

Variation of Acehnese Monophthong /ʌ/ in Western Acehnese Dialect

Tanzir Masykar¹, Roni Agusmaniza²

Akademi Komunitas Negeri Aceh Barat, Indonesia
tanzir@akanacehbarat.ac.id, roni@akanacehbarat.ac.id

Tabsyir Masykar³

STAIN Tgk. Dirundeng Meulaboh, Indonesia
tabsyirmasykar@staindirundeng.ac.id

Huang Shan⁴

Guangxi Normal University for Nationalities, China
huangshan@gxnun.edu.cn

Febri Nurrahmi⁵ (Corresponding Author)

Universitas Syiah Kuala, Indonesia
febri.nurrahmi@unsyiah.ac.id

Abstract:

Acehnese has many dialects, one of which is the western Acehnese dialect. Western Acehnese dialects considerably vary when compared to northern dialects. Many studies on Acehnese vowels focused on describing vowels in the Pase dialect. Little attention has been given to other dialects and let alone, vowel variation within those dialects. The current study aims to investigate vowel variation produced by Acehnese in Aceh Barat for the words commonly produced as /ʌ/ in the northern dialect. Six language consultants are recorded reading five Acehnese words containing /ʌ/ vowel in a carrier sentence. Two phonetically

Tanzir Masykar et.al.

trained Acehnese listeners identify the vowel produced based on IPA symbols. Formant frequencies of F1 and F2 are generated using Praat software and projected into vowel plots. The findings show that the vowel /ʌ/ is realized as /ə/, /ɛ/, and /ɔ/ by the people in Aceh Barat. Both impression and instrumental analysis seem to agree in terms of vowels realized. The occurrence of the vowel seems to be word-specific instead of location-specific. The word göt is realized as /ə/, /ɛ/, and /ɔ/ while peugöt is only realized as /ə/ and /ɔ/ despite occurring between the same consonants. F2 frequencies are used to produce /ə/ and /ɔ/ in the word pöt, böh, and röt.

Keywords: *Acehnese monophthong, Acehnese vowel variation, Aceh Barat dialect, western Acehnese dialect, instrumental analysis*

1. INTRODUCTION

Variation in speech production of a language inexorably exists as an integral part of linguistic diversities. Variation usually emerges in diverse ethnic communities with a range of local languages. Children of Arabic descent, for example, made use of their Arabic phonetic features when speaking English compared to English monolinguals (Khatab, 2007). Code-switching between Arabic and English when acquiring English, children of Arabic descent are rated to be more foreign-accented. Acehnese in Aceh Barat speak the local ethnic language in addition to the Acehnese language. These languages include Jamee, Sinabang, and Kluet. Their respective languages may influence phonetic and prosodic features of Acehnese as a local lingua franca.

Asyik (1987) described that Acehnese has four major dialects, Northern, Pidie, Banda Aceh, and Western dialect. However, Masykar (2021) argued that the dialect described by Asyik was based on regional borders. Now that districts in Aceh have expanded, the traditional division of Acehnese dialects needs to be reconsidered. Aceh Barat, for example, has been divided into four districts, Aceh Jaya, Aceh Barat, Sinabang, and Naga Raya. If dialect division was made based on district, Aceh Barat regions should have at least four dialects. Masykar, Almulhim, et al. (2021) found that some people in Samatiga (part of Aceh Barat district) tend to diphthongize certain vowels, just like old Acehnese mentioned by Asyik (1987).

While much research on Acehnese vowels focused on describing the overall vowel quality of a particular dialect, little attention has been given to individual variations of particular vowels within a dialect. A study by Yusuf and Pillai (2016) on Acehnese dialect in Keudah, Malaysia shows that Acehnese in Keudah produced certain words differently from commonly reported vowels of North Aceh dialect by Yusuf and Pillai (2013), Asyik (1987),

and Durie (1985). Yusuf and Pillai (2016) learned that Acehnese in Keudah tends to realize the vowel /ʌ/ as the vowel /ɛ/ or /ɔ/. This makes it difficult for phoneticians to document the vowel across dialects in Aceh. Despite not focusing on vowel variation, Masykar, Agusmaniza, et al. (2021) also learned that the word *göt* is realized variably by Aceh Barat people.

Thus, this study aimed to investigate vowel variation produced by Acehnese in Aceh Barat for the words commonly produced as /ʌ/ in other dialects. The findings in this study could help researchers design better instruments to capture vowel quality across various dialects in Aceh. However, this study does not plan to design a comprehensive instrument for research on Acehnese vowels. Rather, it aims to see how certain words are produced variably by Aceh Barat people so that researchers can make an informed decision when researching people with diverse dialects, such as Aceh Barat. The study first determines the vowel variation based on an impression analysis by phonetically trained researchers. Impression analysis is later confirmed through instrumental analysis of vowel wave frequency through Praat software (Boersma & Weenink, 2017). Similarly produced vowels are then grouped and projected into vowel space using the R-statistics package with the help of the PhoneR library by McCloy (2016).

2. LITERATURE REVIEW

2.1 Acehnese Dialect

Aceh has many dialects, but little is known about the variability of its dialect. Asyik (1987) simply divided Acehnese dialect into four main dialects, North, West, Pidie, and Banda Aceh. Among the four major dialects, the Pase dialect in North Aceh is the most comprehensive and heavily studied dialect (Asyik, 1987; Durie, 1985; Pillai & Yusuf, 2012). Asyik (1987) argued that the northern dialect is more uniform than other dialects, while other researchers consider it the standard Acehnese (Hanafiah & Makam, 1984; Sulaiman et al., 1977; Sulaiman et al., 1983). On the other hand, other dialects are reported to vary considerably. People would find dialect change within a few kilometers walk in Aceh Besar, while the dialect seems to be stable from Pidie to North Aceh (Durie, 1985). In Aceh Barat, for example, despite its close proximity with the capital city of Aceh Barat, the Samatiga dialect is different from the commonly used dialect in Meulaboh (Masykar, Almulhim, et al., 2021). Samatiga dialect in Aceh Barat is characterized with diphthongization of certain monophthong in /ɛ/ and /e/ into /ai/ and /au/ respectively. Diphthong is the feature of old Acehnese (Durie, 1985).

The most notable feature of the Aceh Barat dialect is the uvular trill consonant /ʀ/ instead of the post-alveolar trill consonant /r/ as in the northern and Pidie dialects (Zulfadhli, 2015). He also showed how Acehnese tend to stigmatize this dialect as being vulgar and uneducated. In his study, he asked Acehnese university students to listen to a passage read by an Acehnese speaker from Meulaboh. The passage is read two times using different dialects. He found that the students tend to rate the northern dialect more positively than the western one even though the same speaker reads both passages. Philippon et al. (2008) also reported that certain voices tend to be judged negatively compared to others basing only on earwitness. Such a stereotype also exists in Aceh Barat dialect, in which speakers with Aceh

Barat dialect are considered uneducated but considered smart when the person switched dialect (Zulfadhli, 2015). Another prominent dialect is the Pidie dialect which is described by Asyik (1987) and Al-Harbi (2003). This dialect often adds /i/ when the back vowel /a/, /o/ and /u/ is followed with /h/ placed in the final syllable. The /u/ is often replaced with /u/, while /u/ is replaced with /u/ if it occurs in the first syllable of two to three-syllable words.

2.2 Acehese Vowel

Acehese has monophthong and diphthong vowels. Both monophthongs and diphthongs are divided into oral and nasal vowels. Acehese oral monophthongs consist of 10 vowels, according to an impressionistic study by Asyik (1987) and instrumental analysis by Pillai and Yusuf (2012), who also based their study on Asyik vowel inventories. Asyik (1987) vowel inventories are regarded as the most comprehensive description of Acehese vowel based on northern dialect. Many school textbooks referred to his vowel inventory in teaching Acehese (Abdullah et al., 2008, 2010; Wildan, 2002). Since the current study is based on the oral monophthongs, we do not include their oral counterpart and diphthongs.

