

**MISPRONUNCIATION OF ENGLISH CONSONANT SOUND [θ]
IN THE MEDIAL POSITION
BY THE STUDENTS OF SMK GRAFIKA SURAKARTA**

Agatha Christie Yuansha Aji, Nurul Alfiani, Ayum Andar Sasmita¹

ABSTRACT

In this research, the researcher analyzes the mispronunciation of consonant [θ] in the middle of the word by the students of SMK Grafika Surakarta. In this research, there are two problems that will be discussed. The first is to find out the consonants that appear replacing consonant [θ] in these mispronunciations. The second one is to analyze the reasons behind the appearance of those consonants.

Based on the data analysis, there are 194 mispronunciations of English consonant [θ] from 195 pronunciations (15 participants x 13 English words). From the analysis, there are seven consonants that appear replacing consonant [θ]. They are consonants [t], [r], [s], [tʃ], [f], [h], and [ð]. There are some reasons behind those consonants' appearance. Firstly, those consonants have some closest segments with consonant [θ]. Secondly, those are affected by the pronunciation of the words that the students are familiar with and also that have similar patterns in English words alphabetically. For example, is the word 'method' [meθəd] and metode [metade]. Another reason behind these mispronunciations is seen through their mother tongue, Javanese. In fact, consonant [θ] does not exist in Javanese consonants. Hence, the students are pronouncing the consonants that they are familiar with to make it easy to be spoken and easy to be understood by the listeners.

Keywords: *Mispronunciation, Consonant, Medial, Phonetic Features*

INTRODUCTION

SMK Grafika Surakarta is a vocational high school that concerns in graphic. In order to develop the students' knowledge and skill of speaking, this school provides three language courses which are Javanese, Indonesian, and English courses. As a foreign language learnt by the students, there are two English teachers that teach the English course with the purpose that the students can get many English courses' contact hours.

In this school's English learning processes, when the students are asked to read an English text loudly or to speak in front of the class by using English, they often make many mispronunciations. The most English consonant they often pronounce wrongly is the English voiceless interdental fricative consonant [θ] placed in the middle of the words. For instance, the word "anything" which must be pronounced as [ˈeniθɪŋ], but the students pronounce it as /ˈɛnitɪŋ/.

It is interesting to find out the reason, why the wrong pronunciation uses by students in SMK Grafika Surakarta. Moreover, this school is located in Solo, as one of the towns where Javanese native speakers come from.

In this research, there are two objectives to achieve; (1) to find out the consonant substitute for consonant [θ] that appears in the pronunciation error and after that, (2) the researcher will compare the characteristics between each replacing consonant [θ] that appears with the characteristics of the consonant [θ]. This was done to

¹ London School of Public Relation

identify how the characteristics of replacing consonants [θ] influenced the use of replacing consonants [θ] in Javanese students at SMK Grafika Jakarta.

This research uses two theories of linguistics. The first one is phonetics which is focused on consonants' place of articulation, consonants' manner of articulation, and phonetics features.

Table 1. English Consonant Manner and Place of Articulation

	Bilabial	Labio-Dental	Inter-dental	Alveolar	Post-Alveolar	Palatal	Velar	Glottal
Plosive	p b			t d			k g	
Affricate					tʃdʒ			
Nasal	m			n			ŋ	
Fricative		f v	θ ð	s z	ʃ ʒ			h
Approximant				r		j	w	
Lateral Approximant				l				

(The International Phonetic Association, 2016, p. 41)

Table 2. Javanese Consonants' Manner and Place of Articulation

		Bilabial	Labio-dental	Apiko-dental	Apiko-Alveolar	Lamino-alveolar	Palatal	Medio-palatal	Velar	Glottal
Stop	Vl	p		t			t	tʃ	k	ʔ
	Vd	b		d			ɖ	dʒ	g	
Nasal	Vd	m			n			ɲ	ŋ	
Fricative	Vl		f			s				
	Vd					z				h
Affricate	Vd				r					
Glide	Vd		w					j		
Liquid	Vd				l					

vl: voiceless vd: voiced (Wedhawati, as cited in Susi Luvia, 2016, p. 15)

Table 3. English Consonants Features

	p	b	m	w	f	v	θ	ð	t	d	n	s	z	l	r	ʃ	ʒ	tʃ	dʒ	j	k	g	ŋ	h
[Son]	-	-	+	+	-	-	-	-	-	-	+	-	-	+	+	-	-	-	-	+	-	-	+	-
[Cont]	-	-	-	+	+	+	+	+	-	-	-	+	+	+	+	+	+	-	-	+	-	-	-	+
[Cons]	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+
[Syll]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Nas]	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+
[Ant]	+	+	+	-	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
[Cor]	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-
[Strd]	-	-	-	-	+	+	-	-	-	-	-	+	+	-	-	+	+	+	+	-	-	-	-	-
[Vd]	-	+	+	+	-	+	-	+	-	+	+	-	+	+	+	-	+	-	+	+	-	+	+	-
[Lat]	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
[Obst]	+	+	-	-	+	+	+	+	+	+	-	+	+	-	-	+	+	+	+	-	+	+	-	+
[Delrel]	-	-	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	-	+	+

