

A prosodic analysis of emotional expressions in Langkat Malay speech

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ABSTRACT

Emotional prosody is the paralinguistic elements of language that interact with verbal content to express emotion. It also demonstrates the complex relationship between voice expression and emotional experience, highlighting the depth to which humans can express complex emotions beyond words. This qualitative study investigated the prosodic features associated with the emotional expression of anger in Langkat Malay speech. It focused on variations in pitch, loudness, and tempo among speakers from different socio-economic backgrounds. The aims are to explain how emotions are encoded in speech; and to highlight the influence of cultural and social contexts on emotional expression through prosody. This study employed a qualitative method. The data were collected from 40 native Langkat Malay speakers, divided evenly between individuals from the nobility and the general populace, encompassing a range of ages from 20 to 50 years. The samples were collected, processed, and analyzed using Praat software. The study then looked at the prosodic aspects of emotional speech in terms of its acoustic characteristics. The results showed that louder, faster tempos, and higher pitches are used to indicate anger. The study also found differences between the socioeconomic classes, with the nobles exhibiting more intense and intricate pitch contours in their angry reactions than the ordinary public. It can be concluded that within the Langkat Malay group, cultural and socioeconomic influences modulate prosodic aspects of emotional manifestation. This study is expected to disclose implications for speech therapy, language instruction, and the creation of emotionally intelligent artificial intelligence systems. It will also likely highlight the significance of taking cultural differences into account when studying emotional prosody.

Keywords: Cultural linguistics; emotional expression; Langkat Malay; prosody; socio-economic factors; speech analysis

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INTRODUCTION

Prosody covers speech characteristics such as pitch, pace, and intensity. It is essential for communicating emotions in a variety of languages and cultural contexts (Gao, 2023; Karimi-Boroujeni et al., 2023; Ross, 2023). The study of speech prosodic characteristics has made a substantial contribution to our knowledge of the expression and perception of emotions in spoken language (Ertürk et al., 2024). Some primary emotions, such as anger, have a specific way of showing up in speech. It can affect interpersonal communication, as well as computational applications like affective computing

and speech recognition (Al-Dujaili & Ebrahimi-Moghadam, 2023; Banse & Scherer, 2023).

According to some studies, anger speech frequently has a higher pitch, a louder voice, and a faster speaking tempo (Li & Huang, 2023; Nault et al., 2024; Rosenberg & Hirschberg, 2021). They can differ greatly depending on one's linguistic and cultural background. These prosodic elements are essential to improve AI systems' emotional intelligence in addition to helping human listeners interpret emotional states (Cohn et al., 2021; Erdemir et al., 2023; Rokhsaritalemi et al., 2023). Comprehension of these indicators contributes to the

progress of technologies concerning human-computer interaction, including interactive voice response systems and virtual assistants.

More precise exploration of these prosodic changes has been made possible by recent developments in speech analysis technology, which has enhanced models that capture the complex ways in which emotions shape speech patterns (Larrouy-Maestri et al., 2024). In addition to expanding our theoretical understanding of speech prosody, this research has applications in the fields of automated customer service, forensics, and psychotherapy (Kolekar et al., 2024).

Some studies on the prosodic aspects of speech have also revealed how different languages' acoustic cues can convey different emotional expressions, like anger. Pitch, loudness, length, and speech pace are some of these characteristics that are essential for successfully expressing various emotional states (Esposito & Gratton, 2022; Hashem et al., 2023; Rodero et al., 2022). In some other studies, emotions modify these prosodic traits considerably, not only in tonal languages such as Mandarin and Thai but also in Indo-European languages (Lau et al., 2022; Melnik-Leroy et al., 2022; Ross, 2023; Zhao & Zhang, 2023;).

There have not been significant numbers of studies on the prosodic features of Southeast Asian languages. One of the languages is Langkat Malay which is spoken by a sizable community in North Sumatra, Indonesia. Langkat Malay differs from other Malay dialects and Western languages since it has distinct prosodic characteristics due to its phonetic and phonological structure (Mujahidin et al., 2020). A study on Langkat Malay may offer an important viewpoint since it covers the understanding of how geographical differences within a language family impact emotional prosody. It can also provide insights into the auditory indicators of emotions in less-studied languages and contribute to the expanding corpus of research on cross-linguistic emotional expression (see Kolekar et al., 2024). Examining Langkat Malay may also help add a reference to the socioemotional environment of its speakers to reveal how cultural elements impact how emotions are expressed and perceived through speech (cf. Ivanova & Mikhaleva, 2022; see also Laukka & Elfenbein, 2021). Gaining an understanding of these dynamics is crucial to improving communication technology that is suited to a variety of linguistic contexts and creating more sophisticated voice recognition systems (Elfenbein et al., 2022; Kanwal et al., 2022;).

This study is based on the fields of prosodic phonology and emotion theory in linguistics (Mauchand & Pell, 2021; Ponsonnet, 2022). According to emotion theory in linguistics, speakers and listeners interpret certain language signals, such as prosody, in a systematic way to express and perceive emotional states. Prosodic phonology

theory explains the organization of prosodic components in speech (Ladd & Arvaniti 2023; Wade-Woolley et al., 2022). It consists of rhythms, stresses, and intonations. They convey speaker's purpose as well as emotional states in addition to grammatical information (Alsmadi et al., 2020; Gandhioke & Singh, 2023; Tomasello et al., 2022).

To explore the expression of emotions in Langkat Malay speech, this study employs Scherer's Component Process Model, which integrates these aspects by suggesting that emotions are the result of the evaluation of an event that triggers specific responses, observable through physiological, behavioral, and vocal means (Scherer, 2022). This model is particularly suited to examining how specific emotions like anger alter prosodic features to fulfill communicative intents.