The 10 Acehese monophthongs are divided into front, mid and back vowels. The front vowel have three oral monophthongs /i/, /e/, and /ɛ/. The mid vowels have three oral monophthongs, /u/, /ə/, and /ʌ/. The rest of the oral monophthongs are back vowel /a/, /ɔ/, /o/, and /u/. The plots for these ten oral monophthongs can be observed in Figure xx by Pillai and Yusuf (2012) based on Pase dialect and by Masykar et al. (2021) based on Aceh Barat dialect. Both researchers employed instrumental analysis when documenting Acehese vowels. However, Masykar et al. (2021) consulted fewer speakers and might not depict the overall picture of vowels in the Aceh Barat dialect. However, the speakers in both studies aged above 40 to capture a more authentic Acehese. Alamsyah et al. (2016) found that parents of the present Acehese people preferred to speak in Indonesia with their children, and many young Acehese are less proficient in Acehese.

The location of most vowels presented in Figure 1 is similar to the impressionistic analysis reported by Asyik (1987). In northern and western dialects, both /ɔ/ and /u/ are more fronted than the Asyik's description. The western dialect is also more compact than the northern dialect. The northern dialect spans between 6 Bark and 15 Bark for F2 frequencies and between F3 bark to 8 bark for F1 frequencies. The western dialect is 1 Bark fewer for each F1 and F2. Small samples employed in western dialect may restrict Masykar et al. (2021) to capture a wide range of vowels by the people in Aceh Barat. However, we argue that the /ʌ/ symbol might not best represent this dialect for Western dialect. The words commonly pronounced as /ʌ/ in Pase dialect may be pronounced differently and variably by the people in Aceh Barat. People in Aceh Barat often speak more than one local language, and influence from their other languages is inevitable.

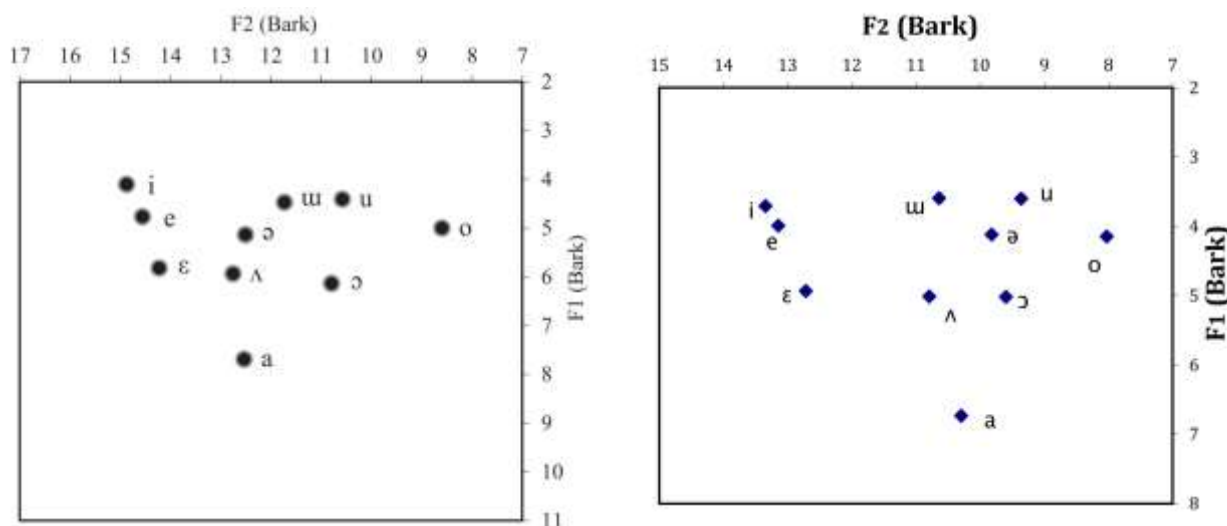


Figure 1 Acehnese vowel of Pase dialect (left) from Pillai and Yusuf (2012) and Aceh Barat dialect (right) from Masykar, Agusmaniza, et al. (2021).

2.3 Vowel Variation

Studies on Acehnese dialect are scarce and let alone vowel variation within various dialects. Yusuf and Pillai (2016) firstly mentioned different vowel realizations in the Acehnese dialect in Kedah, Malaysia. Masykar, Agusmaniza, et al. (2021) later found similar findings when documenting vowels in the Aceh Barat dialect. In another study, Masykar, Almulhim, et al. (2021) also found that some monophthongs are realized as a diphthong in the Samatiga dialect. It is interesting to find diphthongized monophthongs in present-day Acehnese because such quality has been reported as the feature of old Acehnese by Durie (1985). About 20 years ago, Asyik (1987) also mentioned that people in certain areas of Aceh Besar (Ulee Lheue, Lhok Nga, and Samahani) realized the /a/ monophthong as /ə/ or diphthong /əa/. People in Samatiga tend to replaces monophthong /ɛ/ and /ɔ/ with diphthong /ai/ and /au/ when they occur in the word-final.

Yusuf and Pillai (2016) argued that the Acehnese people in Keudah had lost the vowel /ʌ/ and replace them with /ɛ/ and /ɔ/. In their study, the word *göt* /gʌt/ [good, fine], *peugöt* /puʌgʌt/ [fix], and *seutöt* /sutʌt/ [follow] are often produced as /ɛ/ instead of /ʌ/. The /ʌ/ vowel is replaced with /ɛ/ when they appear in plosive stop consonants. Example of these consonants are /t/ and /g/. On the other hand, when bilabial /b/, alveolar /t/, and post-alveolar plosive /d/ followed by a glottal fricative /h/, the vowel /ʌ/ is replaced with /ɔ/. Examples of words in which this occurs are *böh* /bʌh/ [throw away], *gadöh* /gʌdʌh/ [lost], and *töh* /tʌh/ [word used to ask something]. Using the instrument developed by Yusuf and Pillai (2016) when documenting Aceh Barat dialect, Masykar, Agusmaniza, et al. (2021) found that the word *göt* /gʌt/ [good, fine] is realized variably by certain persons. We later wonder that relying on one word for documenting unrecorded dialect is not a viable option. Such practice may be unable to capture the actual vowel in other dialects. Thus, in the current study, we try to look at various words to further examine the variability mentioned in previous studies.

3. RESEARCH METHODS

3.1 Language Consultants

The language consultants for the current study are five Acehese speakers aged 30 – 35 years old. They have lived in Aceh Barat and work at a state campus in the district. Three speakers have lived in Meulaboh between 5 and 10 years, and only two lived in Meulaboh for less than 3 years. They were selected because the campus community is the perfect place to record the diversities of Acehese dialects in Aceh Barat. People from adjacent districts come to study and work in Aceh Barat since it is the only district that has state universities in the southwest region. Originally, the speakers were born and raised in Abdya and Aceh Selatan, but contact with Aceh Barat people might have influenced their speech style to comply with the Aceh Barat people. It was reported in the previous study that people in Aceh Barat produced the /ə/ vowel variably in the word *göt* [good]. In addition to Acehese, the language consultants are proficient in Bahasa Indonesia and another local language, Jamee. Thus, influence from both languages should be expected.

Two additional Acehese speakers took part in the study as listeners. Both listeners have lived and were raised in Meulaboh. They are familiar with various dialects in Aceh Barat. However, since their parents are from Nagan Raya, their dialect must be a mix of both districts. Thus, their perception of their own dialect is expected to contribute to the perception of other dialects. In order to avoid this effect, both were phonetically trained to map a sound heard with correct phonetic symbols. One of the listeners is the author of the current study.

