AL-LISAN: JURNAL BAHASA
Publisher: LPPM IAIN Sultan Amai Gorontalo
ISSN: 2442-8965 E-ISSN: 2442-8973
Volume 10, No. 1 February 2025
Journal Homepage: https://journal.iaingorontalo.ac.id/index.php/al

Diagnosing Consonant Clusters in Gorontalo Language: Revitalization of a Regional Language in Tomini Bay

[1]Rahman Taufiqrianto Dako
(Corresponding Author)
rmtdako@ung.ac.id
English Language Education Study Programme, Faculty of Letters and Culture, Universitas Negeri Gorontalo, Indonesia

[2]Harto S. Malik
malik@ung.ac.id
English Language Education Study Programme, Faculty of Letters and Culture, Universitas Negeri Gorontalo, Indonesia

[3]Dakia N. Djou
dakiadjou@ung.ac.id
Indonesian Language and Literature Education Study Programme, Faculty of Letters and Culture, Universitas Negeri Gorontalo, Indonesia

ABSTRACT

Background: The term "diagnosis" is used in this study to reflect the careful and systematic approach needed to investigate the phonological features of Gorontalo Language (GL). This research study investigates the consonant clusters of the GL covering the phonetic, phonological, and phonotactic approaches focusing on the sounds of /mb/, /nt/, and /ngg/.

Aims: The research aims to clarify whether these sounds are single consonant or consonant clusters, contributing to both linguistic theory and the revitalization efforts for the GL in the Tomini Bay region.

Methods: The qualitative methodology utilized in this research is an analytical method associated with simultaneous data collection and analysis. The study assesses the phonological characteristics of GL with an emphasis on consonant clusters using a thorough literature analysis and real-world sources, including social media and interviews. A comprehensive description of GL's sound system can be obtained by applying phonetical, phonological, and phonotactical analyses of sound, phoneme, and syllable structures.

Results: Based on Gorontalo's phonetics, phonology, and phonotactics rules, the sounds /mb/, /nt/, and /ngg/ function as consonant clusters rather than a single consonant. Each sound in /mb/, /nt/, and /ngg/ is created uniquely, according to phonetic, phonological, and phonotactical analysis verifies that they function as independent phonemes that alter the meaning of words. Additionally, their classification as consonant clusters rather than a single consonant is supported by Gorontalo's phonotactic rules, which forbid consonants at syllable endings.

Implications: These clusters can find utility within educational resources, thereby reinforcing linguistic sustainability. This work contributes not only to linguistic knowledge regarding Gorontalo phonetical, phonological, and phonotactic but also has applications to inform the design of revitalization programs for endangered languages.

Keywords: Consonant clusters; Gorontalo language; revitalization; Tomini Bay Region

Article Info:
Received: 21 November 2024
Accepted: 25 February 2025
Published: 28 February 2025
How to cite:
Dako, R., T., Malik, H., S., Djou, D., N. (2025). Diagnosing Consonant Clusters in Gorontalo Language: Revitalization of a Regional Language in Tomini Bay**.** *Al-Lisan: Jurnal Bahasa (e-Journal),10*(1), 131-145. https://doi.org/10.30603/al.v10i1.5688

1. INTRODUCTION

Every language has its own grammatical structures, and one of the things that sets each language different is its phonology (Nafilah et al., 2019). The Gorontalo Language (henceforth abbreviated as GL), which is spoken by the Gorontalo community in the Tomini Bay area, generally has a special feature, namely having a vocalic feature, which a word cannot end in a consonant, whose vowel must end (Badudu, 1982); (Pateda, 2003). This characteristic raises an interesting question about consonant clusters in GL in contrast to so many languages that use consonants in a word-final position (Jubran AL-Mamri, 2021). Proposed sound patterning prevents Gorontalo phonology from allowing some sounds at the end of a word ultimately having a large impact on how consonant clusters are treated and pronounced, particularly those derived from loanwords. Therefore, knowing the phonotactic limitations in Gorontalo is essential to recognising and articulating consonant clusters in the Gorontalo language (Dako, 2023).

Pateda, who describes the vocalic character of GL phonology, notes that Gorontalo typically takes the position of treating consonant clusters such as /mb/, /nt/, and /ngg/ as single phonemes even though those clusters have complex articulatory compositions. As he has shown, these clusters violate the syllabic constraints of Gorontalo, where each syllable must break, meaning that consonants are limited to syllable-final positions. This structural restriction demands that foreign lexicons in Gorontalo conform to abiding by the vocalic law by inserting vowels to accommodate the linguistic phonotactics of the language (Pateda, 1981; Pateda, 1994). The clusters with the sounds / r /, / c /, / s /, and / j / occur in Gorontalo as foreign phoneme variations. These clusters add variety to the phonological side (Badudu, 1982; Pateda, 1994). These results suggest that these clusters may instead behave as consonant clusters instead of single consonants, which makes sense given the proposed phonological nature of Gorontalo and warrants more in-depth phonological investigation to confirm their statuses as single consonant clusters in Gorontalo.