This study selected Langkat Malay as its language environment based on several factors. First, the context of Langkat Malay may offer a fresh point of view on cross-linguistic theories of emotional expression. It is because the dialect is a variation of the Malay language that has received only little attention in the field of emotion-related prosodic studies involving the Malay language (Maharani, 2023). Furthermore, Langkat Malay is a dialect of Malay spoken by a community with a specific culture of the Malay realm. Thus, it may reveal new prosodic patterns that can be very different from those seen in languages that are researched more extensively. This may have wider ramifications for our comprehension of the cultural distinctiveness and universality of emotional speech expression (see Kolekar et al., 2024).

This study has a primary objective to investigate the prosodic expression of anger in Langkat Malay speech. It is to identify specific prosodic patterns associated with anger, including variations in pitch, volume, and tempo, within the linguistic context. By focusing on Langkat Malay, a less commonly studied language, this study tried to enrich the existing body of knowledge on emotional prosody; and to integrate these findings into broader linguistic models of emotional expression.

In addition to the primary objective, this study also aims to pursue more specific objectives. First, the prevalence and arrangement of prosodic traits that are mostly associated with the expression of anger in Langkat Malay were analyzed. Second, it looked at how these prosodic expressions of anger relate to different languages. Its goal is to assess the efficacy and perception of the emotional emotions they convey. Finally, the study examined if there are any distinctive, culturally specific prosodic patterns of emotions among Langkat Malay speakers. This might affect our understanding of how cultural factors affect how people verbally convey their feelings.

This study offers a novelty in terms of the languages it is studying, namely Langkat Malay.

From the list of studies of the Austronesian languages, especially in the case of prosodic studies, no study has specifically studied the rare dialect of Malay. The insights gained from addressing the aims and novelty could have implications for advancing speech technology applications, such as speech recognition systems and emotional artificial intelligence, by providing refined data on emotional prosody in a cross-cultural context.

METHOD

To investigate the prosodic characteristics linked to the emotional expressions in Langkat Malay speech, this study employed a qualitative methodology. The qualitative technique is thought to be useful for this kind of study as it enables a thorough analysis of the nuances and complexity present in human speech, particularly about emotional expression. In contrast, because quantitative approaches concentrate on numerical, measurable data, they may miss the subtleties of the relationship between prosody and emotion. The techniques employed clarify this relationship (Gasteiger et al., 2024; Zhang et al., 2022, pp. 798-813.).

The focus of the qualitative study is native Langkat Malay speakers' recorded speech samples. The recordings underwent a methodical analysis to determine the prosodic characteristics, such as pitch, loudness, tempo, and others, that indicate emotions. To assess these traits exactly and provide a thorough profile of anger-associated prosody in this language context, the study used modern audio-analytic technologies.

Contextual details about the speakers and their cultural backgrounds can also be included because of the qualitative technique. It is considered essential for deciphering the subtle emotional overtones in their speech patterns (Durmuş & Okyayuz, 2023; Truba et al., 2024). This methodological decision supports the goal of the study, which is to highlight the language and cultural aspects of emotional expression in Langkat Malay.

Participants

This study involved six participants. The selection of participants is based on a purposive nature for convenience in the study. They consisted of two socioeconomic groups in the Langkat Malay community. These two social classifications were used to provide a comprehensive analysis of prosodic variations. The first group consisted of three participants from the '*bangsawan*' (literally means Noble) Class. Historically, they have higher socio-economic status and cultural prestige in Malay society. Three other participants consist of the public representing socioeconomic demographics in general. This stratification is carried out so that this study was able to capture the possibility of the effect

of socioeconomic background on potential variations in emotional expressions through prosodies (cf. Ma, 2022).

Age is not the main variable in this study because this study does not try to examine the performance of prosodies in terms of age. However, the selection of participants in this activity also considers the age range of participants. Thus, the absence of this age variable can also be said to be one of the limitations of the study.

The participants range from ages 20 to 50 years. This range was chosen to ensure representation throughout the adult spectrum that can affect the performance of emotional and linguistic behavior. All participants are native speakers of the Langkat Malay dialect. They have lived in the Langkat Malay-speaking area for at least 15 years. The criterion was used to ensure the depth of cultural and linguistic mastery. The purposive sampling selection process by targeting these specific groups is very effective in qualitative research to uncover insights into the population subgroup. Each participant gives approval and understanding rights of confidentiality and voluntary participation.

Data Collection

The data collection process for this research was carefully arranged to capture the prosodic features of emotional expressions in Malay. The six speakers, which were evenly distributed between two socio-economic groups, nobles, and the general population, participated in the data collection phase. These groups are then categorized further by considering age. Three speakers are aged between 20 and 35 years, and three are aged between 36 and 55 years. This categorization is to ensure the representation of all young and old participants (cf. Huttenlauch et al., 2023).

Speech samples are collected through prepared dialogue (not spontaneous) and quasi-spontaneous. Participants were given a special narrative context and asked to express three different emotions: anger, sadness, and happiness.

- (1) For anger, the target expression is as follows.
Pedeh hati ambe ngeleh kelakuannya tang orang tua!
(It hurts my heart to see how they treat parents!)
- (2) For sadness, the phrase is as follows.
"Pereh kali atine, ia gugor dalam ngelakuka tugasnya."
(it is very sad that they failed in their duties.)
- (3) For happiness, the phrase used is as follows.
"Senang bena, amba mendengar kabarnya yo."
(I am happy to hear the news.)

This method is expected to ensure that each emotion can be analyzed to show prosodic features such as pitch, volume, and tempo. Expressions prepared have been designed in such a way as to allow speakers to control linguistic content. Thus, each prosodic variation is directly related to the

emotional state expressed. On the other hand, the quasi-spontaneous dialogue is designed to capture a more naturalistic speech pattern and give a richer data set for analysis. The recording session was conducted in an environment that was ruled out of its noise to ensure high-quality audio capture and free from noise that can affect acoustic analysis.