3.2 Instruments

Six Acehese words placed in the CVC context were used to record the speech production. Four words were placed in between plosive consonants *göt, pöt, cöt, peugöt*. The symbol *ö* instead of the phonetic symbol is intentionally used throughout this study to avoid the vowel's prescriptive interpretation. The other two vowels are placed in plosive, trill, and approximant. The word *röt* starts with the trill consonant /R/ and ends with plosive *t*. The word *böh* starts with the plosive consonant /b/ and ends with the approximant consonant /h/. The words used with the APA symbol and the English translation can be observed in Table 1.

Table 1: Words used to elicit the target vowel

	Word		Target Vowel	English Translation
1	<i>göt</i>	<i>gʌt</i>	/ʌ/	good, fine
2	<i>pöt</i>	<i>pʌt</i>	/ʌ/	pick (of fruit)
3	<i>böh</i>	<i>bʌh</i>	/ʌ/	throw away
4	<i>röt</i>	<i>rʌt</i>	/ʌ/	road
5	<i>peugöt</i>	<i>pʌgʌt</i>	/ʌ/	fix

As opposed to presenting the word in written form, the words are presented in their Indonesian translation with the help of pictures representing the Acehnese word attached. This was done to discourage the participants from producing the target words based on the orthography because Acehnese written forms are unpopular. The presentation is made in PowerPoint slides so as to make it easier to move from one word to another. The pictures were taken from the free version of istockphoto.com. The instrument used can be seen in Figure 2.



Figure 2: illustration used to elicit the word *pöt* [pick fruit]

3.3 Procedures

The recording was done in a quiet room in one of the classrooms in AKN Aceh Barat. Before recording, we ensure that the recorder in the recording room captures no other sounds. The recorder is placed a few inches away from the speakers' mouths to ensure consistent quality. All recorded data are sampled at 4400 Hz and saved in a .wav format. Prior to recording, we familiarized the speakers with the words to be recorded. However, we never explicitly told the speakers what the target words are in Acehnese. Clues were given whenever needed. Once they are comfortable with the instruments, they start producing the word in a carrier sentence in Acehnese: *Nyo lam Bahasa Aceh ...* [This in Acehnese is ...]. Carrier sentences are used to help them produce the words at the same rate and avoid the unexpected influx of sounds during recording. The recording was done one by one and followed with some background interviews.

3.4 Data Analysis

All data were extracted using Praat version 6.1.29 made by Boersma and Weenink (2017). To extract the F1 and F2 for each vowel, we first determine the location of the particular vowel in the linear predictive coding by analysing the wave of the sound. The onset and offset of the vowel is marked and labeled with word and vowel symbol. Instead of manually determining the midpoint of the vowel, we used the Praat script made by Crosswhite (2003). Using the script, we obtained the F1 and F2 in Hz frequency exported to the .txt file. The example of our formant analysis can be observed in Figure 3. The midpoint frequencies of the F1 and F2 are tabulated in excel for analysis and vowel plot. Midpoint are used to determine the height (F1) and the depth (F2) of the vowel in the linear predictive coding (Hayward, 2000). Some vowel plots are produced with an R-statistics package using the Phone-R library made by McCloy (2016). All formant frequencies in Hz are normalized into Bark for vowel plot as suggested by Deterding (2003).

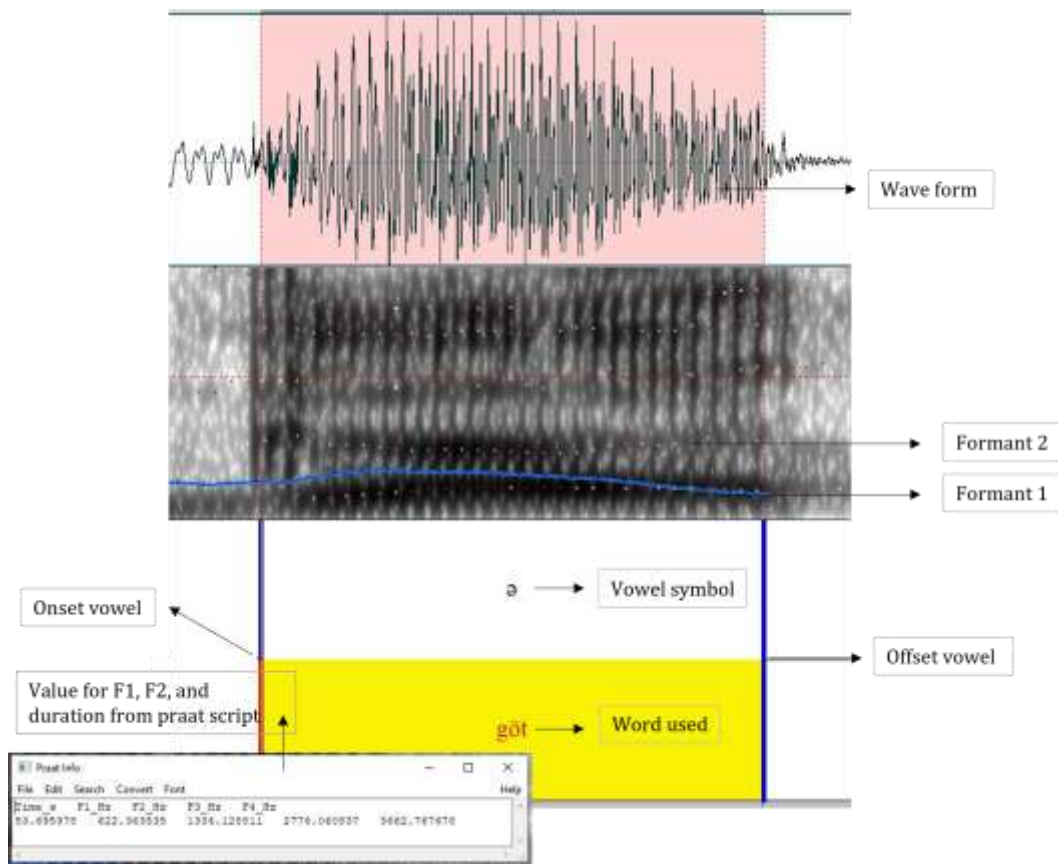


Figure 3: Example of vowel analyzed in Praat to obtain F1 and F2 frequencies

4. FINDINGS

4.1. Impression Analysis

Table 2: impression analysis of each word by speaker

		göt	pöt	böh	röt	peugöt
Listener 1	S1	ε	ɔ	ɔ	ɔ	ε
	S2	ɔ	ə	ə	ɔ	ε
	S3	ε	ɔ	ɔ	ɔ	ε
	S4	ə	ɔ	ə	ɔɛ	ε
	S5	ə	ə	ə	ə	ə

		göt	pöt	böh	röt	peugöt
Listener 2	S1	ε	ɔ	ɔ	ɔ	ε
	S2	ɔ	ə	ə	ə	ε
	S3	ε	ɔ	ɔ	ɔ	ε
	S4	ə	ɔ	ə	ɔ	ɔ
	S5	ə	ə	ə	ə	ə

Table 2 shows the impression analysis made by two Acehnese listeners from Meulaboh. For impression analysis, each listener was asked to determine if the vowel heard is /ə/, /ε/, and /ɔ/. Each listener listened to the word separately in order to minimize perception influence. To our surprise, the two listeners mostly agree in the vowel variation except for the vowel in the word *röt* and *peugöt*. For the word *röt*, listener 1 perceived it as the vowel /ɔ/ while Listener 2 perceived it as /ə/. For the word *peugöt*, listener 1 perceived it as /ε/, while listener 2 perceived it as /ɔ/. Listener 1 also believes that the S4 produced the vowel word *röt* as a diphthong. Despite trivial, such difference is quite surprising considering /ə/ is the mid vowel while /ɔ/ is the back vowel. However, it is important to note that both vowels are close-mid and open-mid vowels. When we further inquire this particular discrepancy with both listeners, we found that Listener 2 seems to agree that the vowel in the word *röt* is actually closed to /ɔ/ and is difficult to distinguish while the vowel in the word *peugöt* by speaker 4 is actually /ε/. In the impression analysis, the vowel /ɔ/ is realized 9 times by listener 1 and 10 times by listener 2. Similarly, listener 1 perceived the vowel /ə/ 9 times while listeners 2 10 times. The vowel /ε/ is perceived the least by the two listeners with the number occurrences 6 times by listener 1 and 5 times by listener 2.