1.1 Research Gap and Novelty

Consonant clusters are defined as several consonants articulated in a row (without vowels between them) (Mayr et al., 2015; Setyadi, 2019; Ekarina, 2022), like in an Indonesian word /pr/ in praktik (practice). While consonant series consists of sequences of neighbouring consonants across syllable boundaries (Setyadi, 2019; Bety, 2021), such as /bd/ in "*sab.da"* or /ht/ in "*tah.ta"* in Indonesian words. Such a distinction is particularly important in phonotactic and syllable structure studies of a given language.

The occurrence of such kind in Gorontalo needs to be assumed theoretically and empirically checked. Consonantal phonemes might occur as /mb/, /nt/, and /ngg/, for example, functioning as clusters and not a single unique consonant as in some other languages. Such as, the phonotactic distinction between clusters and singular phonemes is more pronounced in Gorontalo when compared to other languages, such as Javanese, where dialectal variation also shows a preference for complex consonant articulations (Rachmawati & Diharti, 2022), consonant clusters also found in Betawi and Indonesian (Nafilah et al., 2019); in Yemeni Arabic in initial, middle, and final position (Jubran AL-Mamri, 2021). All of these provide evidence to hypothesize that Gorontalo, like many other languages, which up until this point were assumed to have phonemic clusters, such as Javanese, Betawi, Indonesian, and Yemeni Arabic, possess sequences of consonants, which may act as clusters.

The comparison of GL with other languages, such as Javanese, Betawi and Arabic, would be a very appropriate choice because GL is also a language with complex consonant clusters. Still, it is processed by a proper phonological system, which makes other languages so complex in phonology. In Javanese, clusters such as /mb/ are regarded as consonant cluster (Rachmawati & Diharti, 2022), Betawi adapts the phonotactic rules to its loanwords (Nafilah et al., 2019), and Yemeni Arabic which introduces more complex clusters at different positions of the words (Jubran AL-Mamri, 2021). Such comparisons are useful in determining which patterns of cluster treatment are generalizable across languages and which are language-specific. To strengthen claims that GL treats /mb/, /nt/, and /ngg/ as consonant clusters, empirical evidence such as phonetics, phonology, and phonotactic analysis and native speaker perception tests are essential.

Studies in other languages have demonstrated that consonant cluster adaptation often leads to a transformation in pronunciation, structure, and even meaning, influenced by native language constraints. Rungruang found similar adaptation challenges among Thai speakers acquiring English, where the lack of familiarity with clusters led to pronunciation shifts (Rungruang, 2017). For Gorontalo, examining these cluster adaptations provides insights into how phonological and phonotactic pressures shape language evolution.

The term "*diagnoses*" is used with caution throughout this research. Some scholars, such as Badudu and Pateda, view these sounds as single phonemes despite being represented by two or three letters (Badudu, 1982; Pateda, 1991; Pateda, 1994). Conversely, other researchers, including Rachmawati and Diharti, posit that these sounds may be classified as consonant clusters (Rachmawati & Diharti, 2022). Just as "*a doctor diagnoses an ailment*", in linguistics, *diagnosing* means finding out where the problems are and looking for patterns in a language. Phonologists use this approach to examine sound patterns, like consonant clusters, pronunciation differences, or phonological changes, with the goal of understanding the "health" of a language, including challenges such as extinction or pressure from dominant or prestige languages. This best practice overcomes phonological disorders, e.g. position consonant clusters (Gorontalo due to Indonesian influence e.g. /mb/, /nt/, /ngg/), provides a valuable diagnosis in the context of both threats (e.g. speaker numbers drop or loss of native features) and language revitalization.

This approach is supported by linguistic theories, such as *language variation and change* (Labov, 2010), which focuses on phonological variations across time; *Generative Phonology* (Chomsky & Halle, 1968), which emphasizes sound pattern analysis; and *Language Revitalization Theory* (Fishman, 1991), which highlights the need to identify the factors of language endangerment to build preservation strategies. In practice, diagnosing phonological issues involves the identification of specific problems (e.g., clusters in Gorontalo), analysis of native speaker data, and the proposal of strategies for remediation (e.g., documentation or teaching programs). Overall, the diagnostic approach is critical for understanding phonological processes in general and developing strategies for the conservation of endangered languages such as GL.

