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Intonation Difference Between Chinese EFL Speaker and Indonesian EFL Speaker : An Acoustic Features Analysis

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Abstract. *Intonation is one of the acoustic features that is highly emphasised by English learners worldwide, including Chinese EFL and Indonesian EFL speakers. The primary focus of the research is to compare variations in intonation between Chinese EFL and Indonesian EFL speakers while at the same time observing the other two acoustic features, which are intensity and duration. To make this research more comprehensive, a native English speaker's pronunciation was also included to set the standard of English pronunciation. The data was visualised using the phonetic software PRAAT following the experiment. The findings indicate that Indonesian EFL speakers exhibit intonation patterns more similar to native English speakers compared to Chinese EFL speakers, although the specific intonation differences from native speakers remain evident. Learning about phonetic theory and adjusting intonation with the help of visual phonetic software are both effective ways to address this issue.*

Keywords: *acoustic features, praat analysis, intonation, phonology, English*

1. INTRODUCTION

In the era of globalisation, English is undeniably essential for people. Many individuals are exposed to English as a foreign language, and this phenomenon also exists in Indonesia. English is considered a foreign language in Indonesia since it is primarily used in formal settings like meetings, conferences, or international business dealings rather than in everyday communication.

One of the four skills required in acquiring English is mastering speaking. It is essential inasmuch as good speaking skills play a crucial role in exchanging information effectively, convincing others, and forming solid connections among speakers and listeners. However, non-native speakers of English often struggle with accent issues during the pronunciation or intonation practice because of the influence of their mother tongue. The use of incorrect intonation can cause misinterpretations, which can differ in importance based on the situation where the intonation is employed.

Carr (2008) stated that intonation, as part of phonology, refers to the type of pitch variation found in complete utterances. Intonation, as one of the crucial aspects of suprasegmentals, is believed to be one of the primary elements of speech that infants attend to, respond to, and mimic (Lieberman, 1967).

In speech, intonation is the conveying of information through tone, apart from the words themselves and their sounds. Intonation, also known as speech melody or sentence melody in everyday speech, highlights variations in pitch and modulation (Chun, 2002). Pitch

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modulation, vital for intonation, is commonly linked to the utilisation of pitch across the entire phrase.

Speakers use intonation to send varied messages. The tone of a declarative sentence can produce an unexpected or inquisitive impact. By working together, sentence stress and intonation help speakers communicate their intended message effectively. British linguist Roger Kingdon (1958) suggests that intonation is the soul of language. Second-language learners may not be aware of their intonation issues until they hear the same sentence uttered by a native speaker.

XU (2021) reported that Chinese EFL (English as a Foreign Language) speakers faced significant challenges in acquiring intonation in their second language due to their mother tongue's influence. Meanwhile, other studies say that the Indonesian tongue is more flexible in pronouncing foreign languages such as English, despite some lingering local accents. Simply knowing that interrogative sentences should have a rising tone and declarative sentences should have a falling tone is not sufficient. To become fluent in a second language, learners must carefully adhere to the rules of intonation.

On that account, the problem statement in this research is to figure out the intonation difference between Chinese EFL speaker and Indonesian EFL speaker, compared to native English speaker's pronunciation as a standard.

Through the comparison of visual intonation between those non-native and native English speakers in this research, it is expected that readers and other scholars will get additional references in the field of acoustic phonetics studies, especially on acoustic features analysis.

2. RESEARCH METHODS

In conducting this research, the researchers employed a descriptive qualitative method. However, numerical data were included to depict the pitch, frequency, and intensity of the sentences uttered. It is in line with what Moleong (2000) states that qualitative research frequently incorporates quantitative data, even though it is typically not accompanied by simultaneous quantitative analysis.

This research also used an instrumental approach by using the PRAAT programme as an analytical tool. The tool was employed to assist in comparing the audio of both non-native and native English speakers. PRAAT, which means "talk" in Dutch, is a free computer software program designed for the scientific study of speech and phonetics. This application was created by Paul Boersma and David Weenink at the Institute of Phonetics Sciences in Amsterdam in 1992. The application provides tools for analysing and measuring voice pitch, which can be

represented in the form of a curve. These pitch curves are often used in intonation analysis, pitch recognition, and understanding prosodic patterns in language.

