PRONUNCIATON ANALYSIS OF ENGLISH CONSONANTS /θ/ AND /ð/ BY ENGLISH DEPARTMENT STUDENTS

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ABSTRACT

Indonesians have been taking much concern in English since it has been applied in formal education curricula. Also, not all Indonesians are familiar with English pronunciation, especially its characteristics in phonemes. Some English consonants even do not exist in Indonesian consonants such as the sounds /θ/ and /ð/ categorized as voiceless and voiced interdental fricatives. Due to this concern, this study investigates the production of English voiced and voiceless interdental consonants uttered by English Department students as non-native speakers of English using the Praat application to see their pronunciation and spectrogram analysis. There were eight undergraduate first-year English major students as the respondents. The researcher gave them eighteen words consisting of /θ/ and /ð/ sounds in initial, medial, and final word-position. The data are in audio recordings. The result revealed that most students changed the voiced interdental fricative into consonants such as /d/ and /t/. This inappropriate way also happened when they produced voiceless interdental fricatives. They changed /θ/ sound into consonant sounds such as /d/ and /t/.

Keyword: *Interdental Fricative, Phonology, Pronunciation, Spectrogram*

ABSTRAK

Indonesia menaruh perhatian yang besar terhadap bahasa Inggris karena bahasa tersebut telah digunakan dalam kurikulum pendidikan formal. Tidak semua warga negara Indonesia mengetahui pelafalan bahasa Inggris, khususnya karakteristik fonem bahasa tersebut. Beberapa konsonan bahkan tidak ditemukan dalam bahasa Indonesia seperti bunyi /θ/ and /ð/ yang dikategorikan sebagai bunyi interdental frikatif bersuara dan tidak bersuara. Atas dasar permasalahan tersebut, penelitian ini menginvestigasi produksi bunyi /θ/ and /ð/ yang dituturkan oleh mahasiswa Program Studi Bahasa Inggris sebagai non penutur jati bahasa Inggris dengan menggunakan aplikasi Praat untuk mengetahui pelafalan dan analisis spectrogram mereka. Ada delapan partisipan dan mereka diberikan delapan belas kata yang mengandung bunyi /θ/ and /ð/ pada posisi kata awal, tengah, dan akhir. Data berupa rekaman audio. Hasil penelitian

menemukan bahwa beberapa mahasiswa mengubah bunyi interdental frikatif bersuara menjadi bunyi konsonan seperti /d/ dan /t/. Ketidaktepatan kaidah ini juga terjadi pada saat mereka memproduksi bunyi interdental frikatif tak bersuara. Mereka mengubah bunyi /θ/ menjadi bunyi konsonan yaitu /d/ dan /t/.

Kata Kunci: Interdental Frikatif, Fonologi, Pelafalan, Spektrogram

INTRODUCTION

Indonesia has adopted English from the lowest level of education. It becomes a mandatory subject at the level of junior and senior high school and even at university. This procedure happens due to the importance of English for Indonesians. Compared to Indonesian, English has pronunciation characteristics that Indonesian does not have. English pronunciation involves segmental and suprasegmental features. Segments are vowel and consonant sounds which are so-called phonemes, while suprasegmental deals with intonation, stress, and timing (Mirza, 2015). Regarding pronunciation, Indonesian learners are having difficulties pronouncing some English consonants and vowels. Examples of mispronounced consonants are /θ/ and /ð/ (Komariah, 2018; Firdaus et al., 2020). The correct pronunciation was often hindered due to nonnative speakers' mispronunciation in consonants and vowels (Munro cited in Bui, 2016). This condition aligns with Bergmann et al. (2016) argued that many speakers have an accent shaped by their first language and are perceived as non-native-like. Moreover, in this article, university students majoring in English in Jakarta have difficulties pronouncing /θ/ as in thank and /ð/ as in father so that they produce those two sounds into what they are not supposed to be.

Meyer (2009) classified English consonants into three parameters: voicing, place of articulation, and manner of articulation. Voicing deals with whether or not the vibration occurs in the vocal cords. When the vocal folds vibrate during the consonant articulation, the consonant is called voiced, and if the vocal folds do not vibrate, it is called voiceless. Place of articulation is a term where the sound is produced in the mouth, while the manner of

articulation is how the airstream flows in the mouth during articulation. Carr (2013) added that the place of articulation, which consists of seven places, deals with how airflow can be modified. The first place is known as bilabial, which forms a constriction between the lower lip and the upper lip. An example is /p/ as in pit. The second place is labio-dental, a constriction between the lower lip and the upper teeth, such as /f/ as in fit. The third place is dental, meaning there is a constriction between the tip of the tongue and the upper teeth, such as /θ/ as in thin. The fourth place is called alveolar, produced by making a constriction between the blade or tip of the tongue and the alveolar ridge. An example is /s/ as in sin. Fifth place is produced by making a constriction between the blade of the tongue and the palato-alveolar, which is so-called palato-alveolar. This happens in sound /ʃ/ as in ship. The sixth place is called palatal, which happens when there is a constriction between the front of the tongue and the hard palate. An example of this sound is /j/ as in yes. Seventh place is conceptualized as velar produced by a constriction between the back of the tongue and the velum, such as /k/ as in cool.