These phonetic and phonological structures, therefore, additionally underscore the necessity of revitalizing the GL. Those in charge of revitalization should be aware of the detailed phonological rules that dictate the language so that materials can be created that are consistent with native phonotactics. Harminsyah states that language revitalisation can be more successful if undertaken in terms of both form and function, which would allow a language to be revived through phonologically transparent models whilst also being highly accessible (Harminsyah, 2017). The GL is confronted with the problem of younger generations showing a preference for Bahasa Indonesia instead of their native language, revealing an urgent necessity for language preservation. Hulukati et al., Rahardini & Niswah

mention the Gorontalo language decline in the children and adolescent community, which is caused by the child/adolescents themselves who are less interested in using their native language assertively, and they choose to take a step back when it comes to developing linguistics confidence, which consequently will affect the Gorontalo language acquaintance as well (Hulukati et al., 2017); (Rahardini & Niswah, 2022). Some revitalization should utilize the specific phonology of Gorontalo and promote its use through education and community.

So, the novelty of this study is to diagnose the phonological status of /mb/, /nt/, and/ngg/at the end of In Gorontalo. This study, through a phonetic, phonological, and phonotactic analysis of these sounds, seeks to place them as single phonemes versus constraining them as consonant clusters. This classification entails repercussions that have wide-reaching significance for linguistics theory and the practical conservation of languages. The findings of this investigation also align with the broader GL revitalization efforts, providing information on the phonological rules of this critical GL that will assist in developing language learning resources and revitalization programs in the Tomini Bay area.

1.2 Research Question

As can be seen from the description above, this is made so that the sounds //mb, nt, and ngg// fall into two categories, first as a consonant, and second, consonant clusters. To sum up, the research question can be represented like this: Are /mb, nt/, and /ngg/ one consonant or, consonant cluster?

2. METHODS

2.1 Research Design

The qualitative methodology utilized in this research is an analytical method associated with simultaneous data collection and analysis. According to Mahsun, one of the characteristics of qualitative research is the problem that the research object is described (Mahsun, 2005). Here the object is the GL, the phonetic and phonological aspects of it. These factors are very important for identifying the location of consonant sounds and consonant clusters in GL. Phonetic characteristics under investigation: sounds, such as /mb/, /nt/, and /ngg/, which may behave as consonants or as parts of larger consonant clusters. These characteristics are instrumental in diagnosis because they guide the revitalization efforts to be more effective in the Tomini Bay area, and the outputs from this diagnosis provide more details of the GL phonetics and phonological and phonotactic processes.

2.2 Research Subjects

To gather accurate phonetic data, the study used three selective native speakers of GL. These speakers are stratified based on age, geographical region, and language exposure, ensuring a representative sample of the Gorontalo-speaking population in Table 1. The goal of classification is to capture potential variations in the use of consonant clusters across different demographic groups.

Table 1 The Classification of the Three Native Speakers of GL Based on Geographical Region and Language Exposure

No	Age	Geographical Region	Language Exposure	Description
1	Young (18-30)	Urban (Gorontalo City)	Dominant Indonesian, limited exposure to GL	Represent the younger generation in urban areas with limited exposure to GL.
2	Adult (31-50)	Rural (Bone Bolango Regency)	Dominant GL, minimal exposure to other languages	Represent the adult group in rural areas with strong usage of GL.

No	Age	Geographical Region	Language Exposure	Description
3	Elderly (51+)	Coastal (Boalemo Regency)	GL with exposure to other regional languages	Represent the older generation in coastal areas with influence from neighbouring regional languages.

2.3 Research Procedures

In studying the phonological characteristics of GL, two key points are to be highlighted in the data collection process. Step 1: Survey of Literature—this step examines available literature (including dictionaries, journal articles, and locally published writings) regarding foundational aspects of GL phonology, any attested specialisations such as consonant clusters, and possible phonetic patterns. The implications of this systematic review are to provide a logical framework and identify gaps in research. Step 2: Collect real-life data from social media platforms (e.g., YouTube, Facebook) and local publications (e.g., newspapers, bulletins) to capture GL usage in informal and everyday contexts. Through natural science conversations, videos and texts, researchers have noted that pronunciation variations are based on the so-called social-geographic or generations-influenced factor. Integrating these two steps — literature review and real-life data provides extensive information on GL phonology, connecting theoretical with practical knowledge for a complete image of the sound of a language.

2.4 Research Instruments

The primary data collection method involves recording interviews with native speakers. These recordings focus on specific words containing the target consonant clusters. Words and sentences are chosen to illustrate the sounds /mb/, /nt/, and /ngg/ in various positions within words (e.g., initial, medial). In addition to interviews, the study employs observational methods during conversations to capture natural language use in different social settings.