The instrumental approach is an approach that involves the use of accurate measurement tools or techniques in collecting data. In the context of phonetic linguistics, the instrumental approach is used to analyse acoustic parameters of sound, such as duration, pitch, and intensity.

Data Sources

All participants in this research are women. The data used was a declarative sentence "I prefer tea to coffee" uttered by two non-native English speakers and a native English speaker. The data of non-native English speakers were taken from a Chinese EFL speaker and an Indonesian EFL speaker with their local accents background in day-to-day communication. To make the comparison between these non-native English speakers more comprehensive, researchers recorded an audio of a native English speaker, saying the same utterance. It was done to maintain the standard English pronunciation.

Data Collection

In collecting the data, the researchers used an observational method within the documentary technique. The data were collected by using a recording device. The procedures administered in collecting the data were as follows:

a) the researchers recorded voices of non-native English speakers saying a declarative sentence "I prefer tea to coffee"
b) the researchers recorded voice of a native English speaker saying the same declarative sentence as the standard value of English pronunciation
c) the sound files from those non-native and native English speakers of English were transferred to a computer
d) the sound files were converted to WAV format for better quality, grouped into a folder, and then analysed with PRAAT software

Data Analysis

The problem of this research was conducted using the following steps:

a) the observation was done by recording the sound files using Sony ICD-PX470 Digital Voice Recorder
b) the data recorded from the observation were then analysed using PRAAT software

c) the recorded audio was edited to cut out any irrelevant sounds that might disrupt the analysis. This process involved removing unnecessary sounds at the beginning and end of the recordings, guaranteeing that only the required speech parts were examined

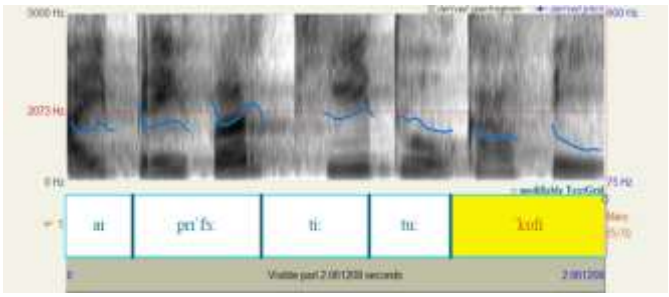
d) acoustic features of the sound files, in this research limited to pitch and intensity, were analysed

e) the conclusion was obtained as the final point of this research.