(Fromkin *et al*, 2013, p. 285)

Table 4. Javanese Consonants Features

	p	b	m	f	w	t	d	n	l	r	s	z	ʈ	ɖ	tʃ	dʒ	ɲ	j	k	g	ŋ	h	ʔ
[Son]	-	-	+	-	+	-	-	+	+	+	-	-	-	-	-	+	+	+	-	-	+	-	-
[Cont]	-	-	-	+	+	-	-	-	+	+	+	+	-	-	-	+	+	+	-	-	-	+	-
[Cons]	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+
[Syll]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Nas]	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-
[Ante]	+	+	+	+	-	+	+	+	+	-	+	+	+	+	-	-	-	-	-	-	-	-	-
[Cor]	-	-	-	-	-	+	+	+	+	+	+	+	+	+	-	-	+	-	-	-	-	-	-
[Strd]	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-	-
[Vd]	-	+	+	-	+	-	+	+	+	+	-	+	-	-	-	+	+	+	-	+	+	-	-
[Lat]	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[Obst]	+	+	-	+	-	+	+	-	-	-	+	+	+	+	+	-	-	-	+	+	-	+	+
[Delrel]	-	-	+	+	+	-	-	+	+	+	+	+	+	+	+	+	-	+	-	-	+	+	-

(Wedhawati, as cited in Susi Luvia, 2016, p. 22)

Moreover, the second theory is phonology. Phonology tells you what sounds are in your language and which ones are foreign; it tells you what combinations of sounds comprise a possible word in your language, whether it as an actual word like *black*, or a non-word (in English) like *blick*; and it tells you what combination of sounds is not a possible word in your language like **mbick* (Fromkin *et al*, 2013, p. 22).

The theory of phonology is focused on the closest segments and speech ergonomics. Raimy and Cairns (2015) state that the Neogrammarians discovered that sound change was based on segments; every occurrence of a segment, or class of segments, not as primitive constituent parts that can occur independently of one another (p. 2). There are three subtypes of the similarities: objective acoustic similarity, language-specific allophonic

similarity, and cross-linguistic phoneme similarity. Furthermore, Gussenhoven and Jacobs (2011) stated that languages somehow monitor the development of their phonologies, and check segments and inventories off against two very general guidelines: ‘Don’t make things difficult for the speaker’ and ‘Don’t make things difficult for the listener’. That is, the best systems are those in which contrasts are maximally distinct with the least amount of articulatory effort (p. 41).

In order to identify the speech sounds and how each sound differs from the others, phonetics, as one of linguistic studies which focuses on speech sounds, is applied in this study. Fromkin, Rodman, and Hyams (2013) state that the science of phonetics attempts to describe all of the sounds used in all languages of the world (p. 225).

METHOD

The respondents of this study were selected by researchers using the sample method, where respondents consisted of five students from each grade (grade 10, grade 11, and grade 12) so that the total number of respondents was fifteen. Those respondents were chosen in order to represent 195 students in SMK Grafika Surakarta. The sampling method was used in this study and the respondents were chosen randomly because all students of each class predominantly have Javanese as their mother tongue.

In order to collect data about the language used and spoken by respondents, researchers provide questions about the languages that respondents commonly use and also about the languages that respondents use most often on a daily basis. This was done to reveal whether respondents used Javanese as their mother tongue or not. After collecting the data, the researcher proceeds to the recording process. This process is the process of recording the words that have consonant [θ] from the respondents. In this session, the respondents had to mention their own names as the identity, their age, their mother tongue, and definitely they had to pronounce some selected words (13 words) which consist of the consonant [θ] placed in the middle of each word. The words were taken from some stories applied on the book of *Bahasa Inggris SMA/MA/SMK/MK Kelas X* as the respondents’ English module used in the classroom for one semester. Those words were taken from this respondents’ English module because all the respondents already knew those words and they already knew about how to pronounce those words. The respondents knew the pronunciation of the 13 words which consist of the consonant [θ] placed in the middle of each word from their teacher when she gave them the English course in the classroom. When the respondents were pronouncing the words, the researcher recorded them. This study uses the phonetic transcription applied in Oxford Dictionary of English (2018) as a reliable source.

Table 5. The Selected English Words and Its Phonetic Transcription

No	Words	Phonetics Transcription
1	Anything	[eniθɪŋ]
2	Author	[ɔ:θə(r)]
3	Birthday	[bɛ:θdeɪ]
4	Earthquake	[ɔ:θkweɪk]
5	Healthy	[helθi]
6	Marathon	[mæɾəθən]
7	Mathematics	[mæθəmætɪks]

No	Words	Phonetics Transcription
8	Method	[meθəd]
9	Python	[paɪθən]
10	Something	[sʌmθɪŋ]
11	Toothache	[tu:θeɪk]
12	Truthful	[tru:θfl]
13	Wealthy	[weɪlθi]

In data analysis, the first step taken by the researcher is to transcribe the results of the respondents' voice recordings when recite 13 selected words phonetically. The next step is finding the number of words that are pronounced incorrectly. After that, the researcher listed the consonants which replace the consonant [θ] and the total number (frequency) of each consonant's appearance. The results of the analysis were presented in a table. The table is about the percentage of each consonant's appearance. Here is the example of the table that represents the percentage of consonant's appearance. The table below also shows how the percentage was counted by the researcher.