Analytical Tools and Procedures

Prosodic analysis of speech samples involves several stages. First, it began with the digitalization of audio recordings. All data was recorded using Sony WM-GX410 stereo cassette recording equipped with a microphone headset. The recording was then transferred to the digital format as sound waves using computer software, especially the Prika program (version 4.0.27), a widely recognized software for phonetic analysis in linguistic research. The first step in the analysis was the digitalization process. The audio cassette recordings were converted into digital sound wave files. This conversion is important for the next detailed acoustic analysis (Vogel & Morgan, 2009). The selected phrases that express anger, sadness, and happiness were isolated for more examination.

Following the digitalization step, the speech sample was analyzed by its acoustic features using Praat software. This analysis involves the measurement of the frequency and duration of each speech. The extracted measurement is then compiled into the database for comprehensive evaluation. In addition, the perception test was carried out on 40 respondents, who as participants, were divided evenly between the nobles and the public, to assess how prosodic cues were felt in various socioeconomic groups. This perception test involves a structured questionnaire that includes the emotional aspects of the recorded phrases. The procedures were expected to provide a healthy framework to understand the acoustic patterns associated with different emotional expressions in Langkat Malay speech, facilitating a nuanced interpretation of prosodic variation and its impact on emotional communication.

Data Processing

The data processing phase involved several careful steps to prepare a speech recording for detailed analysis. Initially, all data recorded was extracted and converted to WAV format for uniformity and ease of analysis. After the conversion, the data underwent segmentation into a single segment for each sound by using a text grid tool in the praat software, an important process for detailed phonetic and prosodic examination. After the segmentation, the data undergoes a tone and intonation manipulation, using the model from IPO (*Instituut Voor Perceptie Onderzoek*) for data manipulation. It allows a detailed study of prosodic elements. The results of this manipulation were then extracted into

a pitch-level representation for the right analysis of the contour and duration of the pitch.

To ensure the relevance and quality of speaking samples, screening tests were carried out. This test involves presenting original or not processed records to six informants who evaluate the clarity and suitability of the sample. This filtering is very important to choose the most representative greeting to be included in the research corpus. Corpus data is then given a code with a system that categorizes the emotional expression of each speech: '01' for anger, '02' for sadness, and '03' for happiness, followed by recording order numbers. For example, the code '0101' was assigned to the first recording to express anger.

FINDINGS AND DISCUSSION

This part presents the findings of a qualitative analysis of prosodic features in Langkat Malay speech that are associated with emotions. The study investigated the nuances of changing speed, pitch, and loudness to convey different emotions, particularly fury. The qualitative approach allowed for a detailed analysis of these prosodic elements and illuminated the cultural variations and universal traits of emotional expression in speech. The discussion is presented to reveal these findings in the context of the greater corpus on prosody and emotion. It also highlights any contradictions or evidence in favor of conventional linguistic theories.

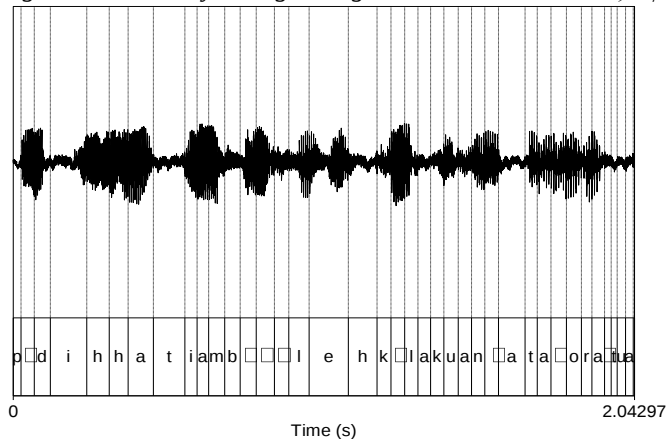
Data Presentation

In line with the aims of the study to identify specific prosodic patterns associated with anger, including variations in pitch, volume, and tempo, within the linguistic context, the six target sentences in the Langkat Malay language were processed. The processes were focused on anger, sadness, and happiness which can be traced from the six expressions. The first findings revealed distinct patterns that underscore both universal and unique characteristics. They can be presented in terms of pitch, loudness, and tempo. The features were identified as significant in conveying emotions. The complete recording of pitch, volume, and tempo can be seen in the appendix of this article.

The first feature, *pitch variations*, indicated the occurrence of an increase in pronunciation when the six participants expressed anger. In comparison to neutral speech, the average fundamental frequency (F0) in angry expressions can be considered higher. The graphical representations of pitch contours show sharp rises and falls as in Figure 1. They are typical markers of anger in prosodic studies. These patterns are consistent with findings from other linguistic studies where increased pitch is correlated with heightened emotional states (Bharadwaj & Acharjee, 2020; see also Mauchand & Pell, 2023).

Figure 1

Acoustic Signals and Text Grid Convey The Intonation of Angry Emotions by The Nobles, Pedeh Hati Ambe Ngeleh Kelakuannya Tang Orang Tua [s↔ad heart I s↔)ee/b↔ehaviour his t↔o pa↔rents]



In the sad expression, the pitch looks lower. However, there are some significant differences between the noble speakers and the common people. The common people tend to pronounce it flatly, compared to the nobles who have more dynamic rises and falls. The pitch contours of the nobles show rises and falls after a thick sound. It shows that the speakers tend to hold the expressions in some words.

Lastly, the happy expression shows a longer contour with less fall and rises. This finding shows an almost similar nature in both speaker-participant groups. Among the three categories of emotional expressions, happiness is an emotion with an almost similar nature in the prosodic features pronounced by all speakers.

The second feature, *loudness* level also varied significantly with the three expressions among the speaker-participants. The data show that the average intensity in decibels was higher for the expression of anger compared to the expression of sadness or happiness. Sadness, on average, is the lowest decibels. This increase in loudness in anger expression is in line with the general perception of anger as an intense emotion. Most cultures in the world tend to link anger with increased vocal effort and physiological arousal.