Table 2 The List of Questions for Native Speakers

Analysis	Questions		
	Structured	**Observation**	**Additional**
Phonetics	1. Can you clearly and naturally pronounce the following words? e.g, /mb/: /mbele'o/ /nt/: /ntali/ /ngg/: /bunggu/ 2. Are there any differences in pronouncing these words when spoken quickly or in relaxed situations?	1. Can you share a daily experience or short story using words that contain /mb/, /nt/, or /ngg/? 2. Does the pronunciation of these words change depending on the situation (e.g., formal vs. informal)?	1. Do you feel there is an influence from other languages (e.g., Indonesian) on the pronunciation of /mb/, /nt/, or /ngg/? 2. If yes, how does it influence them?
Phonological	1. Do you notice any differences in pronouncing /mb/, /nt/, or /ngg/ when they appear at the beginning of a word (initial position) compared to the middle (medial position)? 2. Are there any words with these clusters that are harder to pronounce?	1. Have you noticed any variations in pronouncing /mb/, /nt/, or /ngg/ among speakers from different regions or generations? 2. If yes, can you explain the differences?	1. Are there any words with these clusters that are considered old-fashioned or no longer used? 2. If yes, what are those words, and why are they rarely used?
Phonotactic	1. Are words /mb/, /nt/, or /ngg/ commonly used in everyday conversations?	1. Are there any words with these clusters that are considered unusual or	1. Are there words with these clusters that are often shortened or

2. Are there specific words that are considered more formal or informal because they contain these clusters?	rarely used in Gorontalo? 2. Do loanwords from other languages (e.g., Indonesian) influence how these clusters are pronounced or used?	modified in everyday conversations? 2. If yes, how do these changes occur?

The purpose of these questions is to collect information on the pronunciation of the consonant clusters /mb/, /nt/, and /ngg/ in different situations and placements. They Also to seek to investigate how social, regional, and generation factors affect pronunciation variations.

2.5 Data Analysis

Phonetic analysis refers to the analysis of the way speech sounds are produced and articulated by the human vocal tract during data analysis. This approach has a more detailed view of the study of sound production, from vibration of the vocal folds to movement of the tongue, lips, and other parts of the mouth. It then concentrates on the notion of clusters, where particular sounds (mostly consonants) combine to create new clusters. It could reveal the acoustic properties of each of the individual sounds through phonetic analysis of where they work together and how they work together. So, basically, phonetics is the study of the sounds that humans make; phonetics enables us to investigate how humans can produce these sounds and how we might classify these sounds according to various features that depend on the vocal tract that we each use to produce these speech sounds.

Phonologically, it deals with whether the consonant clusters are separate phonemes or single units. Minimal pair analysis is used to determine whether substituting one sounding a cluster makes a difference in word meaning, thus verifying that unique phonemes exist. More formally, in GL, a minimal pair such as ”*manggo”* (cup) *"banggo"* (sword) demonstrates that the two sounds /m/ and /b/ contrast with each other, suggesting that /mb/ is a cluster of two phonemes and not one.

Syllable structure is an important concept in phonotactics. It is used in the analysis of the syllable structure of language GL to find out how sounds combine, especially in terms of consonant clusters. The objective is to examine the syllable structure and determine whether there are restrictions on the consonant-vowel combinations associated with GL, as well as the nature of variation in consonant cluster pronunciation among speakers.

3. FINDINGS AND DISCUSSION

3.1 Findings

Sounds /mb, nt, and ngg/ are written with two letters but consider only one phoneme (consonant) (Badudu, 1982; Pateda, 1994). This assumption encourages the authors to explore these sounds even more. A comparative study is taken with the Surabaya Javanese dialect, a cluster of two or three symbols, such as /mb/ and /nt/, is treated as a consonant cluster (Rachmawati & Diharti, 2022). Such an assumption calls for a diagnostic test to see whether /mb, nt, and ngg/ behave as consonant clusters, with three-way analysis: *phonetic, phonological, and phonotactic*.

The Consonant Cluster /mb/

Phonemes /m/ and /differ from one another in their phonetic, phonological, and phototactically relevant properties.

Phonetic Analysis

Phonetically, /m/ and /b/ are distinct sounds in table 3 below.

Table 3 The Speech Organ and How to Produce /m/, and /b/

Sound	The speech organ and how to produce
/m/	a bilabial nasal consonant, produced by closing the lips and directing airflow through the nose. It involves a nasal airflow without any release burst.
/b/	a voiced bilabial plosive, created by closing the lips, holding the air briefly, then releasing it in a burst. It involves an oral airflow stop followed by a burst upon release.

Nasal and plosive sounds are, articulation-wise, easily distinguishable, and hence, there can be no merger of the two into one sound or phoneme. This means that they are articulated in two different ways, which shows that /mb/ is a consonant cluster (two phonemes).

Phonological Analysis

Phonemic distinctions in phonology are usually determined by contrast in meaning. If two sounds can differentiate words, they are considered different phonemes. In Table 4, /m/and /b/ in /mb/are different phonemes. There are a few reasons why /m/ and /b/ in /mb/ should be treated as different phonemes.