Table 6. The Total Number and Percentage of Consonant's Appearance

Words	Total Number	Percentage
Anything	X	y %
Author	X	y %
....
Earthquake	X	y %
Total	X	$\frac{x}{195} \times 100\% = z\%$

The x represents the number of mispronunciation where consonant [t] takes place. Meanwhile, y represents the number of its percentage. This was the formula that was used by the researcher to find the percentage of the mispronunciation in each word.

$$y = \frac{\text{Number of Consonant}[t] \text{ Appears in Each Word}}{\text{Total Number of Each Word Pronounced}} \times 100\%$$

In order to count the percentage of total number of each consonant's appearance pronounced in all words, the researcher used this formula.

$$z = \frac{\text{Total Number of Consonant [t] Appears in All Words}}{\text{Total Number of Recorded Words}} \times 100\%$$

The consonant which has the percentage under 25% was included in class of consonant which has very low possibility to replace consonant [θ], 26%-50% was included in class of consonant which has low possibility,

51%-75% was included in class of consonant which has high possibility, and 76%-100% was included in class of consonant which has very high possibility to replace consonant [θ] in the middle of English words pronounced by the respondents who represent the students in SMK Grafika Surakarta.

The last step was to find out the reason why the respondents cannot to pronounce the consonant [θ] correctly. In this study, researchers tried to compare the use of English consonants and Javanese consonants to find similarities between the uses of each consonant that appears to replace consonants [θ]. The similarities were used in order to find the closest segment between two consonants and in order to find what kinds of closest segments that affect the appearance of some consonants in these mispronunciations.

After finding the closest segments, the researcher would like to find the other reasons of the consonant that appears to replace consonants [θ] appearance based on how Javanese as a mother tongue affects the pronunciations of English words. It would be found through the theory of speech ergonomics.

FINDINGS AND DISCUSSION

1. Mispronunciations of Consonant [θ]

Based on the summary of the respondents' results, the English consonant [θ] is not successfully pronounced by the respondents. It can be noticed by the data that there are 194 mispronunciations of 195 pronunciations (13 words x 15 participants). It means that there is only one correct pronunciation of consonant [θ] by a respondent.

In these mispronunciations, there are some consonants that are pronounced by the respondents to replace consonant [θ] in their pronunciations. There are seven different consonants that emerge which are consonant [t], [tʃ], [f], [h], [r], [s], and [ð]. Moreover, there are two consonants that are switched in the mispronunciation caused by slips of the tongue. Based on the data, consonant [t] becomes the most consonant that is pronounced by the respondents to replace consonant [θ] because it is pronounced 173 times from 195 pronunciations. The appearance of consonant [t] can be seen through the pronunciation of the word 'author' is pronounced as /aʊtɑ:r/ instead of [ɔ:θə(r)], the word 'method' is pronounced as /metɔ:t/ instead of [meθəd], and the other words. The distribution of consonant [t] covers all the English words listed. Consonant [tʃ] occurs in the pronunciation of two English words listed. They are the word 'toothache' that is pronounced as /tʊtʃæt/ instead of [tu:θeɪk] and the word 'truthful' as /tɜ:tʃfʊl/ instead of [tru:θfl]. Consonant [f] replaces consonant [θ] only in the pronunciation of the word 'earthquake'. Instead of pronounce it as [ɔ:θkweɪk], a respondent pronounces it as /efkweɪk/. Consonant [h] is pronounced by a respondent in pronouncing the word 'toothache'. Instead of pronouncing that word as [tu:θeɪk], one of the respondents pronounces it as /tu:hædz/. Consonant [r] is pronounced by 8 respondents to replace consonant [θ] in their pronunciations. There are three English words that are pronounced by using consonant [r]. They are the word 'birthday' that is pronounced as /bi:rdeɪ/ instead of [be:θdeɪ], the word 'earthquake' that is pronounced as /eərkwa:t/ instead of [ɔ:θkweɪk], and the word 'truthful' that is pronounced as /trʌrʃfʊl/ instead of [tru:θfl]. Consonant [s] is pronounced by 5 respondents in pronouncing two English words listed. They are the word 'birthday' and 'earthquake'. Instead of pronouncing the word 'birthday' and 'earthquake' as [be:θdeɪ] and [ɔ:θkweɪk], 5 respondents pronounce those words as /besdeɪ/ and /estweɪk/. The last consonant that occurs in these mispronunciations is consonant [ð]. This consonant is pronounced once by a respondent in pronouncing the word 'author'. Instead of pronouncing the word 'author' as [ɔ:θə(r)], one of the respondents pronounces it as /ʌðər/.