4.1. Instrumental Analysis

In order to comprehensively see the different vowels produced across the different words, vowels produced similarly are grouped into single vowels and plotted into the vowel space using R Statistics packaged with the help of the PhoneR library made by McCloy (2016). The comparison of all vowels can be observed in Figure xx. Figure on the left is the spread of the three vowels produced by each speaker across the five words. A solid circle in green symbolize /ε/, a hollow circle in blue symbolizes /ɔ/, and a solid triangle in red

symbolizes /ə/. It is apparent that the three vowels are produced differently. The /ɔ/ is located at the back, while the /ə/ is more fronted than /ɔ/, indicating a mid vowel. The /ε/ is located at the front of the vowel space.

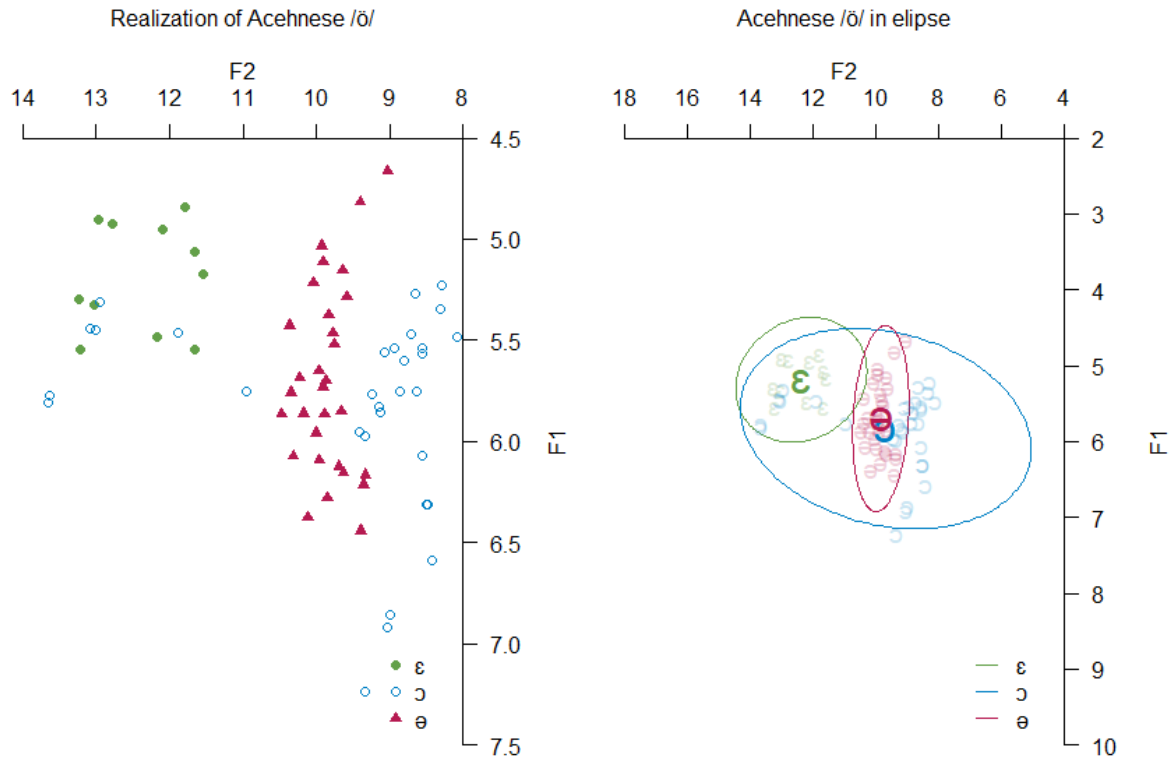


Figure 4 Comparison of /ə/ /ε/ /ɔ/ (left) and elipse line (right)

However, some vowels perceived as /ɔ/ by our listeners are located near /ε/ as in Figure 4. The eclipse also indicates that the /ɔ/ vowel is more spread out, covering the space belong to /ə/ and /ε/. In order to determine which speakers are misperceived as /ɔ/ we replotted the vowel and added showing the subject of certain vowels. The illustration can be observed in Figure 5. Each speaker is given different colors to represent their vowel production. Solid circles are used for /ε/, hollow circles for /ɔ/, and solid triangles for /ə/. It is clear that S1 and S4 produced the vowel /ɔ/ near the /ε/. The listener's 1 assumption is proven in the instrumental analysis that the word *röt* by S4 sounds somewhere in between /ε/ and /ɔ/.

Variation of Acehnese monophthong /ʌ/ in Western Acehnese Dialect

Realization of Acehnese /ʌ/ by subject

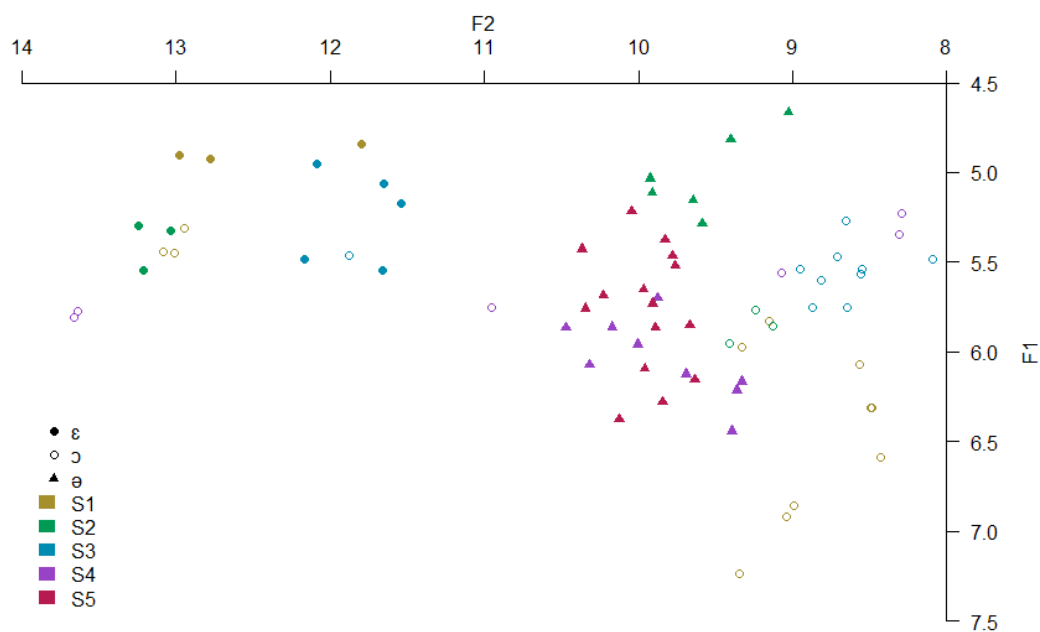


Figure 5 Comparison of /ə/ /ε/ /ɔ/ by vowel and subject

4.2. The word *göt* [good]

Table 3: Mean and SD for F1 and F2 for *göt* in Hz and Bark scale

Speaker	MIN	MAX	F1 (Hz)		F2 (Hz)		F1 (Bark)	F2 (Bark)
			\bar{x}	SD	\bar{x}	SD	\bar{x}	\bar{x}
S1	491	500	497	5	1863	171	5	13
S2	602	625	613	11	1128	26	6	9
S3	504	567	533	32	1704	86	5	12
S4	614	640	623	15	1332	31	6	10
S5	592	600	596	5	1300	45	6	10

Table 3 shows that the F1 and F2 frequencies for the word *göt* are produced variably across five speakers. In terms of F1, S1 and S4 have the same frequencies, while S3 is similar to S5. S1 has the lowest F1 frequencies at 497. On the other hand, S1 has the highest F2 frequencies, followed by S3. S2 produced the lowest frequencies, while S4 and S5 have comparable F2 frequencies at 1332 Hz and 1300 Hz, respectively.