3. RESULT AND DISCUSSION

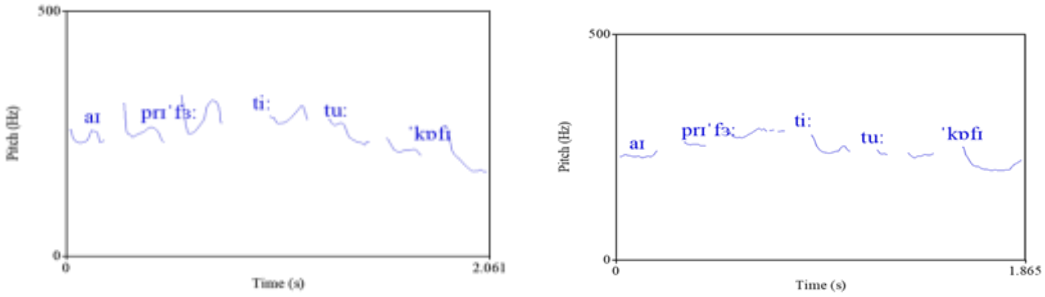
Result

Data of Sound Pitch

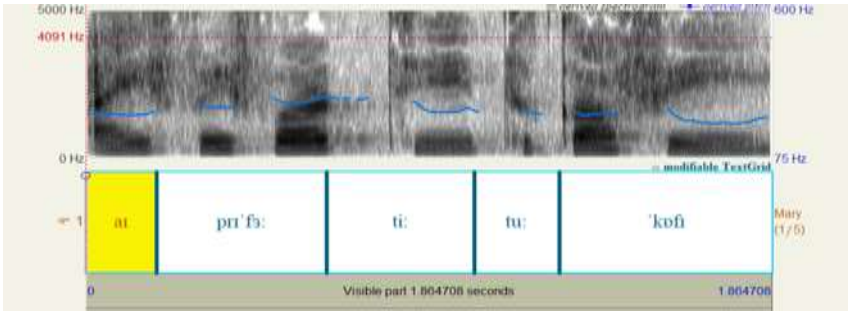


Picture 1. The pitch of a Chinese EFL speaker's voice

Picture 1 above explains the magnitude of the pitch produced in the form of Hertz (Hz) by a Chinese EFL speaker. The pitch is shown by the blue line curve. The minimum pitch obtained is 171.69 Hz and the maximum pitch is 326.88 Hz.

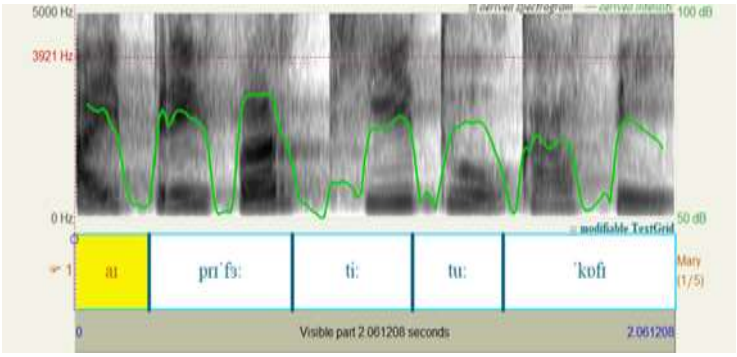


Picture 2. The pitch contour of a Chinese EFL speaker's voice

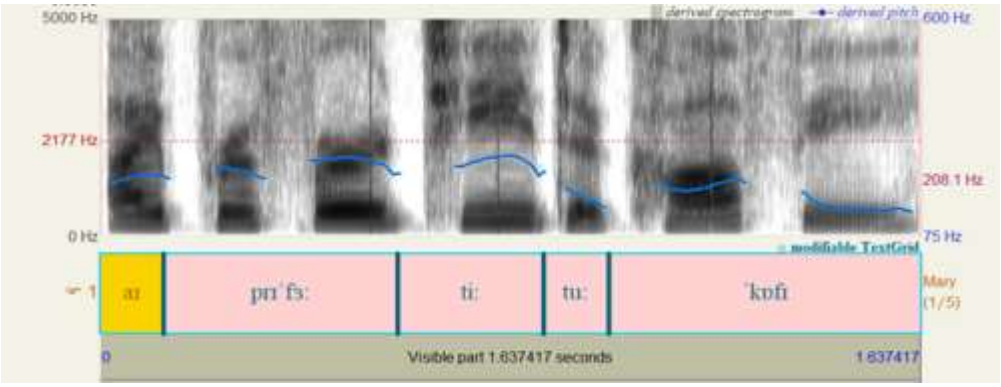


Picture 3. The pitch of an Indonesian EFL speaker's voice

Picture 3 above shows the magnitude of the pitch produced by an Indonesian EFL speaker. The minimum pitch obtained is 197.88 Hz and the maximum pitch is 291.10 Hz.

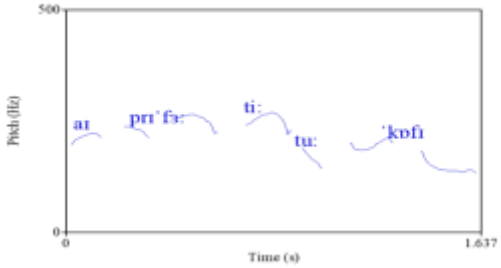


Picture 4. The pitch contour of an Indonesian EFL speaker's voice



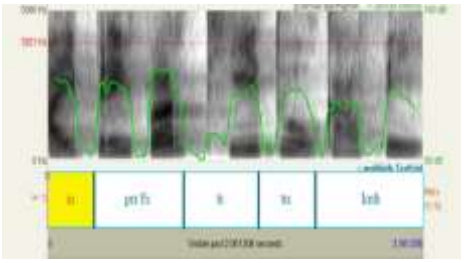
Picture 5. The pitch of a native English speaker's voice

Picture 5 above shows the magnitude of the pitch produced by a native English speaker. The minimum pitch obtained is 134.08 Hz and the maximum pitch is 270.38 Hz.