Besides some consonants that appear in the mispronunciations replacing consonant [θ], there is another phenomenon appears. Two of the respondents are mistaken in their pronunciation by switching two consonants of the word 'healthy'. Although the consonant [θ] is not pronounced and replaced with [t], but the switching consonants between the [t] and [l] are more attracting. Instead of pronouncing 'healthy' as [helθi], two respondents pronounce it as /heətli:/ and /hetli:/. Those switching consonants are caused by slips of the tongue. Although there is a low possibility for the consonant at the end of a syllable and the consonant at the beginning of the other syllable to be switch, in fact, it happens.

Based on the data, the mispronunciation takes 99.49% from 100% whereas the correct pronunciation only takes 0.51% from 100% as the total number of percentages. Most of the respondents pronounce the English words incorrectly by changing the consonant [θ] with the consonant [t]. There are six English words which are pronounced by using consonant [t] to replace the [θ] by all respondents. Those are the word 'anything', 'marathon', 'mathematics', 'method', 'python', and 'something'. In the rest words, consonant [t] is also pronounced by some respondents. The table below shows the percentage of the appearance of consonant [t] in each word pronounced by the respondents.

Table 7. Percentage of Consonant [t] Appearance

Words	Number of Mispronunciations	Percentage
Anything	15	100%
Author	14	93.3%
Birthday	8	53.3%
Earthquake	9	60%
Healthy	14	93.3%
Marathon	15	100%
Mathematics	15	100%
Method	15	100%
Python	15	100%
Something	15	100%
Toothache	12	80%
Truthful	13	86.6%
Wealthy	13	86.6%
Total	173	88.72%

Furthermore, here are the percentages of the appearance of the others consonants.

Table 8. Percentage of Consonant [tʃ] Appearance

Words	Number of Mispronunciation	Percentage
Toothache	2	13.3%
Truthful	1	6.6%
Total	3	1.55%

Table 9. Percentage of Consonant [f] Appearance

Words	Number of Mispronunciation	Percentage
Earthquake	1	6.6%
Total	1	0.51%

Table 10. Percentage of Consonant [h] Appearance

Words	Number of Mispronunciation	Percentage
Toothache	1	6.6%
Total	1	0.51%

Table 11. Percentage of Consonant [r] Appearance

Words	Number of Mispronunciation	Percentage
Birthday	5	33.3%
Earthquake	2	13.3%
Truthful	1	6.6%
Total	8	4.10%

Table 12. Percentage of Consonant [s] Appearance

Words	Number of Mispronunciation	Percentage
Birthday	3	20%
Earthquake	2	13.3%
Total	5	2.56%

Table 13. Percentage of Consonant [ð] Appearance

Words	Number of Mispronunciation	Percentage
Author	1	6.6%
Total	1	0.51%

Table 14. Percentage of Switching Consonants' Appearance

Words	Number of Mispronunciation	Percentage
Healthy	2	13.3%
Total	2	1.03%

The switching consonants are caused by slips of the tongue. The phenomenon of slips of the tongue may occur in the pronunciation of consonant [θ] by the students of SMK Grafika Surakarta. This phenomenon is occurring twice from 195 as the total number of pronunciations or it takes 1.03% from 100%. It can be concluded that the probability of slips of the tongue's occurrence spoken by the respondents is very low. Briefly, here is the total number and percentage of the results.

Table 15. Total Number and Percentage

Consonants	Total Number	Percentage
[t]	173	88.72%
[r]	8	4.10%
[s]	5	2.56%
[tʃ]	3	1.55%
[f]	1	0.51%

Consonants	Total Number	Percentage
[h]	1	0.51%
[ð]	1	0.51%
Switching	2	1.03%
Consonants Correct	1	0.51%
Pronunciation		
TOTAL	195	100%

2. Closest Segments between Consonant [θ] and the Consonant Appears ([t], [tʃ], [f], [h], [r], [s], [ð]) as Replacing Consonant [θ]

In this part, there is phonological analysis based on the closest segments between all consonants appear in this study which is replacing consonant [θ] and consonant [θ] itself. The similarities between each consonant that appears ([t], [tʃ], [f], [h], [r], [s], and [ð]) as the replacing consonant [θ] and consonant [θ] will be elaborated in details. The reason behind the appearance of those consonants can be found through the closest segments between those consonants and consonant [θ]. Following is an explanation of how each consonant that appears, in the pronunciation of consonant errors [θ], is influenced by the nearest segment.

2.1 Closest Segments between Consonant [t] and Consonant [θ]

Based on the objective acoustic similarity, consonants [t] and [θ] are not relatively close acoustically because only consonant [θ] that has acoustic sound while consonant [t] does not. It can be seen through both classes of manner of articulation in which consonant [θ] is classified as fricative in English consonants while consonant [t] is classified as stop or plosive in both Javanese and English consonants.