The next feature, *tempo*, shows that speech in angry expressions was faster than two other expressions. The duration of syllables was shorter, and the speech rate increased in the angry expression. The sad expression has the longest tempo among others. In this feature, there is no significant difference between the nobles and the ordinary people. This finding can be considered to support the hypothesis that emotional intensity can affect speech rate, with anger leading to quicker speech patterns (cf. Hashem et al., 2023; Patnaik, 2023).

After some findings that appeared to be in line with universal patterns of emotional prosody, this study also observed certain distinctions that are

specific to the Langkat Malay cultural context. For example, based on the findings, there are some possibilities that the degree of pitch elevation and the specific pitch contours associated with anger may be different slightly from those documented in other cultures (cf. Anikin et al., 2021; Hirst & de Looze, 2021). In Langkat Malay, anger expression tends to show more pronounced pitch fluctuations and a higher overall pitch range compared to sadness and happiness. It reveals that there may be a cultural modulation of prosodic features. In this case, anger is expressed with greater vocal intensity and variability. Conversely, expressions of sadness in Langkat Malay show a generally lower pitch and slower tempo as the main character. It may reflect a more subdued vocal pattern. Happiness, on the other hand, was expressed with a moderate increase in pitch and tempo. However, the expression did not show extreme variations compared to the anger expression.

The study also found significant differences between the prosodic features used by noble speakers and those used by ordinary people. Noble speakers tend to exhibit more complex and dynamic pitch contours when expressing anger. It often involved multiple rises and falls within a single utterance. This complexity may reflect a cultural norm within the nobility that encourages more elaborate and expressive speech patterns. In contrast, ordinary speakers displayed simpler pitch contours. Mostly, it was reflected in a single rise or fall. It indicates a more straightforward approach to emotional expression. These differences were less pronounced in expressions of sadness and happiness, where both groups showed similar prosodic patterns. However, the noble speakers still maintained a slightly more varied pitch contour.

The findings illustrate the complex correlation between linguistic norms and emotional expression that may appear in different cultural frameworks. The cultural specificity observed in Langkat Malay prosody highlights the importance of cultural

context to be considered in the study of emotional expression. They also show how cultural norms and social structures can shape not only the content of speech but also its emotional delivery.

Interpretation of Results

Based on the context of emotional linguistics and prosodic phonology as the frameworks, the results of the analysis of the expressions of anger, sadness, and happiness among Langkat Malay speakers highlight some important points. The prosodic patterns, especially in pitch contours and intensity levels, have shown that there are some correlations between linguistic structure and emotional expressions. The expressions are reflected in the linguistic features. However, to interpret further correlation with the surrounding social contexts, these analyses need further elaboration.

Pitch and Emotional Expression

The study found patterns of pitch contours that appeared with anger expression within the two social classes (the nobles and the ordinary people) respectively. Among the nobles, the prosodic expression of anger appeared with more complex pitch variations. The most common feature is a marked declination contour with multiple shifts in pitch level in the expression. For instance, the phrase "*Pedeh hati ambe ngeleh kelakuannya tang orang tua*" (It hurts my heart to see how they treat the elderly) is mostly pronounced with a triphasic pitch movement. Initially, the expression was pronounced with rising before sharp falling sharply. This pattern is in accordance with the findings in some other prosodic phonology studies. It can be concluded that the findings of the study emphasize the reflection of emotional intensity in the variability and range of pitch (Anikin, 2020; D'Onofrio & Eckert, 2021).

Among ordinary people, the expression of emotions through prosody was observed to be notably simpler. Specifically, the expression of anger was primarily characterized by a descending pitch contour. Compared to the nobles, who exhibited more complex and dynamic pitch variations, it suggests a more restrained vocal expression of anger. The ordinary people's simpler pitch contour shows a method that is less complicated and more straightforward in expressing anger. It might have its roots in cultural conventions that put an emphasis on humility and control of emotions. This is consistent with other studies that indicate socioeconomic class has a major impact on speech's ability to communicate emotions (Abdel-Hamid et al., 2020; Sun et al., 2020).

When comparing the expression of anger to that of sadness and happiness, distinct patterns emerge across different socio-economic groups. For example, sadness in both the nobility and general populace was marked by a lower pitch and slower tempo, reflecting a more subdued and melancholic

vocal pattern. However, even in sadness, noble speakers tended to have slight variations in pitch contours, adding a layer of vocal complexity that was less evident among the general populace. This difference suggests that while sadness is universally expressed as a low-energy emotion, the degree of vocal modulation can still vary depending on cultural and socio-economic factors.

Happiness, on the other hand, was expressed with an increase in pitch and tempo in both groups, but the patterns again varied. Noble speakers often displayed a rise-fall pattern, giving their expressions of happiness a rhythmic quality that may reflect cultural norms of eloquence and articulation. In contrast, the general populace exhibited a more straightforward rise in pitch and tempo, indicative of a more direct and less ornate form of expression. This comparison highlights how even positive emotions like happiness can be modulated by socio-economic status, with the nobility favoring more complex prosodic patterns and the general populace opting for simplicity.

These differences between noble speakers and ordinary people in expressing anger, sadness, and happiness underscore the intricate relationship between socio-economic status, cultural norms, and emotional prosody. Noble speakers, with their elaborate and dynamic pitch variations, reflect a cultural heritage that values expressive and articulate speech. On the other hand, the general populace, with their simpler and more restrained vocal patterns, may embody cultural norms that prioritize modesty and straightforwardness in communication. This variation within the same linguistic community highlights the need for a nuanced approach in studying emotional prosody, recognizing that socio-economic and cultural contexts significantly shape how emotions are vocally expressed.