Table 4 The Distinct Phonemes /m/, and /b/

Word	vs	Word	Sound	
maama (mother)		Paapa (father)	/m/	/p/
manggo (bowl)		*banggo* (sword)	/m/	/b/
womu (shame)		*wonu* (dew)	/m/	/n/
Bala (fence)		*Tala (wrong)*	/b/	/t/
Buhu (name of one type of tree)		*Duhu (blood)*	/b/	/d/
Baka (eternal)		*Kaka (brother)*	/b/	/k/

These examples show that /m/ and /b/ are two different words and are two distinct phonemes. If /mb/ counted as one phoneme, we would be losing the contrast of /m/ and /b/ and that is not the phonological fact of the matter. Phoneme (where each sound or /m/ and /b/ can occupy space as its own phoneme, demonstrating that it not a single phoneme).

Phonotactic Analysis

In phonotactics, a consonant cluster is a sequence of two or more consonants in a syllable. Within the patterns of phonotactics that permit such structures, /mb/ is a consonant cluster. More specifically, multidimensional representations have high dimensionality because consonant clusters in syllable structure usually consist of two or more phonemes which are preserved as separate units. As an example, in Gorontalo words like "*lambi"*, this word can consist of two separate phonemes, /m/ and /b/. Note that the syllabic structure for *lambi* is *la-mbi* and not *lam-bi* because no syllable in the GL may end in a consonant, due to the vocalic structure of the language. So, the structure of *lambi* (la-mbi) is a CV-CCV.

Table 5 Syllable Pattern of /mb/

Word	Syllabified as	Structure	First/second syllabe
lambi (banana)	la - mbi	CV - CCV	The onset at the second syllable
Mbele'o (goat bleat)	mbe – le- 'o	CCV – CV - V	The onset at the first syllable
Lambuto (goose bumps)	la – mbu - to	CV – CCV - CV	The onset at the second syllable

The /mb/ syllable preserves the potential to segment these phonemes into two separate phonological units, even in single connected speech. Phonotactic sequences such

as /mb/ are allowed, as seen in words like "*mbele'o*" (mbe-le-o) (goat bleat) in syllable-initial position, or in the case of *"lambuto"* (la-mbu-to) (goosebumps) in syllable-internal position, but no phonotactic rules force these two sounds to coalesce into a single phoneme. This indicates that /m/ and /b/ are two adjacent phonemes, and they appear in a consonant cluster, which is more like a single phoneme.

The Consonant Cluster /nt/

Phonemes /n/ and /t/ differ from one another in their phonetic, phonological, and phototactically relevant properties.

Phonetic Analysis

Looking at the phonetics of the sounds /n/ and /t/ are shown in Table 6.

Table 6 The Speech Organ and How to Produce /n/, and /t/

Sound	The Speech Organ and How to Produce
/n/	An alveolar nasal consonant is produced by directing airflow through the nasal cavity while the sides of the tongue contact the alveolar ridge (the gum area behind the upper front teeth). The /n/ sound is resonant due to its nasal quality, as the airflow passes primarily through the nasal cavity.
/t/	An alveolar plosive consonant is produced by obstructing the airflow at the alveolar ridge and then releasing it abruptly, creating an explosive sound. The /t/ sound is voiceless, as it is produced without vocal cord vibration, and involves complete closure in the alveolar region.

Phonological Analysis

Within the phonological system, /n/ and /t/ function as separate phonemes, which implies that substituting one for the other alters the meaning of a word. This distinction is evident through minimal pairs such as in table 7.

Table 7 The Distinct Phonemes /n/, and /t/

Word	vs	Word	Sound	
naana (mother)		taata (sister)	/n/	/t/
pana (arrow)		*pama* (uncle)	/n/	/m/
bani (tire)		*baji* (wedge)	/n/	/j/
Tato (wet)		*Tabo (fat)*	/t/	/b/
Tutu (breast)		*Lutu (banana)*	/t/	/l/
Tete (cat)		*Meme (fragrant leaves)*	/t/	/m/

Since replacing / n / with / t / yields a different word with a different meaning, /n/ and /t/ must be separate phonemes. That is, when listeners hear/n/ instead of /t/, the listeners automatically make the distinction between the two speech sounds, and their perception and interpretation of the word are affected by that.

Phonotactic Analysis

The phonotactics examine within syllables the arrangement and possible combinations of /n/ and /t/. As in the syllable "*ntali"* (nta - li), /nt/ and /l/ are the onset while /a/ and /i/ are the nucleus.

Table 8 Syllable Pattern of /mb/

Word	Syllabified as	Structure	First/second syllabi
ntali (ayo	nta – li	CCV - CV	The onset at the first syllable
Hulontalo (Gorontalo)	hu-lo-nta-lo	CV–CV-CCV-CV	The onset at the third syllable

Focus on /nta/, it can be in the form of [C1C2V] and C1 = /n/, C2 = /t/, V = /a/. The phonotactic rules of the do permit the /n/ + /t/ sequence at the onset of a syllable. And this

means that the language can have a nasal consonant followed by a plosive consonant. For /n/ and /t/ to be observed to co-occur within the same syllable with no violation of neighboring phonotactic rules, it lends to the argument that /n/ and /t/ behave as separate phonemes.