The second is the similarity between consonant [t] and [θ] is based on the language-specific allophone. In English, the sound of pronouncing phoneme /θ/ is only one as how the actual physical phoneme /θ/ itself is realized. It is very different from phoneme /t/ which might sound differently. For instance, phoneme /t/ can be pronounced with a string explosion of breath [t^h] as in the word 'top' or without a string explosion of breath [t] as in the word 'stop'. Meanwhile, in Javanese, as the respondent's mother tongue which /θ/ does not appear as a phoneme, the sound of the pronunciation of the phoneme /t/ is the only way the physical phoneme /t/ itself is realized. Thus, it can be concluded that the allophone of English phoneme /θ/ and Javanese phoneme /t/ are similar because there is only one sound (one allophone) established when both are pronounced in each language.

The third is the closest segments between consonant [t] as part of Javanese consonants and [θ] as part of English consonants found by looking at their cross-linguistic phoneme similarity. Based on the features that both consonants have, consonant [t] and [θ] can be identified as the same phoneme because they occupy similar places in consonant features. For instance, consonant [t] and [θ] are classified as [- syllabic] because both consonants cannot form the nucleus of a syllable. Here is the table that shows all similar features between consonant [t] and consonant [θ].

Table 16. Similar Features between Consonant [t] and [θ]

Similar Features between Consonant [t] and [θ]
<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;"> <p>+ <i>Consonantal</i> + <i>Anterior</i> + <i>Coronal</i> + <i>Obstruent</i> – <i>Sonorant</i> – <i>Syllabic</i> – <i>Nasal</i> – <i>Strident</i> – <i>Voiced</i> – <i>Lateral</i></p> </div>

2.2 Closest Segments between Consonant [tʃ] and Consonant [θ]

Based on the manner of articulation, consonant [tʃ] and [θ] are classified in two different classes. Consonant [tʃ] is classified as an affricate while [θ] is a fricative. Although [tʃ] is an affricate, this consonant has an acoustic sound in the end of its pronunciation. It means that even though consonant [tʃ] and [θ] occupy different classes on manner of articulation and consonant [θ] has higher acoustic sound than consonant [tʃ], both still have an acoustic similarity that affects the occurrence of consonant [tʃ] in these mispronunciations.

Based on language-specific allophone, the appearance of phoneme /tʃ/ is influenced by the neighboring sound. For example, the word ‘toothache’ which is pronounced as /tɒtʃæt/. The fact that consonant clusters of /ch/ is more often pronounced as [tʃ] has influenced the appearance of /tʃ/ in this pronunciation although actually the consonant clusters of /ch/ in the word ‘toothache’ is not pronounced as [tʃ]. Stanlaw, Adachi, and Salzmann (2017) stated that this phenomenon is called as allophonic assimilation where allophone is influenced by a neighboring sound so that the two become similar or the same (p. 338). In Javanese, actually, there is also allophonic assimilation. For example, the phoneme of /k/ in the word *kegedhen* (too big) that can be pronounced as [kægəðɛn] or [gægəðɛn] where the occurrence of the first [g] is affected by the second [g] in the middle of the word *kegedhen*. As the information, there is no allophonic assimilation into /tʃ/ in Javanese. Hence, there is no allophonic similarity between consonant [tʃ] and [θ] in this mispronunciation.

The last reason behind the appearance of consonant [tʃ] can be found by looking at both consonants’ cross-linguistic phoneme similarity. Based on the features of consonant [tʃ] and [θ], both consonants can be identified as the same phoneme because they occupy some similar features. For instance, consonant [tʃ] and [θ] are classified as [- nasal] because when these consonants are produced, the airstream cannot escape through the nose. Here is the table that shows all similar features between consonant [tʃ] and [θ].

Table 17. Similar Features between Consonant [tʃ] and [θ]

Similar Features between Consonant [tʃ] and [θ]
<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;"> <p>+ <i>Consonantal</i> + <i>Obstruent</i> + <i>Delayed Release</i> – <i>Sonorant</i> – <i>Syllabic</i> – <i>Nasal</i> – <i>Voiced</i> – <i>Lateral</i></p> </div>

2.3 Closest Segments between Consonant [f] and Consonant [θ]

Based on English and Javanese consonants' manner and place of articulations, consonant [f] and [θ] occupy the same place. Based on the manner of articulation, both are classified as fricative. Moreover, both are labiodentals based on their place of articulation. Shortly, as part of fricative, consonant [f] and [θ] are produced with a hissing sound. It means that consonant [f] and [θ] are relatively close acoustically.

Consonant [f] emerges replacing [θ] in the word 'earthquake' pronounced by a respondent as /efkweik/. Hence, [f] cannot be categorized as allophone because its occurrence change the meaning of the word into meaningless. Thus, there is no reason behind the appearance of consonant [f] in these mispronunciations based on the allophonic similarity.