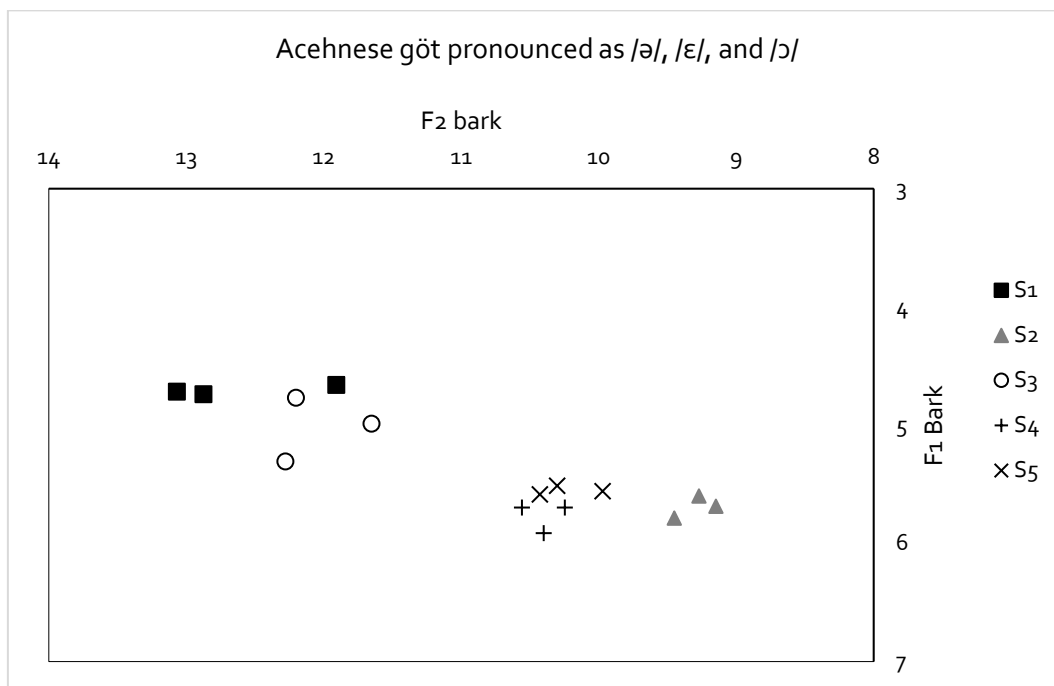


Figure 6: Vowel plot for the word göt

When the production of the vowel in the word göt by all speakers is projected into the vowel space (Figure 6), it is obvious that the vowel is produced at a different location within the vowel space. S1 and S2 produced the vowel more fronted compared to S4 and S5. The instrumental analysis confirmed our impression analysis that S1 and S3 produced the same vowel as did S4 and S5. On the other hand, S2 produced the vowel further to the back of the vowel space, near the /ɔ/ vowel. Thus, we can conclude that the vowel in the word göt is produced as /ə/ /ɛ/ and /ɔ/.

4.3. The word pöt [pick fruit or leaf]

Table 2: Mean and SD for F1 and F2 for pet in Hz and Bark scale

Speaker	MIN	MAX	F1 (Hz)		F2 (Hz)		F1 (Bark)	F2 (Bark)
			\bar{x}	SD	\bar{x}	SD	\bar{x}	\bar{x}
S1	610	640	626	15	1085	70	626	70
S2	522	543	531	11	1212	33	531	33
S3	565	577	572	6	1014	15	572	15
S4	536	576	554	20	1006	76	554	76
S5	612	643	623	17	1236	29	623	29

Variation of Acehnese monophthong /ʌ/ in Western Acehnese Dialect

Table 4 shows the production of the vowel in the word *göt* by the speakers in Meulaboh. S2 and S5 produced F1 at 531 Hz and 623 Hz, respectively, but their F2 is higher than other speakers at 1212 Hz and 1236 Hz each. Even though the frequencies of F1 of S1, S3, and S4 range from 531 Hz to 572 Hz, their F2 frequencies are below 1200 Hz. It is clear that the speakers make use of F2 frequencies as cues to produce the vowel in the word *göt* as either /ə/ or /ɔ/. The difference of only in F2 despite both F1 and F2 explains why the speakers tend to produce the word *göt* interchangeably as /ə/ or /ɔ/.

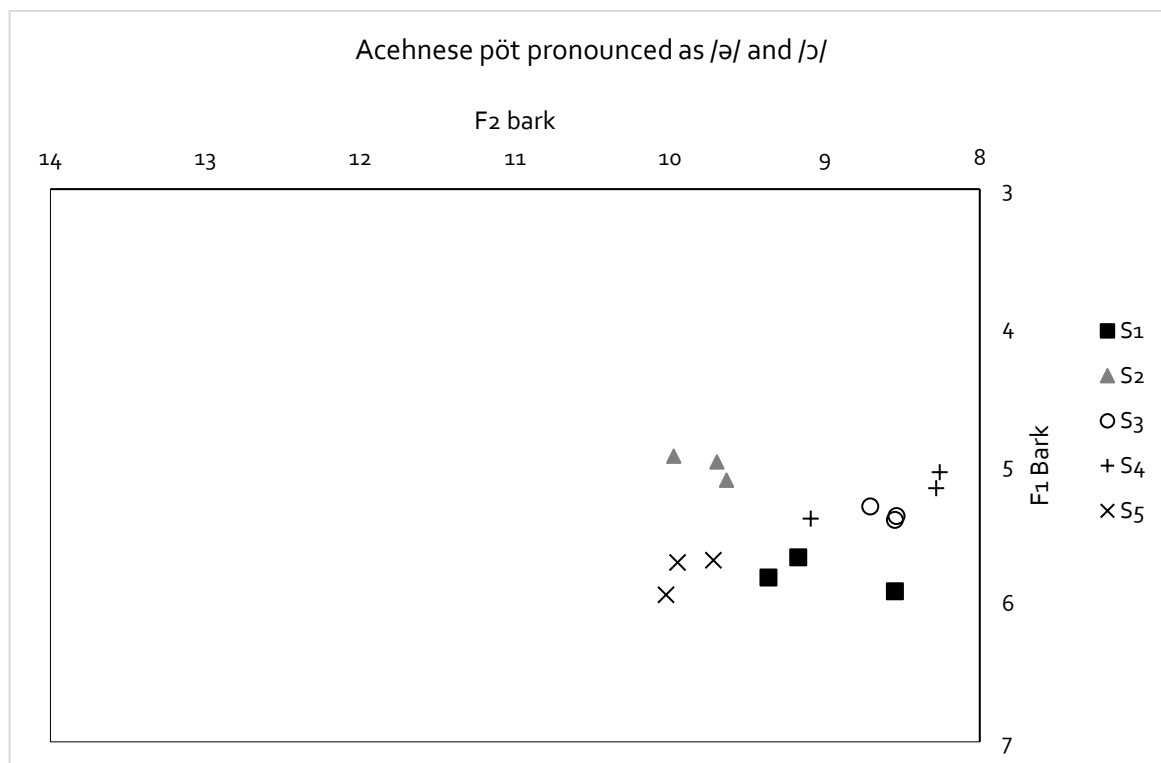


Figure 7: Vowel plot for the word *pöt*

Figure 7 evidently depicts our assumption from the previous table that the speakers rely on F2 when realizing different vowels. Since all speakers produced comparable F1, their vowels clearly occupy the vowel space at the bottom between 4.5 bark to 6 bark. Both /ə/ and /ɔ/ fall within this range in terms of F1. The distinction starts to emerge when we look at the F2 frequency. S1, S3, and S4 produce the vowel more back, indicating that the vowels are back vowel /ɔ/. What is intriguing is that the word *pöt* only has two possible vowels instead of three, as in *göt*. The speakers never realize the vowel as the mid vowel /ɛ/. Vowel variation seems to be word-specific despite its presence in between plosive consonants /g/, /p/ and /t/.