Meanwhile, as Carr (2013) conceptualized, a manner of articulation can be identified in a sound articulated. He explained seven distinctions between each way of articulation. The first way is stop which forms a complete closure in the mouth with the representative sounds are /t/, /k/, /d/, /g/, and so on. The second one is called fricatives which means the airflow is not entirely blocked. Sounds produced in this way are /f/ and /v/. The third way, approximant, is produced when articulators come close together but not sufficiently creates friction as in /j/. The fourth concept is called lateral, which means there is no friction created, and the tongue blocks the alveolar ridge as in /l/. The fifth concept, trills, is produced when the blade of the tongue against the alveolar ridge, as in /r/. Moreover, the sixth way is well-known as affricates. It is produced with a constriction of complete closure followed by a release phase; the example is sound /tʃ/. The seventh production is nasal, produced by air escaping through the nasal cavity, such as/m/, /n/, and /ŋ/.

Since language is varied, parts of the vocal tract are functional (Löfqvist, 2010). For example, Yavaş (2011) conceptualized /θ/ as a voiceless interdental fricative, while /ð/ as voiced interdental fricative produced by placing the tip of the tongue between the upper and lower front teeth. He added that voiced sound is produced when glottis (space between vocal cords) assume different sounds, whereas voiceless occurs when the cords are open, and the air passes freely through the glottis. That is why speech production involves controlling and coordinating some parts of the vocal tract (Löfqvist, 2010).

Due to this problem, the researcher finds some relevant previous research. The first one was conducted by Bui (2016), who examined the pronunciation of consonants /ð/ and /θ/ uttered by 115 adult Vietnamese learners of English. Her objective was to identify their mistakes in pronouncing those two English consonants and determine what caused their mispronunciation. The findings revealed that errors appeared when they pronounced /θ/ as /t/, while /ð/ as /z/, and there was a tendency that /ð/ was pronounced /dʒ/ instead of /ð/. The second previous research was carried out by Cornwell & Rafat (2017). They investigated the production of /θ/ and /ð/ uttered by three groups of English speakers; they were English monolinguals, Dutch heritage speakers, and Dutch English speakers. There were 21 participants whose ages were between 20--80. The production was found using naturalistic and reading tasks. In the naturalistic task, Cornwell & Rafat (2017) saw their fluency responses to their Dutch and English. In the second task, the participants were audio-recorded and were assigned to describe pictures in detail. Meanwhile, in the third task, they were audio-recorded while reading a paragraph containing /θ/ and /ð/. The findings revealed that Heritage Dutch speakers produced [θ] and [ð] at similar rates to Monolingual English speakers, while the other groups showed different allophonic realizations, mainly when /ð/ is in the initial position and /θ/ is in the middle position. In contrast to the previous research, this article aims: 1) to analyze what kind of production is produced by English department students in pronouncing voiced and voiceless interdental fricative sounds

and 2) to analyze sound production spectrogram by English department students in pronouncing voiced and voiceless interdental fricative sounds using Praat (Boersma & Weenink, n.d.). Praat means "talk" in Dutch, and it is computer software to analyze speech in phonetics proposed by Boersma & Weenink as cited in Li (2019).

METHODOLOGY

This research employs qualitative research designed to rely on text and image data as Creswell (2018) claimed. The participants of this study are eight undergraduate first-year English major students of the academic year 2020 in Jakarta. The researcher gave them eighteen words in six categories: voiced interdental fricative /ð/ written in the initial, medial, and final position and voiceless interdental fricative /θ/ written in the initial, medial, and final position of words as well. After giving them the classified words, the researcher asked them to record their voices and sent them. After data were collected, the analyses are begun by uploading each voice to the Praat application to find out how voice and voiceless interdental fricative sounds are produced. In the next analysis step, the researcher finds out how the spectrogram sees its sound production. The results, then, are classified based on the sixth category above.

RESULT AND DISCUSSION

A. Berikut Voiced Interdental Fricative Data

Data distribution of students' audio recordings is presented as follows.