The Consonant Cluster /ngg/

The phonetic, phonological, and phototactically significant characteristics of the phonemes /ŋ/ and /g/ are different from one another.

Phonetic Analysis

The consonant cluster /ngg/ phonemes make up two base sounds: the velar nasal /ŋ/ and the voiced velar plosive /g/. A sequence of individual sounds is played back through an automatic articulation that moves between the nasal and the plosive positions in the velar area.

Table 9 The Speech Organ and How to Produce / ŋ /, and /g/

Sound	The Speech Organ and How to Produce
/ŋ/	a velar nasal consonant, formed by raising the back of the tongue toward the velum (soft palate), allowing airflow through the nasal cavity while the oral cavity remains closed. /ŋ/indicates that the vocal cords vibrate during the production of this sound
/g/	a voiced velar plosive consonant, produced with complete closure in the velar region (the back of the tongue touches the velum), followed by a sudden release of air. Voiced means the vocal cords vibrate as air is released

Next, it is where the sounds /ŋ/ and /g/ are pronounced one after another in /ngg/. When the speaker pronounces /ngg/, they begin with the nasal sound and are then going to stop the airflow to produce the plosive sound. For instance: the /ngg/ sound in Indonesian such as, tinggal (stay), menggaet (hook), mengganggu (disturb). Examples are *tanggi* (ditch), *nggou* (humpback), and *longgi* (yam) can be seen in GL.

Phonological Analysis

Phonologically, however, /ngg/is a consonant cluster consisting of two distinct phonemes, /ŋ/ and /g/. Important phonological features include /ŋ/ and /g/ as separate phonemes with complementary distributions, making them contrastive and meaning-bearing units. As shown in Table 10, this contrast is demonstrated conceptually in GL.

Table 10 The Distinct Phonemes / ŋ /, and /g/

Word	vs	Word	Sound	
longgi (yam)		loni (burn)	/ŋg/	/n/
bunggu (humpback)		*buku* (book)	/ŋg/	/k/
wonggo (squat)		*wowo* (mute)	/ŋg/	/w/
gola (thief)		*dola (attack)*	/g/	/d/
goda (tease)		*noda (smudge)*	/g/	/n/
gola (thief)		*kola (compote)*	/g/	/k/

For example, in Indonesian the words *menggaet* (/ŋg/) and *mengait* (/ŋ/) distinguish between the two words is the consonant cluster of /ngg/.

Phonotactic Analysis

Phonotactically, /ngg/ is consistent with certain phonotactic rules of GL. In general, syllable pattern types that include the /ngg/ cluster are CCV such as in table 11 below.

Table 11 Syllable Pattern of /ngg/

Word	**Syllabified as**	**Structure**	**First/second syllable**
Nggou (humpback)	Nggo - u	CCV - V	The onset at the first syllable
Longgi (yam)	Lo - nggi	CV - CCV	The onset at the second syllable

In GL phonotactics, based on the data above, the /ŋg/ consonant cluster can occur at both the beginning and middle of syllables. However, there is no evidence of this cluster appearing at the end of syllables, likely due to the vocalic nature of GL syllable structure.

3.2 Discussion

In GL, three approaches, phonetic, phonological, and phonotactic, are used to classify sounds /mb/, /nt/, and /ngg/ as consonant clusters. The goal of this study is to clarify the differences between those sounds and to discuss why the authors consider those sounds consonant clusters and not just single phonemes.

Phonetically, however, each of these are two different consonants with two different articulation mechanisms. For example, /nt/ is made up of the alveolar nasal /n/ and the alveolar plosive /t/. Notice how the two sounds are produced differently: /n/ uses air flowing through the nasal cavity, while /t/ uses an alveolar ridge and creates an explosive sound. This suggests that /nt/is not one phoneme but two phonemes with little pause between each phoneme. This fits with the evidence of Dako, which states that /nt/ indeed acts as a consonant cluster and not a single phoneme. For instance, he claims that the nasal /n/ and the alveolar /t/ come one after another in a word, as in. The sound aspect of this word that native Gorontalo speakers pronounce is/hu. lo. nta. lo/, which differs from hulondalo, hulonthalo, or hulondhalo (Dako, 2023). A similar case applies to /ngg/, which also consists of two consonants with distinct articulatory differences. Those sounds are common in GL loanwords from Indonesian. The word *bunggu* (bungkuk in Indonesian) became /*bu.nggu*/ (Badudu, 1982). These examples lead the author to assume that /mb/, /nt/, and /ngg/ can be categorized as consonant clusters.