Based on the features that consonant [f] and [θ] have, both occupy some similar places. Those similarities that are classified as part of cross-linguistic phoneme similarity can be the reason behind the appearance of consonant [f] because it can be identified as the same phoneme as consonant [θ]. For instance, consonant [f] and [θ] are classified as [- voiced] because both consonants have a glottal setting inconsistent with vocal-fold vibration and both are classified as [- lateral] because in producing process of consonant [f] and [θ], the tip of the tongue does not touch the roof of the mouth and the airstream does not pass the nose. Here is the table that shows the similar features between consonant [f] and [θ].

Table 18. Similar Features between Consonant [f] and [θ]

Similar Features between Consonant [f] and [θ]	
<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;"> <p style="margin: 0;">+ <i>Continuant</i></p> <p style="margin: 0;">+ <i>Consonantal</i></p> <p style="margin: 0;">+ <i>Anterior</i></p> <p style="margin: 0;">+ <i>Obstruent</i></p> <p style="margin: 0;">+ <i>Delayed Release</i></p> <p style="margin: 0;">– <i>Sonorant</i></p> <p style="margin: 0;">– <i>Syllabic</i></p> <p style="margin: 0;">– <i>Nasal</i></p> <p style="margin: 0;">– <i>Voiced</i></p> <p style="margin: 0;">– <i>Lateral</i></p> </div>	

2.4 Closest Segments between Consonant [h] and Consonant [θ]

Firstly, based on English and Javanese consonants' manner of articulation, consonant [h] and [θ] are classified in the same place that is fricative sounds. By looking at that fact, these consonants definitely have similar characteristics in the production process. As fricative ones, consonant [h] and consonant [θ] is produced with a hissing sound. This close acoustic similarity is one of the reasons behind the appearance of consonant [h] in these mispronunciations.

Secondly, the appearance of /h/ is caused by the /t/ in the consonant clusters of /th/ in the word 'toothache' is not pronounced by the respondent. In this case, /h/ is categorized as phoneme not allophone because when the respondent pronounces the word 'toothache' as /tu:hædʒ/, the meaning of the word changes into 'to hajj'. Meanwhile, in Javanese, /h/ can be classified as allophone because spoken or not it does not really change the meaning of the word itself. For instance, in the word *sahur* (an Islamic term of the per-dawn meal) that can be

pronounced as [saor] or [sahor]. The other example is in the word *omahe* (the house) that can be pronounced as [amɔhe] or [amɔe]. Hence, there is no allophonic similarity that is found.

The next reason behind the appearance of consonant [h] in these mispronunciations is found by looking at the closest segments between consonant [h] and [θ] based on the similar features that these consonants have. Consonant [h] and [θ] can be classified as two same phonemes because both occupy some similar features. For instance, both are classified as [+ continuant] because these consonants are produced with the airstream that can escape through the oral cavity and both are classified as [- lateral] because these consonants are not produced with the tongue tip touching the roof of the mouth and there is no airstream that passes the tongue at both sides. Here is a table that shows the similar features between consonant [h] and [θ].

Table 19. Similar Features between Consonant [h] and [θ]

Similar Features between Consonant [h] and [θ]
<div style="display: inline-block; vertical-align: middle;"> <ul style="list-style-type: none"> + <i>Continuant</i> + <i>Consonantal</i> + <i>Delayed Release</i> - <i>Sonorant</i> - <i>Syllabic</i> - <i>Nasal</i> - <i>Strident</i> - <i>Voiced</i> - <i>Lateral</i> </div>

2.5 Closest Segments between Consonant [r] and Consonant [θ]

Based on the English consonants' manner of articulation, consonant [r] and [θ] are a little bit close acoustically. It is because both create the same noise although [r] as an approximant has not much noise as consonant [θ] as a fricative. Moreover, comparing with the Javanese consonants' manner of articulation, consonant [r] and [θ] are also a little bit close acoustically because [r] is classified as an affricate which ends with a low hissing sound.

Based on the data, the appearance of phoneme /r/ is classified as allophonic assimilation because that appearance is influenced by its surrounding sound. For example, some respondents pronounce the word 'birthday' as /bi:rdeɪ/, 'earthquake' as /eərkwa:t/, and 'truthful' as /trɒrful/. Phonetically, it can be seen that there is a /r/ before the consonant clusters /th/. In Javanese, there is also an allophonic assimilation which is affected by phoneme /r/. For example, the word *kursi* (chair), it can be pronounced as [karsi:] or [krasi:]. In short, in English, the allophone of /θ/ can be affected by /r/ as its surrounding sound without changing the meaning of the word and in Javanese /r/ can also influence the sound around it. Hence, it can be concluded that the allophone /θ/ can be influenced by allophone /r/ either in Javanese or English.

The next reason behind the appearance of consonant [r] in this mispronunciation is found by knowing either these consonants are classified as similar phoneme or not. By looking at the features that both consonants have, consonant [r] and [θ] are occupying some similar features. For instance, both are classified as [+ coronal] because when these consonants are produced, the blade of the tongue rises above its neutral position. Here is a table that shows all similar features between consonant [r] and [θ].