Table 1. Students' Production of Voiced Interdental Fricative

Position	Voiced Interdental Fricative	Production
Initial	then	/ðen/, /den/, /deːn/
	them	/ðəm/, /deːm/, /dem/
	those	/ðəʊs/, /ðɔːs/, /ðɒs/, /doʊs/

Medial	father	/fɑ:.ðə/, /fɑ:.ðər/ /fʌ.ðər/, /fadər/, /fɑ:.dər/, /fʌ.də/
	other	/ʌð.ə/, /ʌð.ər/, /ɔ:də/, /ɒd.ər/, /ʌd.ɜ:r/, /ʌd.ər/
	either	/i:ðə/, /i:ðər/, /e.ðər/, /e.dər/, /i:dər/, /eɪdə/
Final	with	/wɪt/, /wɪts/, /wɪð/
	booth	/bu:ð/, /buts/, /bu:ð/, /but/, /buð/, /bot/
	smooth	/smu:t/, /smu:ts/, /smu:ð/, /smut/, /smuð/, /smut/

Below is the number of students who pronounce voiced interdental fricative sound correctly and incorrectly in the initial, medial, and final position.

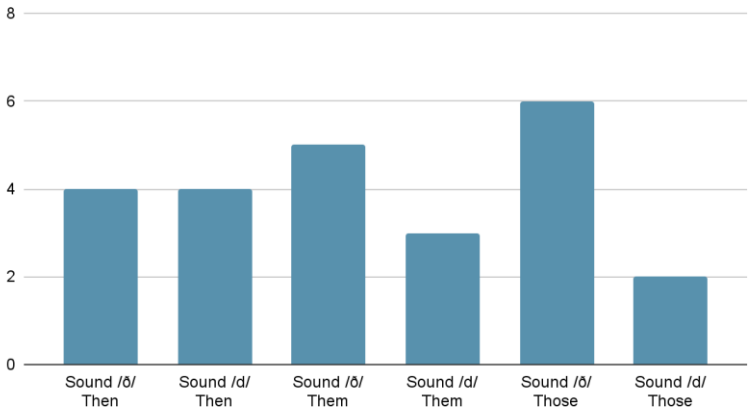

Diagram 1. Voiced Interdental Fricative (Initial Sound)

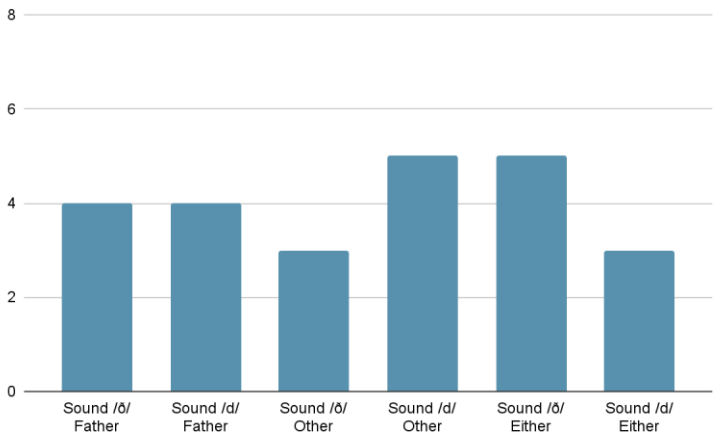

Diagram 2. Voiced Interdental Fricative (Medial Sound)

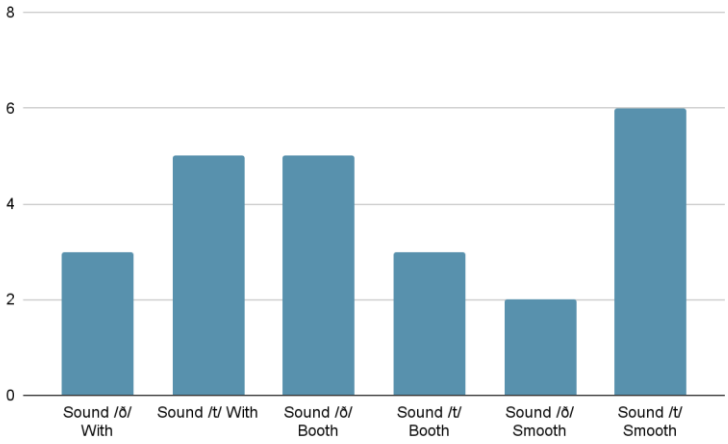

Diagram 3. Voiced Interdental Fricative (Final Sound)

From the table, when producing /ð/ sound in the initial position, some students were applying the voiced interdental sound correctly, while others were not. They changed /ð/ sound into /d/ as in Indonesian. Similar production also happened when they produced /ð/ sound in the medial position. In the final position, some students added an alveolar sound such as /s/ at the end of the sound. Also, most of them had difficulties producing /ð/ sound, so they changed it into /t/ sound.

Spectrogram of Voiced Interdental Fricative

1. Initial Position

To determine whether or not students' production of voiced interdental fricative on a spectrogram is correct, the researcher also analyzes sounds produced by a native English speaker. Sound /ð/ as in *then* is produced with friction. It is shown by the vertical red line. In line with what Yavaş (2011) said, when fricative sound is produced, a turbulent noise (friction) appears on the spectrogram as a scribble pattern. Unlike the native speaker's spectrogram, the second spectrogram does not show a turbulent noise or a scribbly pattern since the student produced /ð/ into /d/. Meanwhile, the third one does. The figures are shown as follows.