Loudness and Speech Rate

The observation of loudness and speech rate between the groups was meant to add another dimension to the complexity of emotional expression in Langkat Malay. The nobles demonstrated greater variations in loudness. They often significantly increased the volume of the expression of anger, which contributed to a more overt and dynamic expression of the emotion. There is a possibility that it is a reflection of their cultural and social context: a more expressive and commanding vocal is more valued and expected. Loudness variation among the noble speakers has a tendency to emphasize the intensity of the emotional state. In other words, it is to align with cultural expectations of assertiveness and authority. In contrast, the general populace displayed more moderate changes in loudness, suggesting a more restrained approach to expressing anger. This restraint might be culturally ingrained, reflecting

societal norms that prioritize modesty and controlled expression in public and social interactions.

The groups also differed significantly in speech rate. In the expression of anger, noble speakers had a tendency to talk more quickly. When it was paired with their larger volume fluctuations, they produced a more urgent and dramatic vocal delivery. The speech's quick delivery might be intended to deliver a stronger sense of urgency and emotional arousal, which is in line with the social class's cultural standards for expressiveness and eloquence. On the other hand, ordinary people spoke at a more constant rate, even when they were angry. It might point to a cultural preference for calm and deliberate communication. This variation in speech rate demonstrates the effect of socioeconomic background on the speech rate and elevates the complexity of emotional expression.

Compared to the expression of anger, the expressions of sadness and happiness demonstrate other distinctions between the noble and the general populace speakers. For instance, the expression of sadness was typically conveyed with a slower speech rate and softer volume in both groups, but noble speakers still exhibited soft variations in loudness and tempo. The production added depth to their vocal expression. These nuances suggest that even in expressing a low-energy emotion like sadness, noble speakers may adhere to cultural norms that favor more elaborate and nuanced speech patterns. In the expression of sadness, the pitch and loudness among the noble speakers fluctuated slightly. The phenomena show that although they are still expressive, their delivery is regulated, in line with their culture's emphasis on speech articulation.

Happiness, while generally characterized by an increased speech rate and louder volume, also showed differences between the groups. Noble speakers often used rhythmic variation in loudness and tempo. Therefore, their expression of happiness sounds more dynamic and engaging. The pattern reflects a cultural value on expressive and articulate speech, even when they convey positive emotions. In contrast, ordinary people's expression of happiness was more straightforward. In addition, they also showed a consistent increase in speech rate and volume but less variation within the utterance. This indicates a simpler, more direct approach to emotional expression that aligns with cultural norms of modesty and straightforwardness. The consistent loudness and tempo in the general populace's expressions of happiness suggest uniformity and predictability in their vocal delivery, contrasting with the more varied and elaborate patterns of the nobility.

Clearly, the loudness and speech rate showed the complex correlation between socioeconomic status, cultural norms, and prosodic features in the expression of emotions. Noble speakers demonstrate

greater variations in loudness and faster speech rates, reflecting a cultural heritage that values expressive and dynamic vocal delivery. Not only does the intensity of emotions like anger, but the elaborated vocal style also aligns with social expectations of eloquence and sophistication. In contrast, the general populace's more moderate and consistent prosodic features suggest cultural norms that prioritize controlled and straightforward communication. Their restrained yet clear expression of emotions such as anger, sadness, and happiness illustrates a cultural preference for directness and simplicity.

Understanding the differences among members of the same language group emphasizes the importance of taking socioeconomic and cultural backgrounds into account in the study of emotional prosody. These elements influence the vocal representation of emotions and show the complex relationship between cultural norms, societal expectations, and personal vocal conduct.

Cultural Considerations in Prosodic Expression

The cultural implications of the findings are very important. They lead to the form of linguistic expressions in the norms and cultural values that are already ingrained. Langkat Malay, like many other Indonesian regional languages, realizes the specific cultural conventions that are reflected in its speakers. The difference observed in the emotional expression between the nobles and the general population highlighted the influence of this culture. For example, the use of Pitch is more dynamic and expressive for the nobles to convey anger. It can be associated with the expectations of the culture. This is in harmony with a broader understanding that sociocultural factors can affect emotions and speeches (Abdel-Hamid et al., 2020; Sun et al., 2020; Wang et al., 2021).

The differences are also indications of the use of prosodic features as more than speakers' linguistic tools but also cultural artifacts forming social meaning. The more controlled and consistent general vocal pattern of the general population reflects cultural norms that respect the simplicity and control of emotional expressions. This can be viewed as an indication of social preferences to maintain social harmony and avoid conflict, which are common values in many collectivist cultures (Hofstede, 2001). Therefore, prosodic differences between nobles and the general population are not only variations of style but also is rooted in cultural and social practices.

The findings can be examples of how cultural and social variables can affect the realization of emotional acoustic in speaking. It may also challenge the universality of certain prosodic features. For example, while the high notes and universal high tones are indicating anger, the level and way of this expression can vary significantly

throughout the culture. This shows that the theoretical model needs to explain the specificity of the cultural emotional prosody. The swinging integrates this cultural nuance, linguistic theories can offer a more accurate and holistic understanding of how emotions are secreted by speeches.

There can be a broader discourse about the universality of the specificity of emotional expressions in various languages and cultures. Some prosodic features may reflect emotions but they can also modulate cultural norms and specific social contexts. This duality highlighted the importance of cross-cultural studies of prosody and differences in emotional expressions. Such a study can reveal how cultural values and social structures form the emotional landscape of a language, and members of the insight of the interaction between language, culture, and emotions.

To sum up, the cultural implications of differences in emotional prosodies between nobles and the general population in Langkat Malay can be very deep. They highlight the need to consider norms and cultural values in the study of prosody and emotions since there are some potentials to apply new insights into practical domains such as education, therapy, and technology. By recognizing and collecting the dimensions of the culture of emotional expressions, researchers and practitioners can achieve a better understanding of human communication.

Other Implications

Based on the findings and the previous discussion, this study anticipates the possibilities of some important implications for psychological and linguistic studies. The differences in prosody, in loudness, pitch, and speech rate linked to angry expressions, emphasize the complex relationships among language, emotion, and culture. In general, there can be deeper discoveries of how emotions are experienced, verbally created, and interpreted in a variety of sociocultural contexts.