Table 20. Similar Features between Consonant [r] and [θ]

Similar Features between Consonant [r] and [θ]
<div style="display: flex; align-items: center; justify-content: center;"> <div style="font-size: 3em; margin-right: 10px;">[</div> <div style="text-align: left; padding-right: 10px;"> <p>+ <i>Continuant</i></p> <p>+ <i>Consonantal</i></p> <p>+ <i>Coronal</i></p> <p>+ <i>Delayed Release</i></p> <p>– <i>Syllabic</i></p> <p>– <i>Nasal</i></p> <p>– <i>Strident</i></p> <p>– <i>Lateral</i></p> </div> <div style="font-size: 3em; margin-left: 10px;">]</div> </div>

2.6 Closest Segments between Consonant [s] and Consonant [θ]

By looking at the Javanese and English consonants’ manner of articulation, consonant [s] and [θ] are part of fricative sounds. It is caused by the hissing sounds that come out together with those two consonants when they are produced. Although it is said in the theory that in English, consonant [s] and [θ] are relatively distant acoustically, but this comparison between Javanese and English consonants shows a different result where consonant [s] especially as part of Javanese consonants has an acoustic similarity with consonant [θ]. This kind of result is consistent with the view that there is an acoustic/auditory basis for perceived similarity that transcends linguistic knowledge (Raimy and Cairns, 2015, p. 201).

Based on the data, consonant [s] occurs replacing [θ] in the word ‘birthday’ and ‘earthquake’ pronounced by some respondents. Hence, [s] cannot be categorized as allophone because its occurrence changes the meaning of the words into meaningless. Thus, there is no reason behind the appearance of consonant [s] in these mispronunciations based on the allophonic similarity.

The other reason behind the appearance of consonant [s] in these mispronunciations is found through the closest segments that both consonants have. Based on the features, consonant [s] and [θ] are classified as similar phoneme because both consonants are occupying some similar places. For instance, these two consonants occupy [+ consonantal] because both have a major obstruction in the oral cavity. Here is a table to make it briefer.

Table 21. Similar Features between Consonant [s] and [θ]

Similar Features between Consonant [s] and [θ]
<div style="display: flex; align-items: center; justify-content: center;"> <div style="font-size: 3em; margin-right: 10px;">[</div> <div style="text-align: left; padding-right: 10px;"> <p>+ <i>Continuant</i></p> <p>+ <i>Consonantal</i></p> <p>+ <i>Anterior</i></p> <p>+ <i>Coronal</i></p> <p>+ <i>Obstruent</i></p> <p>+ <i>Delayed Release</i></p> <p>– <i>Sonorant</i></p> <p>– <i>Syllabic</i></p> <p>– <i>Nasal</i></p> <p>– <i>Voiced</i></p> <p>– <i>Lateral</i></p> </div> <div style="font-size: 3em; margin-left: 10px;">]</div> </div>

2.7 Closest Segments between Consonant [ð] and Consonant [θ]

Consonant [ð] is the most consonant that has many similar characteristics with consonant [θ] just than the other consonants. These consonants are only distinguished by the voiced form. Consonant [ð] occupies [+

voiced] while consonant [θ] is [-voiced]. Based on manner of articulation, these consonants are using fricative sounds. Thus, consonant [ð] and [θ] are relatively close acoustically.

Comparing with Javanese consonants, consonant [ð] and [θ] are only present in English consonants while both are absent in Javanese. Hence, there is no reason behind the appearance of consonant [ð] based on language-specific allophonic similarity because it only can be found when the consonant that replaces consonant [θ] is present in Javanese, as the respondents' mother tongue.

The last reason behind the appearance of consonant [ð] replacing consonant [θ] in these mispronunciations is found by finding the closest segments between these two consonants based on the features that they have. The result of the finding says that consonant [ð] and [θ] are classified as a same phoneme because both are occupying some similar places of features. For instance, consonant [ð] and [θ] are occupying the [+delayed release] feature. It is because these consonants release a total constriction and form a fricative sound. To make it briefer, here is a table that contains of similar features between consonant [ð] and [θ].

Table 22. Similar Features between Consonant [ð] and [θ]

Similar Features between Consonant [ð] and [θ]	
<div style="display: inline-block; vertical-align: middle;"> <ul style="list-style-type: none"> + <i>Continuant</i> + <i>Consonantal</i> + <i>Anterior</i> + <i>Coronal</i> + <i>Obstruent</i> + <i>Delayed Release</i> - <i>Sonorant</i> - <i>Syllabic</i> - <i>Nasal</i> - <i>Strident</i> - <i>Lateral</i> </div>	

After finding the reason behind the appearance of some consonants that appear replacing consonant [θ] in these mispronunciations based on the three types of closest segments between each consonant and consonant [θ], it can be concluded that the appearance of some consonants are caused by at least two types of closest segments. Here is the table of conclusion to make it briefer.

