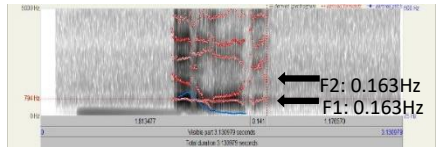
Native Speaker "Abide"



Participant "Abide"



Native Speaker "Analogue"



Participant "Analogue"

4. CONCLUSION

Increase or decrease in F1 frequency, some participants showed an increase or decrease in F1 frequency compared to the native speaker. This indicates variation in the pronunciation of the observed sounds at the end of words. Increase or decrease in F2 frequency, similar to F1, some participants exhibited an increase or decrease in F2 frequency compared to the native speaker. This suggests variation in the pronunciation of the observed sounds at the end of words. Variation among participants, although there is variation among participants, not all participants exhibited similar patterns in the pronunciation of sounds at the end of words. Each participant has unique characteristics in the pronunciation and frequency values of F1 and F2. Individual influence, differences in the pronunciation of sounds at the end of words may be influenced by individual factors such as accent, language background, and personal pronunciation preferences of each participant.

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