4.4. The word *böh* [throw away]

Table 5: Mean and SD for F1 and F2 for *böh* in Hz and Bark scale

Speaker	MIN	MAX	F1 (Hz)		F2 (Hz)		F1 (Bark)	F2 (Bark)
			\bar{x}	SD	\bar{x}	SD	\bar{x}	\bar{x}
S1	671	708	684	21	991	6	6	8
S2	471	513	491	21	1164	84	5	9
S3	541	600	574	30	1043	19	5	9
S4	593	647	622	27	1240	30	6	10
S5	554	587	571	17	1239	21	5	10

In Table 5, the F1 of the word *böh* ranges from 491 Hz to 684 Hz, while F2 is produced from 991 Hz to 1240 Hz. The boundaries for vowel variation are not apparent when looking at F1. However, F2 clearly divides the speakers into two groups. S1 and S3 produced F2 frequencies below 1100 Hz, whereas others are above 1100 Hz. Looking at Figure 8, S1 and S3 produced the vowel more back than the other three speakers suggesting that the vowel is indeed the back vowel /ɔ/. S4 and S5 pushed the vowel to the middle of the vowel space and produced it as /ə/. Interestingly, the S2 produced the vowel /ə/ higher than the S4 and S5 but is still away from the production of /ɔ/ by S1 and S3.

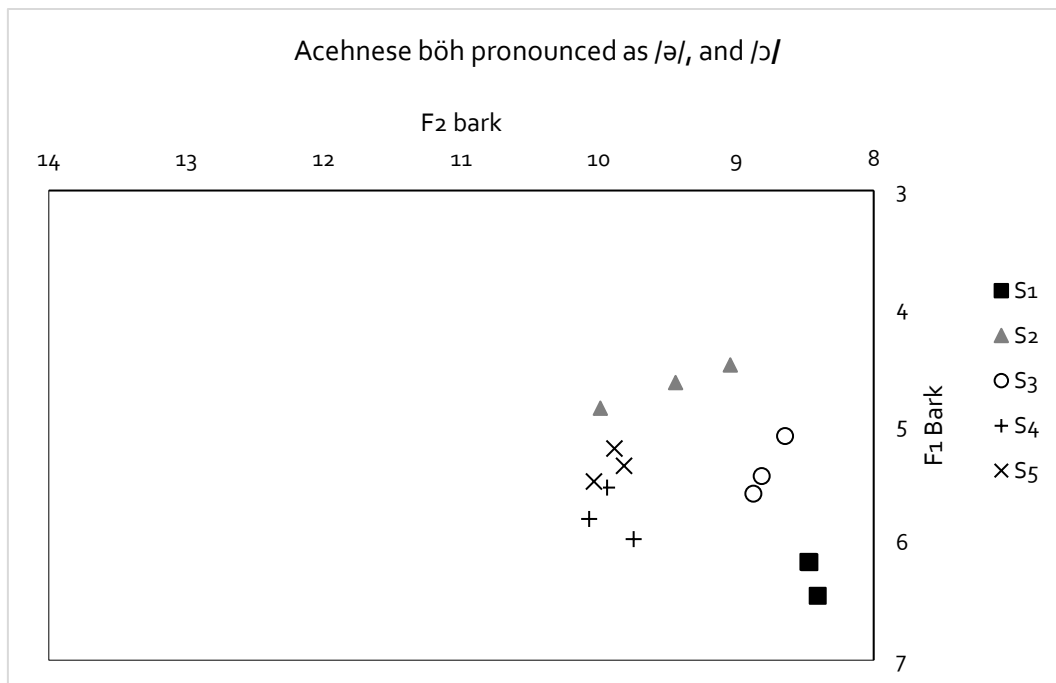


Figure 8: Vowel plot for the word *böh*

Similar to the word *pöt*, the vowel in the word *böh* is realized as either /ə/ or /ɔ/ and never /ɛ/. However, speaker 4 seems to be unconfident in his production of the vowel. In *pöt*, he realized the vowel as /ɔ/ but produced it as /ə/ in *böh*. We were unsure of why such a case happens. Our initial assumption is that the speaker may produce /ɔ/ and /ə/ interchangeably, but for this particular word, he might try not to produce it as /ɔ/ because it has a vulgar meaning when said in isolation. Contextual production such as impromptu speech will reveal its actual production in daily usage. Another possible argument for limited variation is because the vowel /ɛ/ has a different meaning when placed in the same CVC context as in the word *beh* /beh/, which means okay.

4.5. The word *röt* [road]

Table 6: Mean and SD for F1 and F2 for *röt* in Hz and Bark scale

Speaker	MIN	MAX	F1 (Hz)		F2 (Hz)		F1 (Bark)	F2 (Bark)
			\bar{x}	SD	\bar{x}	SD	\bar{x}	\bar{x}
S1	745	799	766	29	1103	29	7	9
S2	595	629	724	18	1138	47	6	9
S3	567	600	683	17	1007	72	5	9
S4	652	689	615	19	1146	6	6	9
S5	651	680	597	14	1242	112	6	10

One of the listeners was unsure of the production by S4 for the word *röt*. The frequency table seems to confirm his doubt when looking at how closely each speaker produces the F2. In terms of F1, both S4 and S5 have a lower frequency ranging from 597 Hz to 615 Hz. All other speakers have an F1 frequency above 683 Hz. Surprisingly, the distinction is not apparent in F2 because S1, S2, S4, and S5 have comparable F2 frequencies. Only S3 has lower F2 frequencies among the speakers.

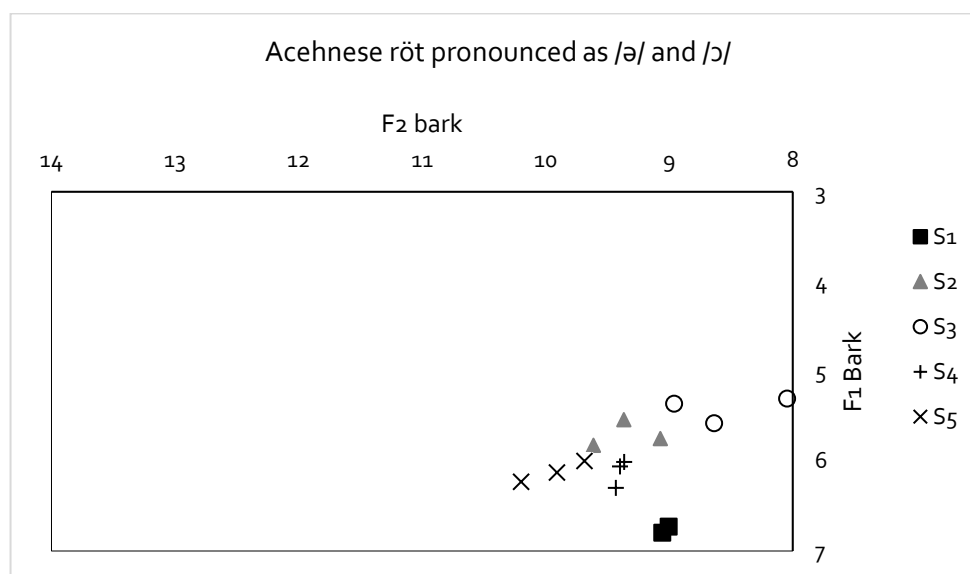


Figure 9: Vowel plot for the word *röt*

Looking at Figure 9, S1 and S3 produced the vowel at a location distinct from other speakers. S3 produced the vowel in the word *röt* further back at the middle position of F1 while S1 produced it further down the space. However, impression analysis indicates that the two speakers produce the vowel /ɔ/ for the word in question, similar to what the S2 produces. It is clear that S5 has a higher F2 frequency and pushed the vowel toward the front space as the vowel /ə/. Similar to the word *böh*, the word *röt* is realized as either /ə/ or /ɔ/ but never /ɛ/. It is interesting to learn that these speakers do not produce *röt* with /ɛ/ despite it is not uncommon to find in Aceh Barat dialect. Since the origin of the current speakers is from South Aceh, it is possible that /ɛ/ is not common there.