Table 23. Reasons behind the Appearance of the Consonants

Consonant	Objective Acoustic	Language-Specific	Cross-Linguistic Phoneme
	Similarity	Allophonic Similarity	Similarity
[t]	-	√	√
[tʃ]	√	-	√
[f]	√	-	√
[h]	√	-	√
[r]	√	√	√
[s]	√	-	√
[ð]	√	-	√

3. Speech Ergonomics between Javanese and English

The other reasons behind the appearance of those consonants are based on speech ergonomics. Basically, Javanese people are not familiar with consonant [θ] because there is no consonant [θ] in Javanese consonants. Therefore, Javanese people pronounce the consonants that they are familiar with in order to make it easy to be spoken and to make it easy to be understood by the listener.

The consonant [θ] is written as /th/ in English. In Javanese, the /th/, it is not pronounced as [θ], but pronounced as [t] as the same pattern of voiceless sounds of /th/. Yet, in Javanese the pronunciations of consonant [t] and [θ] are very close and most of Javanese people do not realize that both pronunciations are different. Hence, most of Javanese people pronounce the letters /th/ by using [t] such as in the words ‘anything’ and ‘author’.

In this mispronunciation, the respondents prefer to mention consonant [t] in pronouncing the English words which consist of /th/ that must be pronounced as [θ] in the medial position. For instance, the word ‘marathon’, it is pronounced by using /t/ as in /mʌrɑ:tʌn/ instead of [mæɾəθən] by all the respondents. The pronunciation of [t] in the word ‘marathon’ is caused by the students of SMK Grafika are more familiar with the word *maraton* which has similar meaning with ‘marathon’ but it is usually pronounced as [mʌrɑ:tʌn] by them. Another example is in the word ‘mathematics’ that is a hundred percents pronounced by using /t/ as in /mætɛmætɪks/ instead of [mæθəmætɪks]. The usage of /t/ in these mispronunciations is affected by the word *matematika* which the respondents are more familiar with. Aside from the word ‘marathon’ and ‘mathematics’, there are many other English words that have similar patterns with Indonesian words which the students of SMK Grafika are more familiar with. They are the word ‘method’ and *metode*, ‘python’ and *piton*, ‘athlete’ and *atlet*, ‘hyphothesis’ and *hypothesis*, ‘mythology’ and *mitologi*, etc.

It can be concluded that the usage of consonant [t] by the students of SMK Grafika Surakarta is affected by the pronunciation of Javanese or Indonesian words that have similar patterns to English words alphabetically. Thus, it is easier for the students to deliver what they are talking about and it is easier to be understood by the listener especially if the listener is a Javanese person too.

Beside the facts mentioned above, the students are also not familiar with the words which have four consonant clusters especially with /th/ in the middle of it such as in the words ‘birthday’ and ‘earthquake’. They are not familiar with those words because in Indonesian and Javanese words, there is no word which consists of four consonant clusters with the /th/ inside. Therefore, some of the students tried to pronounce [r], [s], and [f] instead of [θ] in order to make it easier to be spoken. For examples, when some respondents are pronouncing the word ‘birthday’, they are pronouncing it as /bɛsdeɪ/ and /bi:rdeɪ/, the word ‘earthquake’ as /estweɪk/, /eərkwɑ:t/, and /efkwɛɪk/.

CONCLUSION

Based on the analysis and result, the reason behind the appearance of those consonants is because they all are having closest segments with consonant [θ]. From the three types of closest segments which are objective acoustic similarity, language-specific allophonic similarity, and cross linguistic similarity, each consonant appears to have at least two types of closest segments between consonant [θ]. The appearance of consonant [t] replacing consonant [θ] in this study is because consonant [t] has language-specific allophonic similarity and cross-linguistic phoneme similarity with consonant [θ]. Moreover, the appearance of consonants [tʃ], [f], [h], [s], and [ð] is caused by objective acoustic similarity and cross-linguistic phoneme similarity between these consonants and consonant

[θ]. Meanwhile, the appearance of consonant [r] is not only caused by two types of similarities but three. The appearance of consonant [r] in this mispronunciation is caused by the objective acoustic similarity, language-specific similarity, and cross-linguistic phoneme similarity between consonant [θ] and [r] itself.

The other reason behind the appearance of those consonants is affected by the pronunciation of Javanese or Indonesian words that have similar patterns with English words alphabetically. Beside the similar patterns of the alphabets, those words also have similar meaning. For examples are the words 'method' and *metode*, 'python' and *piton*, 'athlete' and *atlet*, 'hypothesis' and *hipotesis*, 'mythology' and *mitologi*. Moreover, the fact that consonant [θ] does not exist in the list of Javanese consonants affects the students to pronounce the consonants that they are familiar with in order to make it easy to be spoken and to make it easy to be understood by the listener.

After the research is carried out, it could be concluded that consonant [t] is the most consonant that is pronounced by the students of SMK Grafika Surakarta in their pronunciations of consonant [θ]. In spite of the fact that consonant [r] has all three types of closest segments that occur between each consonant and consonant [θ], it does not mean that consonant [r] can occupy the consonant that has high probability to replace consonant [θ].

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