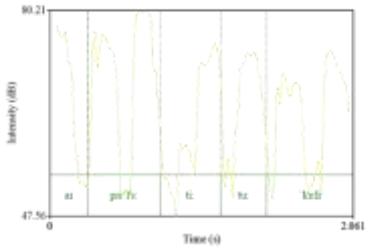
Picture 6. The pitch contour of a native English speaker's voice

Data of Sound Intensity

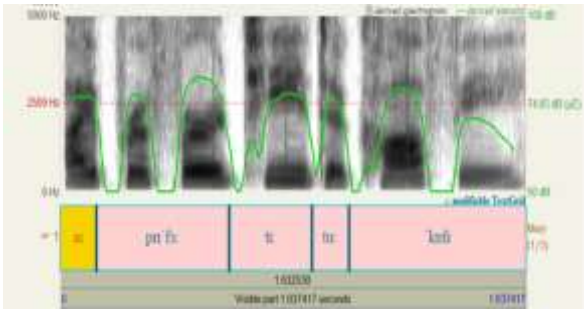


Picture 7. The intensity of a Chinese EFL speaker's voice

Picture 7 above explains the sound intensity produced in the form of decibel (dB) by a Chinese EFL speaker. The intensity is shown by the green line curve. The minimum intensity obtained is 48.04 dB and the maximum intensity is 80.13 dB.

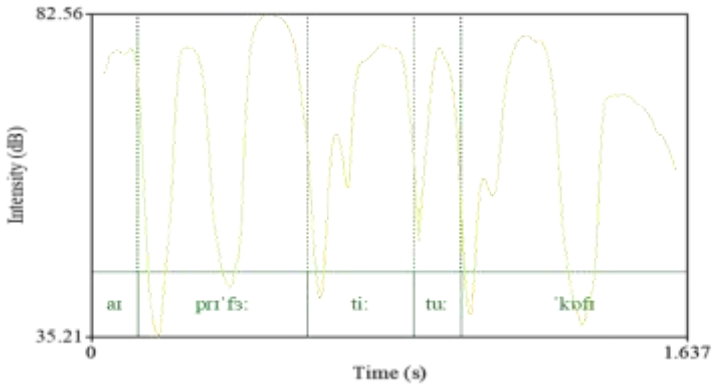


Picture 8. The intensity curve of a Chinese EFL speaker's voice

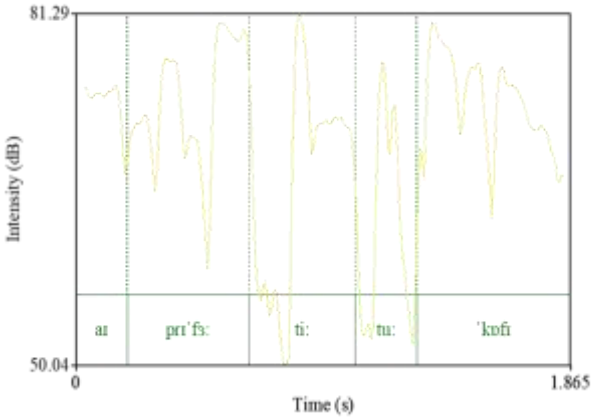


Picture 9. The intensity of an Indonesian EFL speaker's voice

Picture 9 above shows the sound intensity produced by an Indonesian EFL speaker. The minimum intensity obtained is 49.31 dB and the maximum intensity is 80.86 dB.



Picture 10. The intensity curve of an Indonesian EFL speaker's voice



Picture 11. The intensity of a native English speaker's voice

Picture 11 above shows the sound intensity produced by an Indonesian EFL speaker. The minimum intensity obtained is 35.98 dB and the maximum intensity is 82.53 dB.