From the perspective of linguistics, identifying emotion and prosody patterns within a less-studied language group can add a new reference to the subject of prosodic phonology. Cultural and social factors may have a substantial impact on how emotions are expressed and perceived through prosodies. It challenges and expands upon previous models of intonation and emotional expression. It is possible that Langkat Malay speakers employ a distinct set of prosodic devices to communicate emotional nuances, different from those recorded in more extensively researched languages, based on the subtle variations in pitch and intensity levels that have been noticed. Linguists should look at socioeconomic and cultural factors closer after analyzing linguistic traits, particularly in less studied languages. This feature is essential to understanding linguistic models that are more complete and take

into account the variety of human language and communication relationships.

The study is also expected to provide psychological insight into the emotional intelligence of Langkat Malay speakers and listeners. It can be useful to comprehend the prosodic signals employed in this culture to convey emotions such as anger in order to better grasp the dynamics of interpersonal communication. For instance, the capacity to modify speech in a way that is appropriate for one's culture can have an impact on relationships, social interactions, and even power dynamics in the community.

The prosodic aspects of speech are also important to control emotions. Individual psychological health can be influenced by how they use language to communicate and manage their emotions (see Pennebaker et al., 2003). Mental health practitioners can better understand how emotions are transmitted in various cultural contexts by identifying certain prosodic patterns related to emotional expressions. This understanding is useful for sensitive psychological examination and therapy.

The understanding obtained from this study can also bring practical applications in education and clinical arrangements. In education, understanding the emotional prosody of local languages can improve teaching methods, especially in learning language and speech therapy. Speech educators and therapists can adjust their approach to meet the linguistic and cultural needs of their students, especially those from the Langkat Malay community.

From a clinical perspective, these findings may also increase the diagnostic accuracy of communication disorders. Speech-language pathologists can use knowledge about the patterns of typical and atypical emotional prosodies to further distinguish between different speech patterns, thus avoiding false diagnosis and more effectively targeting therapy.

In addition, the findings are attractive to the broader field of human-computer interaction and artificial intelligence. An advanced understanding of emotional prosodies can help the development of a more sophisticated and emotional awareness recognition system, which is sensitive to cultural variations in speaking. This can be very significant because technology increases human interaction, both locally and globally.

CONCLUSION AND SUGGESTION

This study has presented some insights into the prosodic expression of emotions within Langkat Malay speakers. Some points have shown that emotional conditions are communicated through variations in pitch, loudness, and tempo. In addition, the study also found that expressions of anger are characterized by elevated pitch and dynamic pitch

contours, with these expressions varying distinctly between different socio-economic groups. The findings are expected to contribute to understanding of the varying techniques to encode emotions in daily speeches. In the bargain, it is also expected to highlight the critical role of cultural context in linguistic studies.

Despite the expectations, the study also has some limitations. Thus, it is important to propose caution in the wider implementation and interpretation of the study's results. The relatively small number of participants may limit the generalizability of the findings across the wider Langkat Malay population of speakers. In addition, the focus on anger possibly will restrict the understanding of how other emotions are represented in Langkat-Malay prosodies. What is more, the acoustic measurements may have influenced the recording conditions. It potentially affects the analysis of prosodic features.

Overcoming the limitations, future studies can expand the scope of emotions to include a variety of emotions. Thus, they can provide a more comprehensive understanding of emotional prosodies in Langkat Malay as well as other Southeast Asian languages. The use of larger and more diverse samples is believed to be able to increase the representation and generalization of findings. In addition, the comparative study between Langkat Malay and Malay dialects or other languages will be very valuable to explore cross-linguistic and cross-cultural variations in emotional prosodies.

This study also offers some practical applications. In the field of language teaching, educators can develop a culturally informed curriculum that combines emotional prosodies to increase the communicative competence of Malay language students. Speech-language pathologists can take advantage of knowledge about the specific prosodic features of emotions to diagnose and treat talking disorders better, adjusting interventions to the norms of the Langkat Malay speakers. In addition, AI developers and speech technology can use understanding of emotional prosodies to increase the emotional sensitivity of virtual assistants and speaking systems, especially for the Malay-speaking community.

REFERENCES

- Abdel-Hamid, L., Shaker, N. H., & Emara, I. (2020). Analysis of linguistic and prosodic features of bilingual Arabic-English speakers for speech emotion recognition. *Ieee Access*, 8, 72957-72970. <https://doi.org/10.1109/ACCESS.2020.2987864>
- Al-Dujaili, M. J., & Ebrahimi-Moghadam, A. (2023). Speech emotion recognition: a comprehensive survey. *Wireless Personal Communications*, 129(4), 2525-2561. <https://doi.org/10.1007/s11277-023-10244-3>
- Alsmadi, K. A., Yunus, K., & Almadani, Y. (2020). The importance of intonation in the performance of different speech acts. *English Education: Jurnal Tadris Bahasa Inggris*, 13(2), 65-79. <https://ejournal.radenintan.ac.id/index.php/ENGEDU/article/view/7415>
- Anikin, A. (2020). The link between auditory salience and emotion intensity. *Cognition and Emotion*, 34(6), 1246-1259. <https://doi.org/10.1080/02699931.2020.1736992>
- Anikin, A., Pisanski, K., Massenet, M., & Reby, D. (2021). Harsh is large: nonlinear vocal phenomena lower voice pitch and exaggerate body size. *Proceedings of the Royal Society B*, 288(1954), 20210872.
- Banse, R., & Scherer, K. R. (1996). Acoustic profiles in vocal emotion expression. *Journal of personality and social psychology*, 70(3), 614-636. <https://doi.org/10.1037/0022-3514.70.3.614>
- Bharadwaj, S., & Acharjee, P. B. (2020, November). Analysis of Prosodic features for the degree of emotions of an Assamese Emotional Speech. In *2020 4th International Conference on Electronics, Communication and Aerospace Technology (ICECA)* (pp. 1441-1452). IEEE.
- Cohn, M., Predeck, K., Sarian, M., & Zellou, G. (2021). Prosodic alignment toward emotionally expressive speech: Comparing human and Alexa model talkers. *Speech Communication*, 135, 66-75. <https://doi.org/10.1016/j.specom.2021.10.003>
- D'Onofrio, A., & Eckert, P. (2021). Affect and iconicity in phonological variation. *Language in Society*, 50(1), 29-51. <https://doi.org/10.1017/S0047404520000871>
- Durmuş, H. E., & Okyayuz, Ş. (2023). An appraisal approach to emotion, culture and discourse in audio description. In M. Deckert, R. Zago, & P. Pezik (Eds.), *Language, expressivity and cognition* (p. 209). Bloomsbury Publishing.
- Elfenbein, H. A., Laukka, P., Althoff, J., Chui, W., Iraki, F. K., Rockstuhl, T., & Thingujam, N. S. (2022). What do we hear in the voice? An open-ended judgment study of emotional speech prosody. *Personality and Social Psychology Bulletin*, 48(7), 1087-1104. <https://doi.org/10.1177/01461672211029786>
- Erdemir, A., Liu, Y. Y., & Campos, M. J. (2023, June). Emotion explorers & zen: AI system and voice assistant for exploring emotions and cultivating compassion. In *Proceedings of the 22nd Annual ACM Interaction Design*