Phonologically, the contrastive meanings of these sounds provide additional support for the claim that they are consonant clusters. In GL, for example, /m/ and /b/are phonemes that distinguish words with different meanings. *Manggo* (bowl) vs. *banggo* (sword) show the distinction of /m/ and /b/ contrasting with each other, thus making them different phonemes. This contrast is lost, and the potential of /mb/ as a semantic phoneme is greatly reduced if /mb/ is regarded as a single phoneme. This distinctive function is called the principle of contrast as a phoneme identity or minimal pair (Verhaar, 2001; (Wijana, 2011). Minimal pairs can easily be seen with the words *manggo – banggo* /m – b/. Also, sounds (/nt/ and /ngg/) that come with similar places constructed like this e.g. the opposition of /n/ and /t/ in *naana* (mother) – *taata* (older sister) or *lini* (strand of hair) – *liti* (thin wire). Associated with /ngg/, such as *longgi* (taro) – *loni* (burn) (/ŋg – n/) and tangi (sap) – tanggi (drainage) (/ŋ – ŋg/)

GL is phonotactically limited with rigid syllable structure rules. GL is a vocalic language, so syllables in GL cannot end with a consonant. This means that consonant clusters must appear at the beginning or middle of a syllable, as in the words *mbele'o* and *lambi* (banana). In *mbele'o* (mbe – le - o) (goat bleat), the consonant cluster is at the beginning of the word, while in *lambi* (la-mbi) (banana), /mb/ functions as a consonant cluster in the middle of the word.

In the case of the /nt/ sound, /n/ serves as the onset followed by /t/, e.g. *ntali* (nta-li) in the onset of a syllable. In contrast, in *lantingo* (la-nti-ngo), the consonant cluster /nt/ is in the middle of the syllable. There is no vowel inserted between /n/ and /t/, and this pattern is consistent with GL's phonotactic rules. Syllables are syllable constituents that consist of nuclei (or peaks, which are mostly vowels) and optionally include one or more consonants at the beginning (onset) or the end (coda) (Dardjowidjojo, 2003; Keshavarz, 2017). These patterns determine how syllable structure is governed by phonotactics. The syllable *ntali* (/nta-li/) is analyzed as consisting of the first syllable (/nta/) with onset /nt/, peak /a/, and no

coda. The second syllable (/li/) has an onset /l/, a peak /i/, and no coda. This construction is representative of GL's phonotactic rules, in which consonant clusters such as /nt/ are possible as onsets as long as a vowel closes the syllable. The same pattern is true for the sound/ngg/: e.g. in *nggou* (nggo-u) (hunchbacked), *longgi* (lo-nggi) (yam). The consonant cluster /ngg/ appears at the beginning of the syllable *nggo-u* (CCV-V) and in the middle of the syllable *lo-nggi* (CV-CCV). Thus, the syllable structure supports the analysis that sounds such as /mb/, /nt/, and /ngg/ function as consonant clusters rather than single phonemes.

Regarding learning Arabic and English, English language learners in many different countries face difficulties in understanding consonant clusters. These issues yield extremes of high and low variations of consonant clusters in English like those encountered by the Nigerian (Malah & Rashid, 2015), and even non-native American English speakers of the language (Davidson et al., 2015). Thai learners of English experience the same problem in terms of associating with consonant clusters (Rungruang, 2017). Similarly, learning English presents challenges for Indonesian students. Since English is not their mother tongue, they find it difficult to learn (Pardede, 2018; Ekarina, 2022). Thus, it is crucial for English language learners who have a mother tongue GL to become familiar with the consonant clusters in the Gorontalo language. When learning phonetics and phonology, it is necessary to highlight both similarities and differences between the phonotactic structures of English and Gorontalo.

Revitalization of the Gorontalo Language in the Tomini Bay Area

The results from this study on the diagnosis of consonant clusters in the GL have handicaps that are of great relevance for the implementation of program outcomes changes. The discovery that sounds like /mb/, /nt/, and /ngg/ function as consonant clusters in GL provides deeper insights into the phonological structure of the language. The phonological characteristics of the local languages could hold the key to developing such programs for the revitalization of GL when there is a threat of extinction.

Language revitalization is one of the many aspects involved in the revitalization of a language that is being transmitted a few generations down the road, and it is working to reduce its communicative function among the speaker community. As stated in the *Kamus Besar Bahasa Indonesia* (KBBI, Online Edition), revitalization can be interpreted as the process of returning to life or re-functioning something that has previously become less active. On the other hand, according to King, language revitalization is the effort to improve the quality, or in some cases the quantity or cost, of the form or function of the language, which is new to death or extinction (Harminsyah, 2017).

Reinventing the GL is crucial in this context, particularly because the use of the GL in Gorontalo has has fallen quite significantly among the younger generations. It is in line with the findings of Hulukati et al. that young people, particularly children and adolescents, have little confidence in speaking GL and prefer Indonesian when interacting with Gorontalo (Hulukati et al., 2017). This is somewhat alarming since it implies a language change which may subsequently result in the extinction of in the long term.