Discussion

Pitch variations between non-native and native English speakers' voices

Table 1. The pitch of a Chinese EFL speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Pitch (Hz)	
			Minimum	Maximum
Chinese EFL speaker	"I prefer tea to coffee."	2.061	171.69	326.88

Table 2. The pitch of an Indonesian EFL speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Pitch (Hz)	
			Minimum	Maximum
Indonesian EFL speaker	"I prefer tea to coffee."	1.865	197.88	291.10

Table 3. The pitch of a native English speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Pitch (Hz)	
			Minimum	Maximum
Native English speaker	"I prefer tea to coffee."	1.637	134.08	270.38

Based on the tables above, the maximum pitch obtained by a Chinese EFL speaker is bigger than an Indonesian EFL speaker. On the other hand, the minimum pitch of the Chinese EFL speaker is smaller than the Indonesian EFL speaker. Meanwhile, the maximum and minimum pitch obtained by the native English speaker are both smaller than the Chinese EFL speaker and Indonesian EFL speaker.

Intensity variations between non-native and native English speakers' voices

Table 4. The intensity of a Chinese EFL speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Intensity (dB)	
			Minimum	Maximum
Chinese EFL speaker	"I prefer tea to coffee."	2.061	48.04	80.13

Table 5. The intensity of an Indonesian EFL speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Intensity (dB)	
			Minimum	Maximum
Indonesian EFL speaker	"I prefer tea to coffee."	1.865	49.31	80.86

Table 6. The intensity of a native English speaker's voice

Participants	Declarative Sentence	Duration (seconds)	Intensity (dB)	
			Minimum	Maximum
Native English speaker	"I prefer tea to coffee."	1.637	35.98	82.53

The three tables above show that the Chinese EFL speaker has a smaller amount of maximum intensity than the Indonesian EFL speaker. Similarly, the minimum intensity of the Chinese EFL speaker is smaller than the Indonesian EFL speaker. However, the maximum intensity of the native English speaker is bigger than both Chinese and Indonesian EFL speakers, although the minimum intensity is smaller.

4. CONCLUSION

Pitch contour refers to the patterns of stress and intonation in a language, including rises and falls in voice pitch. Whereas intensity represents the loudness of sounds. Having analysed pitch and intensity variations between a Chinese EFL speaker and an Indonesian EFL speaker, researchers concluded several findings as follows:

1. This research shows that the pitch produced by non-native speakers of English tends to be greater than the pitch produced by native English speakers. This indicates a difference in voice characteristics between these two groups.
2. The intensity produced by non-native speakers of English tends to be lower than the intensity produced by native English speakers. It implies that native speaker has stronger power of sounds.

3. Indonesian EFL speaker has a closer range of pitch variations to native English speaker than Chinese EFL speaker has. This reinforces the theoretical statement which says that Indonesians are more flexible and adaptable in pronouncing English utterances.

Furthermore, this research also revealed that the pronunciation duration of Chinese EFL speaker tends to be longer than Indonesian EFL speaker and the native English speaker. tends to be shorter than that of non-native speakers. This longer duration might also affect the rhythm and tempo of speech in English uttered by Chinese EFL speaker.

The results of this research show that there are significant differences in pitch, intensity, and duration between Chinese EFL speaker and Indonesian EFL speaker in comparison with native English speaker. Chinese EFL speaker tends to produce higher pitch, lower maximal intensity, and longer duration in their pronunciation. These findings may provide a better understanding of the acoustic characteristics of sounds in English and the differences between native speakers and non-native speakers.

However, it should be noted that this research has certain limitations. The sample used was limited to two non-native speakers and one native English speaker, so generalisation of the results of this research needs to be done with caution. Therefore, future research could involve larger and more diverse samples to gain a more comprehensive understanding of the differences in pitch, intensity, and duration between Chinese EFL speakers and Indonesian EFL speakers.

In order to produce stronger conclusions, further research involving more sophisticated analytical methods and techniques as well as more representative samples is needed. Thus, our understanding of the differences in pitch, intensity, and duration of sounds between native and non-native speakers of English can be deepened, and the implications of this research can be applied in the context of phonetic linguistics more broadly.

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