- and Children Conference (pp. 444-448). ACM Digital Library.
- Ertürk, A., Gürses, E., & Kulak Kayıkcı, M. E. (2024). Sex related differences in the perception and production of emotional prosody in adults. *Psychological Research*, 88(2), 449-457. <https://doi.org/10.1007/s00426-023-01865-1>
- Esposito, L., & Gratton, C. (2022). Prosody and ideologies of embodiment: Variation in the use of pitch and articulation rate among fitness instructors. *Language in Society*, 51(2), 211-236. <https://doi.org/10.1017/S0047404520000809>
- Gandhioke, S., & Singh, C. (2023). Learner awareness of the “music” of spoken english—focus on intonation—and its impact on communicative competence. is intonation teachable and learnable? *Creative Education*, 14(3), 454-468. <https://doi.org/10.4236/ce.2023.143031>
- Gao, F. (2023). Getting the message in ‘Sound’ across at conference interpreting: a case study on rendering prosodic emphasis. *Perspectives*, 31(6), 1033-1048. <https://doi.org/10.1080/0907676X.2022.2117636>
- Gasteiger, N., Lim, J., Hellou, M., MacDonald, B. A., & Ahn, H. S. (2024). A scoping review of the literature on prosodic elements related to emotional speech in human-robot interaction. *International Journal of Social Robotics*, 16(4), 659-670. <https://doi.org/10.1007/s12369-022-00913-x>
- Hashem, A., Arif, M., & Alghamdi, M. (2023). Speech emotion recognition approaches: A systematic review. *Speech Communication*, 154, 102974. <https://doi.org/10.1016/j.specom.2023.102974>
- Hirst, D. J., & de Looze, C. (2021). Measuring Speech. Fundamental frequency and pitch. In R. Knight & J. Setter (Eds.), *Cambridge handbook of Phonetics* (pp. 336-361). Cambridge University Press.
- Huttenlauch, C., Hansen, M., de Beer, C., Hanne, S., & Wartenburger, I. (2023). Age effects on linguistic prosody in coordinates produced to varying interlocutors: Comparison of younger and older speakers. In F. Schubö, S. Zerbian, & S. Sandra (Eds.), *Prosodic boundary phenomena* (pp. 157-192). Language Science Press.
- Ivanova, Y. E., & Mikhaleva, E. I. (2022). The role of prosody in expressing culture-specific speech behaviour of language teachers in English. *TLC Journal*, 6(1), 49-59. <https://doi.org/10.22363/2521-442X-2022-6-1-49-59>
- Kanwal, S., Asghar, S., Hussain, A., & Rafique, A. (2022). Identifying the evidence of speech emotional dialects using artificial intelligence: A cross-cultural study. *Plos one*, 17(3), e0265199. <https://doi.org/10.1371/journal.pone.0265199>
- Karimi-Boroujeni, M., Dajani, H. R., & Giguère, C. (2023). Perception of prosody in hearing-impaired individuals and users of hearing assistive devices: An overview of recent advances. *Journal of Speech, Language, and Hearing Research*, 66(2), 775-789. https://doi.org/10.1044/2022_JSLHR-22-00125
- Kolekar, S. S., Richter, D. J., & Bappi, M. I. (2024). Advancing AI voice synthesis: Integrating emotional expression in multi-speaker voice generation. In *2024 International Conference on Artificial Intelligence in Information and Communication (ICAIIIC)*. IEEE.
- Ladd, D. R., & Arvaniti, A. (2023). Prosodic prominence across languages. *Annual Review of Linguistics*, 9(1), 171-193. <https://doi.org/10.1146/annurev-linguistics-031120-101954>
- Larrouy-Maestri, P., Poeppel, D., & Pell, M. D. (2024). The sound of emotional prosody: Nearly 3 decades of research and future directions. *Perspectives on Psychological Science*, 17456916231217722. <https://doi.org/10.1177/17456916231217722>
- Lau, J. C., Patel, S., Kang, X., Nayar, K., Martin, G. E., Choy, J., ... & Losh, M. (2022). Cross-linguistic patterns of speech prosodic differences in autism: A machine learning study. *PloS one*, 17(6), e0269637. <https://doi.org/10.1371/journal.pone.0269637>
- Laukka, P., & Elfenbein, H. A. (2021). Cross-cultural emotion recognition and in-group advantage in vocal expression: A meta-analysis. *Emotion Review*, 13(1), 3-11. <https://doi.org/10.1177/1754073919897295>
- Li, J., & Huang, C. R. (2023). Investigating acoustic cues of emotional valence in Mandarin speech prosody-A Corpus approach. In *Workshop on Chinese Lexical Semantics* (pp. 316-330). Springer Nature Singapore.
- Ma, W., Zhou, P., & Thompson, W. F. (2022). Children’s decoding of emotional prosody in four languages. *Emotion*, 22(1), 198-212. <https://doi.org/10.1037/emo0001054>
- Maharani, M. H. (2023). Volitive interjections in Langkat Malay. *IJOTL-TL: Indonesian Journal of Language Teaching and Linguistics*, 8(3), 202-211. <https://ijotl-tl.solocls.org/index.php/ijotl/article/view/758>
- Mauchand, M., & Pell, M. D. (2021). Emotivity in the voice: prosodic, lexical, and cultural appraisal of complaining speech. *Frontiers in Psychology*, 11, 619222. <https://doi.org/10.3389/fpsyg.2020.619222>