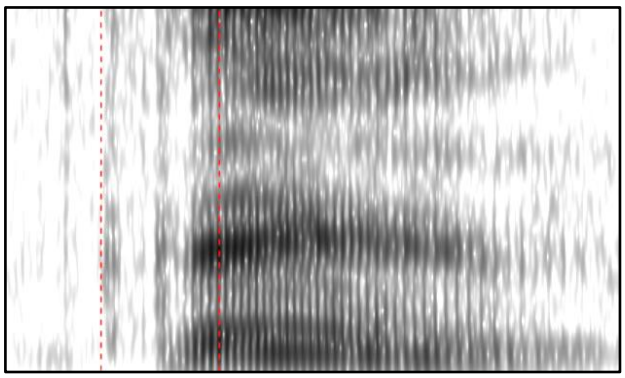

Figure 1.1 Spectrogram of *Then* by English Native Speaker

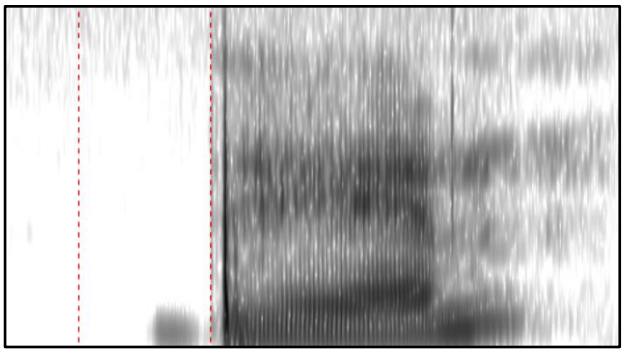

Figure 1.2 Spectrogram of *Then* by the student

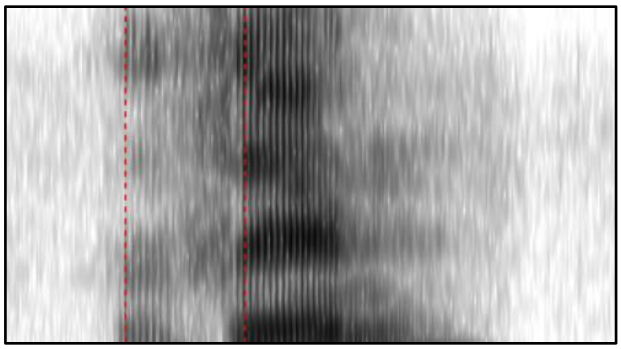

Figure 1.3 Spectrogram of *Then* by another student

2. Medial Position

The sound given to the students in medial position is /ð/ as in *either*. The first figure is aspectrogram from a native English speaker. It shows friction in a vertical red line, while a student's production shows no friction in the second spectrogram since he changed /ð/ into /d/. Meanwhile, the third one has friction. The figures are as follows.