4.6. The word *peugöt* [fix]

Table 7: Mean and SD for F1 and F2 for *peugöt* in Hz and Bark scale

Speaker	MIN	MAX	F1 (Hz)		F2 (Hz)		F1 (Bark)	F2 (Bark)
			\bar{x}	SD	\bar{x}	SD	\bar{x}	\bar{x}
S1	546	563	557	9	2001	34	5	13
S2	544	574	555	16	2045	34	5	13
S3	517	574	552	31	1651	32	5	12
S4	600	607	603	4	1956	422	6	13
S5	535	565	553	16	1281	59	5	10

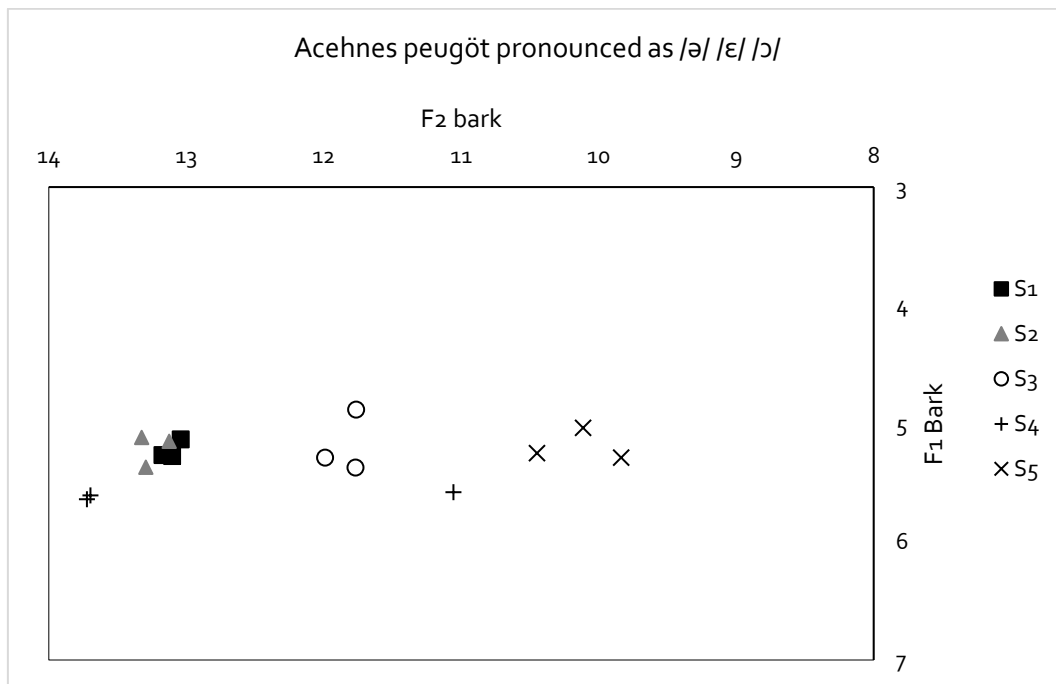


Figure 11: Vowel plot for the word *peugöt*

The word *peugöt* is realized differently from *göt* despite being located within the same plosive consonants. *peugöt* is only realized as /ə/, /ɛ/, but never /ɔ/. The vowel space also indicates that the speakers use F2 as the denominator for different vowels. Despite the impression by listener 2 that S2 produces the word as /ɔ/, we cannot say for sure that the S4 produces the vowel as the back vowel /ɔ/ since its location inclines more to the front near the /ə/ vowel. If it is a back vowel, it should have a much lower F2 frequency. We can say that the F2 in the vowel /ɛ/ has larger ranges for this particular word. 1650 Hz to 2045 Hz, while the /ə/ is within 1281 Hz as produced by S5. In fact, S2 is the only speaker who consistently produces all words as the vowel /ə/ with F2 ranging from 1235 Hz to 1300 Hz.

5. DISCUSSION

Impression analysis indicates that the six Acehnese words which are commonly produced as /ʌ/ in north Aceh dialect are realized variably by the people in Aceh Barat. This variation is similar to what Yusuf and Pillai (2016) found in Acehnese living in Kampung Aceh, Malaysia. North Acehnese /ʌ/ is replaced with /ɛ/, and /ɔ/. In our study, none of the speakers actually produce any of the word the /ʌ/ sound. The /ʌ/ is the low back unrounded sound while the /ɛ/ and /ə/ central vowels. The only possible closer vowel is the /ɔ/. Therefore, it is highly likely that norther Acehnese /ʌ/ is actually produced as /ɛ/, /ə/, and /ɔ/ because they are closer together in the vowel space. Future studies should try to compare the vowel produced by Aceh Barat speakers with the North Aceh ones to confirm this. Different pronunciation is expected in dialectical study. In Sweden, individual variation is recorded even though the participants live in the same West Sweden (Nilsson, 2009). Singaporean English on the other hand, has fewer vowels compared to American and British English. Instead of 10 monophthong vowels as reported by (Ladefoged & Johnson, 2014), Singaporean English only has 7 vowels (Deterding, 2007). Similar occasion was also recorded in Hongkong, China and Brunei (Deterding et al., 2007; Sharbawi, 2012; Xu et al., 2017). Thus, it is reasonable that the western Acehnese dialect may not have the /ʌ/ sound at all due to reduced vowel space.

Instrumental analysis confirms the initial finding found in impression analysis. None of the vowels were produced near the common location for the /ʌ/ sound. It can be said that the western Acehnese dialect produced the /ʌ/ sound similar to the Acehnese-Malaysian living in Kampung Keudah, Malaysia (Yusuf, 2013). Instead of uniformly pronounced as in the northern Acehnese dialect (Pillai & Yusuf, 2012), the western Acehnese dialect has a wide degree of variation despite the speakers coming from the same location. Such variation also confirm the impression report made by Durie (1985) about the western Acehnese dialect. If we compare the production of the four words used in the study, it is clear that only the words *peugöt* [fix] produce three possible variations. The vowel in the other words tested, seem to reduce into two possibilities. The vowel in the words *göt* [good] *göt* [good] *pöt* [pick fruit or leaf] *böh* [throw away] *röt* [road] may one day merged into a single vowel minimizing the variation in the dialect. Vowel merger was also reported in New Mexican English, in which the majority of the speakers were of Hispanic and Latino descend. Some English vowels in New Mexico, USA, are merged into a single phoneme as BOT-BOUGHT lexical set (Brumbaugh & Koops, 2017; Neel, 2008). Such direction seems to be plausible in

the western Acehnese dialect considering variation becoming less in four out of five words used in the study.

6. CONCLUSION

The study showed that the Acehnese *ö* vowel is realized variably by the speakers in Aceh Barat. The common / Λ / vowel produced in northern dialect can be realized as / ∂ /, / ϵ /, and / σ / but never seem to be / Λ /, depending on the words it resides. The word *göt* is realized / ∂ /, / ϵ /, and / σ / but the *ö* in the word *peugöt* are realized only as / ϵ /, and / ∂ / but never / σ /. This finding is quite surprising considering the vowel appears in between the exact same consonants in both words. This led to our initial assumption that the vowel realization is word-specific and does not seem to be caused by the consonants it appears in.