- Mauchand, M., & Pell, M. D. (2023). Complain like you mean it! How prosody conveys suffering even about innocuous events. *Brain and Language*, 244, 105305. <https://doi.org/10.1016/j.bandl.2023.105305>
- Melnik-Leroy, G. A., Bernatavičienė, J., Korvel, G., Navickas, G., Tamulevičius, G., & Treigys, P. (2022). An overview of Lithuanian intonation: a linguistic and modelling perspective. *Informatica*, 33(4), 795-832. <https://doi.org/10.15388/22-INFOR502>
- Mujahiddin, M., Triadi, R., & Chairunnisa, C. (2020, November). The existence of Malay language in the flow of modernization in Medan city. In *Proceeding International Conference on Language and Literature (IC2LC)* (pp. 229-234). Universitas Muhammadiyah Sumatera Utara.
- Nault, D. R., Bonar, R. J., Ilyaz, E., Dirks, M. A., & Morningstar, M. (2024). Fast and friendly: The role of vocal cues in adolescents' responses to and perceptions of peer provocation. *Journal of Research on Adolescence*, 00, 1-15. <https://doi.org/10.1111/jora.12992>
- Patnaik, S. (2023). Speech emotion recognition by using complex MFCC and deep sequential model. *Multimedia Tools and Applications*, 82, 11897-11922. <https://doi.org/10.1007/s11042-022-13725-y>
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual review of psychology*, 54(1), 547-577. <https://doi.org/10.1146/annurev.psych.54.101601.145041>
- Ponsonnet, M. (2022). 49 Emotional linguistic relativity and cross-cultural research. In G. L. Schiewer, J. Altarriba, & B. C. Ng (Eds.), *Language and emotion volume 2* (pp. 1031-1061). De Gruyter Mouton.
- Rodero, E., Larrea, O., Rodríguez-de-Dios, I., & Lucas, I. (2022). The expressive balance effect: perception and physiological responses of prosody and gestures. *Journal of language and social psychology*, 41(6), 659-684. <https://doi.org/10.1177/0261927X221078317>
- Rokhsaritalemi, S., Sadeghi-Niaraki, A., & Choi, S. M. (2023). Exploring emotion analysis using artificial intelligence, geospatial information systems, and extended reality for urban services. *IEEE Access*, 11, 92478-92495. <https://doi.org/10.1109/ACCESS.2023.3307639>
- Rosenberg, A., & Hirschberg, J. (2021). Prosodic aspects of the attractive voice. In B. Weiss, J. Trouvain, M. Barkat-Defradas, & J. J. Ohala (Eds.), *Voice attractiveness. Prosody, phonology and phonetics* (pp. 17-40). Springer. https://doi.org/10.1007/978-981-15-6627-1_2
- Ross, E. D. (2023). Affective prosody and its impact on the neurology of language, depression, memory and emotions. *Brain Sciences*, 13(11), 1572. <https://doi.org/10.3390/brainsci13111572>
- Scherer, K. R. (2022). Theory convergence in emotion science is timely and realistic. *Cognition and Emotion*, 36(2), 154-170. <https://doi.org/10.1080/02699931.2021.1973378>
- Sun, J., Schwartz, H. A., Son, Y., Kern, M. L., & Vazire, S. (2020). The language of well-being: Tracking fluctuations in emotion experience through everyday speech. *Journal of Personality and Social Psychology*, 118(2), 364-387. <https://doi.org/10.1037/pspp0000244>
- Tomasello, R., Grisoni, L., Boux, I., Sammler, D., & Pulvermüller, F. (2022). Instantaneous neural processing of communicative functions conveyed by speech prosody. *Cerebral cortex*, 32(21), 4885-4901. <https://doi.org/10.1093/cercor/bhab522>
- Truba, H., Khrapatyi, S., Harashchuk, K., Shvets, D., & Proskurnia, A. (2024). Psycholinguistic underpinnings of image formation: Suggestion and manipulation in the educational network discourse. *Thinking Skills and Creativity*, 52, 101496. <https://doi.org/10.1016/j.tsc.2024.101496>
- Vogel, A. P., & Morgan, A. T. (2009). Factors affecting the quality of sound recording for speech and voice analysis. *International journal of speech-language pathology*, 11(6), 431-437. <https://doi.org/10.3109/17549500902822189>
- Wade-Woolley, L., Wood, C., Chan, J., & Weidman, S. (2022). Prosodic competence as the missing component of reading processes across languages: Theory, evidence and future research. *Scientific Studies of Reading*, 26(2), 165-181. <https://doi.org/10.1080/10888438.2021.1995390>
- Wang, H., Peng, A., & Patterson, M. M. (2021). The roles of class social climate, language mindset, and emotions in predicting willingness to communicate in a foreign language. *System*, 99, 102529. <https://doi.org/10.1016/j.system.2021.102529>
- Zhang, M., Xu, S., Chen, Y., Lin, Y., Ding, H., & Zhang, Y. (2022). Recognition of affective prosody in autism spectrum conditions: A systematic review and meta-analysis. *Autism*, 26(4), 798-813. <https://doi.org/10.1177/1362361321995725>