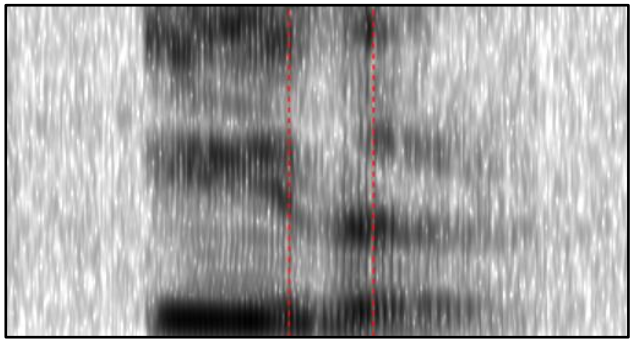

Figure 2.1 Spectrogram of *Either* by the native

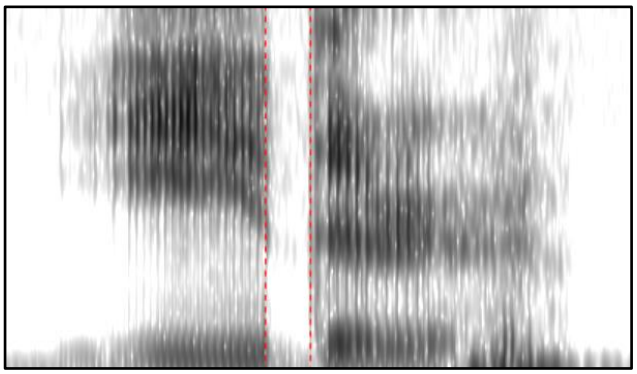

Figure 2.2 Spectrogram of *Either* by the student

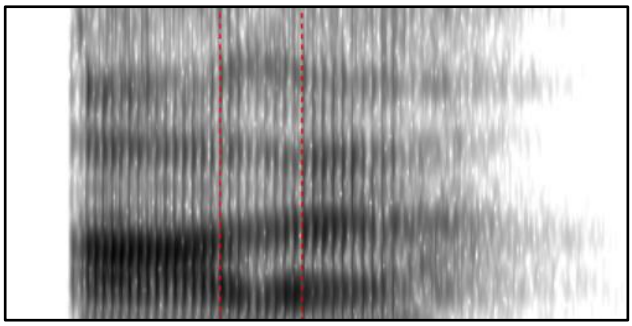

Figure 2.3 Spectrogram of *Either* by another student

3. Final Position

In the final position, the native English speaker and students were asked to produce /ð/ sound as in *with*. The spectrogram from the native English speaker shows friction in the vertical red line, while the student does not since he pronounced /wɪð/ into /wɪt/. That is why the spectrogram shows an empty area. The student even added an alveolar sound at the end

of the sound. On the other hand, the third spectrogram from another student produces the scribbly pattern.

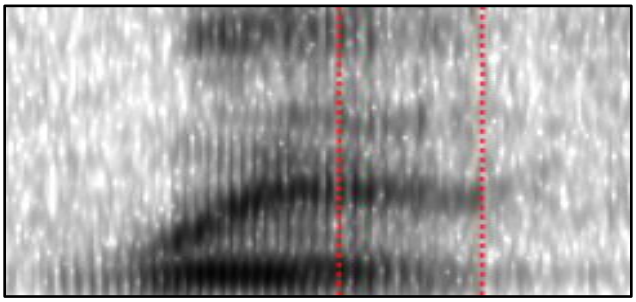

Figure 3.1 Spectrogram of *With* by the native

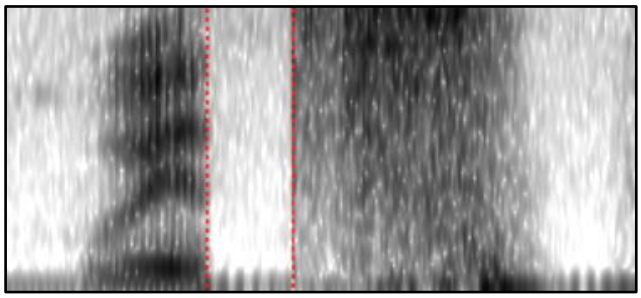

Figure 3.2 Spectrogram of *With* by the student

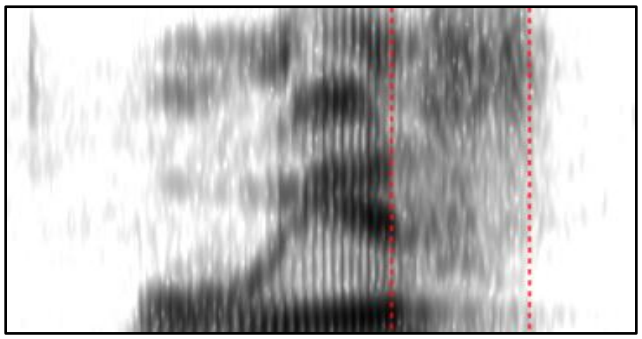

Figure 3.3 Spectrogram of *With* by another student

B. Voiceless Interdental Fricative Data

Data distribution of students' audio recordings is presented as follows.

Table 2. Students' Production of Voiceless Interdental Fricative

Position	Voiceless Interdental Fricative	Production
Initial	Thin	/θɪn/, /tɪn/, /tiːn/
	Through	/θruː/, /truː/
	Thank	/tæŋk/, /θæŋk/
Medial	Author	/auto/, /autər/, /autor/, /ʌð.ər/, /aʊdər/, /aʊdor/, /ɔː.tər /, /ʌtə/
	Nothing	/nʌt.ɪŋ/, /nʌθ.ɪŋ/
	Method	/met.əd/, /meθ.əd/, /metod/, /mə.tod/
Final	Truth	/truːθ/, /trut/, /truːt/, /trəd/
	Path	/pæθ/, /pæt/, /pʌθ/, /pet/, /peθ/, /pɑːt/
	Mouth	/maʊθ/, /maʊts/, /maʊt/, /mɑːt/

Below is the number of students who pronounce voiceless interdental fricative sound /θ/ correctly and incorrectly in the initial, medial, and final position.