The instrumental analysis also confirms our initial impression analysis except for the word / σ / by the first and fourth speakers, which is produced as / ϵ / when projected into vowel space using R-Statistics. F2 frequencies are often used as cues to differentiate between / σ / and / ∂ / in the word *pöt*, *böh*, *röt*. The words *pöt*, *böh*, *röt* are all realized as either / ∂ / or / σ / but never / ϵ /. Due to small samples, we could not claim that Aceh Barat dialect does not produce / σ / for the word *röt* because it is sometimes heard in Aceh Barat. For the word *pöt*, it is reasonable that the speakers do not produce it with the / ϵ / vowel because it is not an Acehnese word. The absence of / ϵ / in the word *böh* is because it is not Acehnese words. This finding is quite surprising considering it has an alternative meaning if produced with / σ /. The word in question has vulgar meaning in Acehnese. However, it is important to note that even though the speakers have lived in Meulaboh quite longer, they were mostly born and raised in Aceh Barat Daya and Aceh Selatan.

This finding should inform future research when conducting research on various dialects in Acehnese. To ensure that the instruments used could record all possible vowel variations within the Acehnese dialect, researchers need to include more than one word for a particularly targeted vowel. Researchers may not be able to capture the intended / Λ / vowel as in the north if they use any of the words utilized in the current study. However, they can capture the possible variation of / ∂ /, / σ /, and / ϵ / if used for vowel inventory studies. Another possible alternative would be to record the impromptu speech, but they may risk not getting all vowels anticipated. Still, actual speech can yield real-world data and better represent the actual use of the language. Despite appealing results, the current study has some limitations. First, the number of participants in this study is only six speakers, and all the speakers are females. The results may not represent the whole trend of vowel variation in the western Acehnese dialect. Future studies should incorporate more speakers involving males and females when researching dialect variation.

ACKNOWLEDGEMENT

This study is funded by the Ministry of Education, Culture, Research, and Technology through the Novice Lecturer Research Scheme (PDP) of 2021.

REFERENCES

- Abdullah, Wildan, Faridan, A., Syafi'i, Hanum, F., Badruddin, & Husni, T. (2008). *Peulajaran Basa Aceh Keu Murip Glah VII SMP/MTs [Acehnese Language Textbook for Public/Religious Junior High School Students Grade 7]*. Global Educational Consultant Institute.
- Abdullah, Wildan, Faridan, A., Syafi'i, Hanum, F., Badruddin, & Husni, T. (2010). *Peulajaran Basa Aceh Keu Murip Glah VIII SMP/MTs [Acehnese Language Textbook for Public/Religious Junior High School Students Grade 8]*. Global Educational Consultant Institute.
- Al-Harbi, A. A. A.-A. (2003). Acehnese coda condition: An optimality-theoretic account. *Umm Al-Qura University Journal of Educational and Social Sciences and Humanities*, 15(1), 9-28. <http://roa.rutgers.edu/article/view/604>
- Alamsyah, T., Taib, R., Azwardi, N., & Idham, M. (2016). Pemilihan bahasa Indonesia sebagai bahasa pertama anak dalam keluarga masyarakat Aceh penutur Bahasa Aceh di Nanggroe Aceh Darussalam. *Jurnal Pendidikan Bahasa Melayu*, 1(2), 31-44.
- Asyik, A. G. (1987). *A Contextual Grammar of Acehnese Sentences* [University of Michigan].
- Boersma, P., & Weenink, D. (2017). *Praat: Doing phonetics by computer*.
- Brumbaugh, S., & Koops, C. (2017). Vowel Variation in Albuquerque, New Mexico. *Publication of the American Dialect Society*, 102(1), 31-57. <https://doi.org/10.1215/00031283-4295200>
- Crosswhite, K. (2003). *Praat Scripts and Other Materials*. <http://web.archive.org/web/20030620172734/ling.rochester.edu/people/cross/scripts.htm>
- Deterding, D. (2003). An instrumental study of the monophthong vowels of Singapore English *. *English world-wide*, 1, 1-16.
- Deterding, D. (2007). *Singapore English*. Edinburgh University Press.
- Deterding, D., Wong, J., & Kirkpatrick, A. (2007). The pronunciation of Hong Kong English *. *English world-wide*, 2, 148-175. <https://doi.org/10.1075/eww.29.2.03det>
- Durie, M. (1985). A grammar of Acehnese on the basis of a dialect of north Aceh. 1-296.
- Hanafiah, M. A., & Makam, I. (1984). *Struktur Bahasa Aceh Aceh [Achenese Structure]*. Depdikbud.
- Hayward, K. (2000). *Experimental Phonetics*. Longman.
- Khattab, G. (2007). Variation in vowel production by English-Arabic bilinguals. *Laboratory phonology*.
- Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th Edition ed.). Cengage Learning.
- Masykar, T., Agusmaniza, R., Masykar, N. T., & Nurrahmi, F. (2021). An instrumental analysis of oral monophthongs in Aceh Barat dialect of Acehnese. *EduLite: Journal of English Education, Literature and Culture*, 6(2), To be published.
- Masykar, T., Almulhim, A., & Nurrahmi, F. (2021). Diphthongized Monophthongs of Acehnese Oral Vowels in Samatiga Dialect. *Journal of Language and Literature*, 21(2), Tobe published.

- McCloy, D. R. (2016). *Normalizing and plotting vowels with phonR 1.0.7*. Retrieved June 10 from <https://drammock.github.io/phonR/>
- Neel, A. T. (2008). Vowel Space Characteristics and Vowel Identification Accuracy. *J Speech Lang Hear Res*, 51(3), 574-585. [https://doi.org/10.1044/1092-4388\(2008/041\)](https://doi.org/10.1044/1092-4388(2008/041))
- Nilsson, J. (2009). Dialect change? *Nord J Linguist*, 32(2), 207-220. <https://doi.org/10.1017/S0332586509990047>
- Philippon, A. C., Cherryman, J., Vrij, A., & Bull, R. (2008). Why is my Voice so Easily Recognized in Identity Parades? Influence of First Impressions on Voice Identification. *Psychiatry, Psychology and Law*, 15(1), 70-77. <https://doi.org/10.1080/13218710701873999>
- Pillai, S., & Yusuf, Y. Q. (2012). An instrumental analysis of Acehese oral vowels. *Language and Linguistics*, 13, 1029-1050.
- Sharbawi, S. (2012). Revisiting the vowels of Brunei English. *World Englishes*, 31, 177-197. <https://doi.org/10.1111/j.1467-971X.2011.01725.x>
- Sulaiman, Budiman, Jusuf, H., Hanum, S., Cut Lani, R., & Ali, Z. (1977). *Struktur Bahasa Aceh (Lanjutan) [Acehnese Structure (Advanced)]*. Depdikbud.
- Sulaiman, Budiman, Yusuf, H., Hanoum, S., & Cut Lani, R. (1983). *Struktur Bahasa Aceh: Morfologi dan Sintaksis [Acehnese Structure: Morphology and Syntax]*. Depdikbud.
- Wildan. (2002). *Tata Bahasa Aceh*.
- Xu, Z., He, D., & Deterding, D. (2017). *Researching Chinese English: the State of the Art* (1st ed. 2017.. ed.). Cham : Springer International Publishing : Imprint: Springer.
- Yusuf, Q., & Pillai, S. (2013). An acoustic description of diphthongs in two varieties of acehnese. *Pertanika Journal of Social Science and Humanities*, 21, 153-158.
- Yusuf, Y. Q. (2013). *A Comparative Study of Vowels in the Acehese Language Spoken in Kedah, Malaysia and Aceh, Indonesia* [1-488].
- Yusuf, Y. Q., & Pillai, S. (2016). An instrumental study of oral vowels in the Kedah variety of Acehese. *Language Sciences*, 54, 14-25.
- Zulfadhli. (2015). *A Sociolinguistics Investigation of Acehese with a focus on West Acehese: a stigmatised dialect* [1-466].