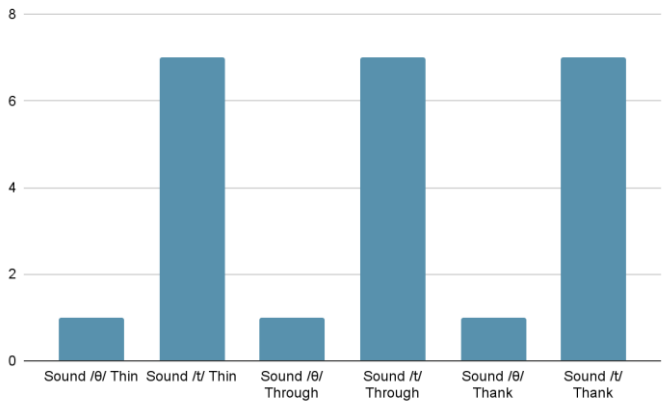

Diagram 4. Voiceless Interdental Fricative (Initial Sound)

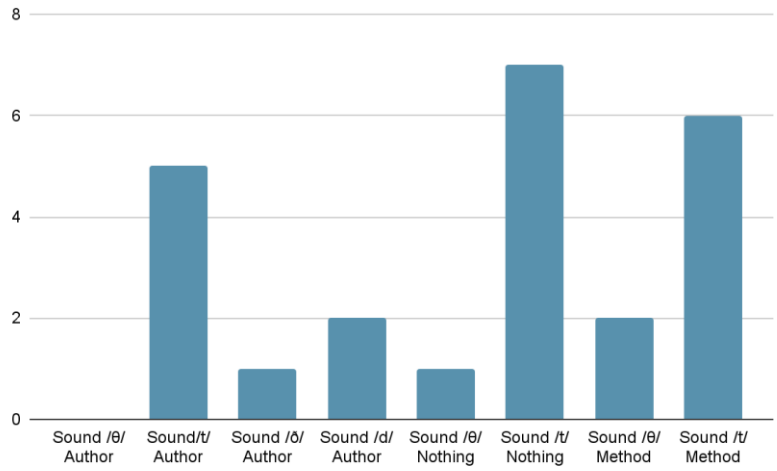

Diagram 5. Voiceless Interdental Fricative (Medial Sound)

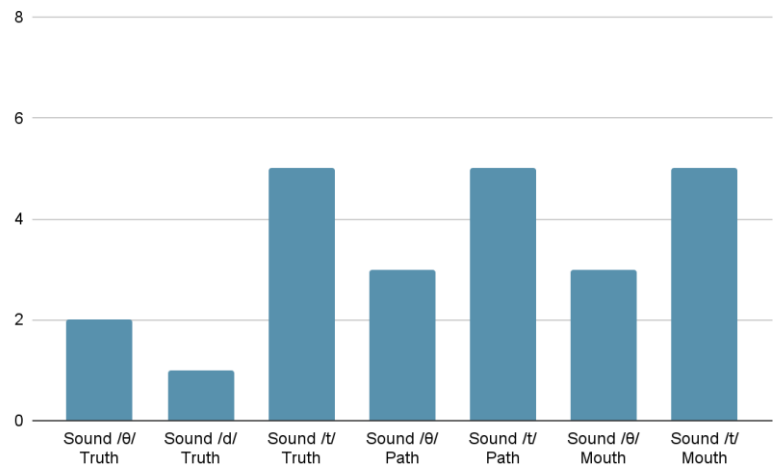

Diagram 6. Voiceless Interdental Fricative (Final Sound)

From the table, when producing /θ/ sound in the initial position, some students were applying the voiced interdental sound correctly, while others were not. They changed /θ/ sound into /t/. Sound /θ/ in the medial position was produced with /θ/, /t/, /ð/, and /d/ sound. In the final position, students produced /θ/ sound into /θ/, /t/, and /d/.

Spectrogram of Voiceless Interdental Fricative

1. Initial Position

The first spectrogram showed that sound /θ/ came up with friction as highlighted with a vertical red line. The strong pattern which appears after the sound is the vowel /æ/. The student produced /θ/ as /t/ that is why it contains no friction in the second spectrogram. Meanwhile, another student could correctly produce sound /θ/ as shown in the third spectrogram with friction. The figures are as follows.

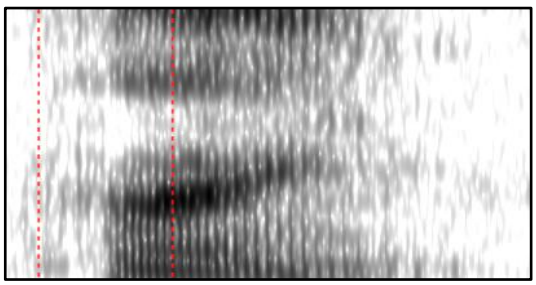

Figure 4.1 Spectrogram of *Thank* by the native

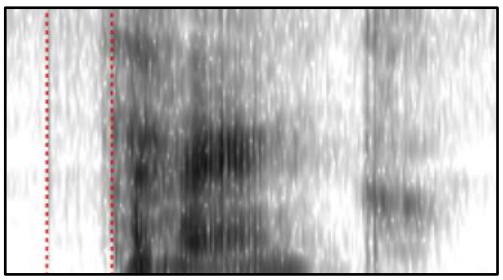

Figure 4.2 Spectrogram of *Thank* by a student

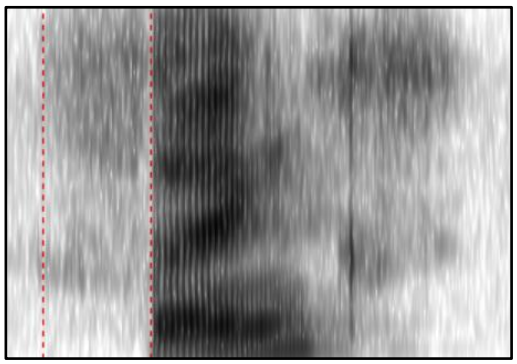

Figure 4.3 Spectrogram of *Thank* by another student

2. Medial Position

The native English speaker firstly produced sound /θ/ in the initial position as in *method*. The scribbly pattern can be scrutinized in the red vertical line. The student's production shows no friction in the second spectrogram since he changed sound /θ/ into /t/. The empty pattern in the vertical red line looks similar to the beginning of the recording when the student had not uttered any sound yet. While the third spectrogram produced by another student also shows a scribbly pattern as shown by the native since he produced sound /θ/.

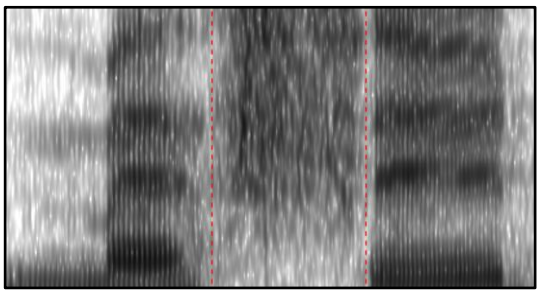

Figure 5.1 Spectrogram of *Method* by the native

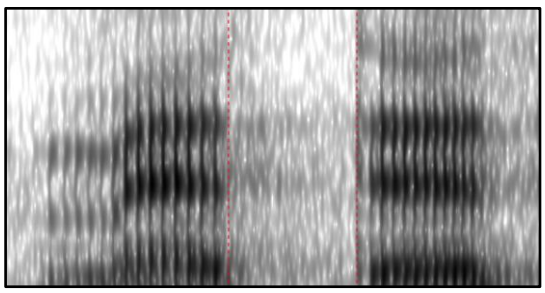

Figure 5.2 Spectrogram of *Method* by the student

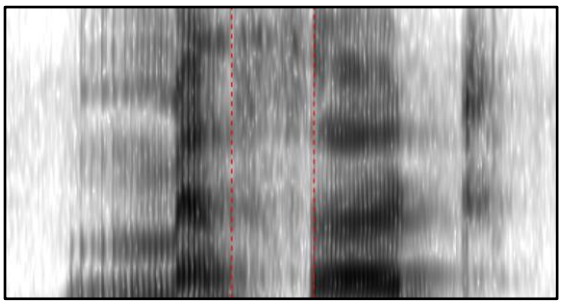

Figure 5.3 Spectrogram of *Method* by another student

3. Final Position

Sound /θ/ in the final position as in *mouth* was first produced by the native as displayed in the following figure. The red vertical line shows the sound /θ/, and it shows friction. In the second figure, the production of /θ/ by the student is different from the native's since the friction is not seen. It is due to the change of sound /θ/ into /t/. Meanwhile, the third figure of the spectrogram produced by another student shows that he correctly produces sound /θ/ without changing it into /t/. Here are the figures.

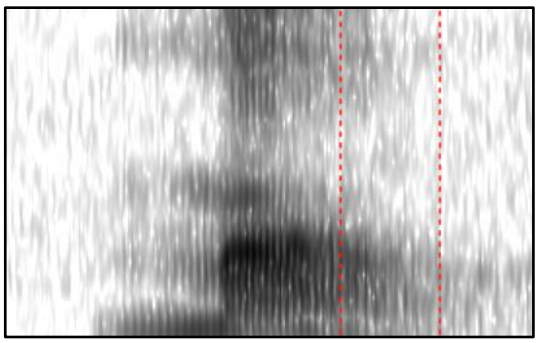

Figure 6.1 Spectrogram of Mouth by the native

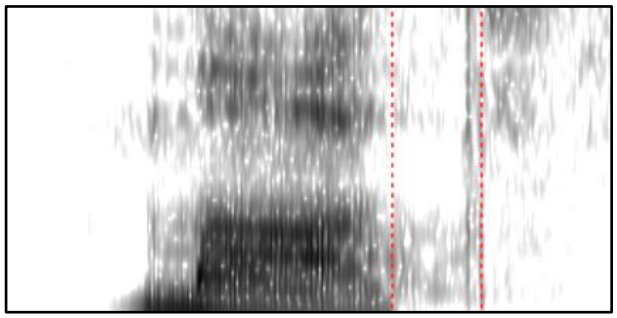

Figure 6.2 Spectrogram of *Mouth* by the student

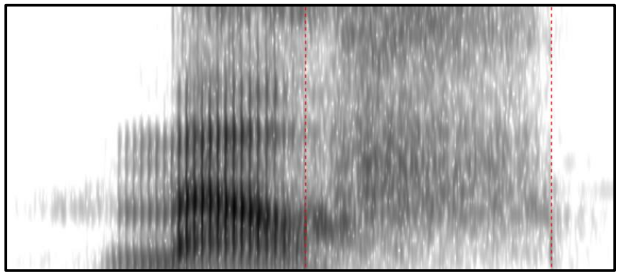

Figure 6.3 Spectrogram of *Mouth* by another student

Regarding what has been conducted in the previous research about the production of /ð/ and /θ/ by Vietnamese learners of English (Bui, 2016) and the same consonant sounds by three groups of English speakers (Cornwell & Rafat, 2017), Indonesian university students, majoring English, also have difficulties in producing the similar consonants. Bui summed up that her respondents produced /θ/ as /t/, /ð/ as /z/, and there was a tendency /ð/ was pronounced /dʒ/ instead of /ð/. Meanwhile, Cornwell & Rafat (2017) concluded that their respondents, Heritage Dutch speakers, produced /θ/ and /ð/ at similar rates to Monolingual English speakers. The case happens to Indonesian university students; the respondents tend to change sound /θ/ as /t/ and /ð/ as /d/. Although they changed the production of /θ/ and /ð/, some students produced them correctly in some productions.

Meanwhile, this discussion of research reveals the research findings in order to justify two research objectives: (1) to analyze what kind of production produced by English department students in pronouncing voiced and voiceless interdental fricative sounds and (2) to analyze sound production spectrogram by the English department students in pronouncing voiced, and voiceless interdental fricative sounds using Praat. This research sees that Indonesian college students majoring in English have difficulties producing voiced and voiceless interdental fricatives such as /ð/ and /θ/. This confirms the idea that Indonesian students do have difficulties in producing sound /θ/ (Firdaus et al., 2020; Komariah, 2018) and sound /ð/ (Firdaus et al., 2020), cases happened to some English course students in Bandung, Indonesia, who produced /θ/ as /d/, /t/, /th/, and elimination of /θ/, while sound /ð/ was produced as /d/ and /t/ (Firdaus et al., 2020). The specific results regarding sounds /ð/ and /θ/ are the college student added sound /s/ at the final position of words for both voiced and voiceless interdental fricative.

The inappropriate production of English sounds can lead to mispronunciation. Indonesian learners are frequently exposed to English since it has been a non-mandatory subject in formal education, and it turns out to be mandatory when they are in university. Also, non-formal education

offers English competency since English is still Indonesians' concern. Demirezen & Kulaksız (2015) contended that pronunciation takes a vital role in terms of a foreign language while communicating with others. Also, it is a significant component of language learning which can lead to the speaker's identity, community, and intelligibility. It is, then, troublesome for non-native English learners. The appropriate pronunciation is not aimed at achieving native speakers' pronunciation but to make learners aware that the appropriateness of pronunciation is meaningful and valuable (Sariçoban & Kuç, 2010).

Meanwhile, this research reveals both correct spectrogram and incorrect spectrogram regarding Praat application. Sound production spectrogram based on the respondents does not show turbulent noise, indicating that they do not produce the fricative sound correctly. On the other hand, production showing the turbulent noise agrees with Yavaş' (2011) ideas. He said that the scribbly pattern made by the production of fricative sounds appears on it.

CONCLUSION

The production of /ð/ sound, which English Department students produced, has not been appropriately applied. In the initial position of voiced interdental fricative, the students used /d/ and /ð/ while producing the words *then, them, those*. While in the medial position, they repeat the misproduction while saying *father, other, either*. Moreover, in the third position, some of them still produced /ð/ in a wrong way, that is /t/, even they added /t/ sound with final /s/ as in *with*, *booth*, and *smooth*. The inappropriate ways of producing sounds also occur when the students uttered voiceless interdental fricative sounds. Sound /θ/ in the initial position as in *thin, through*, and *thank* were changed into /t/. In the medial position, sound /θ/ as in *author*, *nothing*, and *method* was produced using /t/, /ð/, /d/ even though this did not happen to certain students who correctly produced /θ/. Also, they changed /θ/ sound as in *truth*, *path*, and *mouth* into /t/ and was followed by alveolar /s/. Indonesian consonants do not have

these sounds, making them have difficulties producing those particular sounds. Moreover, the appropriate production of voiced and voiceless interdental fricatives are shown by the scribbly pattern they made, while the inappropriate ways did not. Even though some students produced the sounds in inappropriate ways, it is also summed up that some of them produced them in proper ways. Further research could investigate what makes some college students majoring in English tend to produce /ð/ and /θ/ in an inappropriate way, while some are appropriate. Also, it could provide solutions to inappropriate English consonant sounds uttered by English Department students.

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