Revitalization of local languages such as GL can be done through systematic regional language education (both at the school and local community level). Most of the research emphasizes the importance of teaching regional languages to native speakers, which can be done using either classical or community-based approaches (Harminsyah, 2017); (Vergara et al., 2021); (Macrae et al., 2022) .In the case of GL, recent research suggests using a phonology-based approach, specifically one related to the phonetic clusters of consonants that exist in the language, like /mb/, /nt/, and /ngg/. Research identifying the functions of these consonant clusters contributes significantly to the GL curriculum. By

incorporating phonological elements into teaching materials, students are expected to gain a deeper understanding of the phonological characteristics of their language, which, in turn, can foster pride and affection for their mother tongue.

Creating teaching materials that cater specifically to GL's needs in terms of phonology is equally essential in revitalization programs. Rabiah works on finding the Makassar language teaching materials as one of the projects on how to revitalize the local language (Rabiah, 2018), and while Astri, et al, and Andriani, show that learning materials developed specifically can increase students' ability to master the local language (Astri et al., 2021; Andriani, 2015). For example, GL-specified teaching materials that focus on phonological elements (e.g the pronunciation of consonant clusters) would be particularly relevant to facilitating more efficient student learning. These resources may be interactive modules, tutorial videos, or apps that let students practice articulating GL words in glycemic load words in like manner and can dictate back the exact principal sound of GL words.

Indigenous language revitalization in Gorontalo also needs participation from the community and local government policies. According to Rahardini and Niswah, minority languages in Indonesia, including GL, require revitalization efforts due to linguistic shifts occurring in daily life. This aligns with findings indicating that GL is losing its function within its community (Rahardini & Niswah, 2022). As a solution to this issue, language awareness campaigns can be carried out in the Gorontalo community, such as workshops or promoting the use of GL, so that they are overall encouraged to foster their confidence in speaking their regional language. The local Gorontalo government can also provide support in the form of policies, for example, by supporting initiatives to conduct deeper research on GL or adopt local policies to be based on the use of GL in public spaces, radio or television station broadcasting in GL, etc.

These actions, which include curriculum development, teaching material development, teacher training, community campaigns, and policy-level support, will make GL revitalization possible. Such a policy is in line with perspectives from some researchers that these minority languages should be maintained within a national policy framework (Wong, 2015); O'Neal, 2015; Nguyen & Dutta, 2017; Djou et al., 2020; Rahardini & Niswah, 2022). Methods of phonological diagnosis, such as the identification of consonant clusters like /mb/, /nt/, and /ngg/, will instead be deployed in the future to help keep GL intelligible and relevant for generations to come. GL must be revitalized through an integrated revitalization program so that its role in the life of Gorontalo and Indonesia is a valuable linguistic and cultural heritage.

The above discussion points towards two novelties. On the first one, from the phonetic, phonological and phonotactic perspectives, this study provides a new insight for linguistics by proposing that the sounds /mb/, /nt/ and /ngg/ in GL should be regarded as consonant clusters instead of single consonants. This study finds that the distribution and structure of these consonant clusters adhere to unique phonotactic rules within GL, enriching our understanding of phonological variation and phonetic adaptation in regional languages, which have been relatively under-researched.

Second, the phonological results regarding the diagnosis of consonant clusters in GL are highly relevant to the undertaking of GL language revitalization. By implementing strategies such as phonology-based curriculum development, teacher training, community awareness campaigns, policy support, and further research, GL can be preserved and effectively taught to future generations. These strategies will ensure that GL stays relevant and is used by this community, surviving as part of Indonesian linguistic diversity.

4. CONCLUSIONS

Language revitalization efforts in Gorontalo are significantly impacted by the phonological status of /mb/, /nt/, and /ngg/ as consonant clusters. To promote language instruction and language conservation, identifying these clusters also reflects our understanding of the Gorontalo phonological system. This study emphasizes the importance of understanding phonetics, phonology and phonotactic patterns in supporting local language identity, especially for younger generations in the Tomini Bay region, where linguistic continuity faces increasing challenges. The novelty of this *study* is that it could diagnose /mb/, /nt/, and /ngg/ in Gorontalo as consonant clusters rather than single consonants by using *phonetic, phonological, and phonotactic* analyses. From a phonetic perspective, a detailed articulation process suggests that the two sound components are articulated distinctly, while the phonological analysis shows that these sounds behave as independent phonemes since changing them would affect meaning. Furthermore, it makes more sense for these sounds to be consonant clusters rather than single consonants because Gorontalo misses syllable ends that are positioned as consonants.

The implications of these findings are twofold. From the perspective of linguistics, this study contributes a nuanced understanding of GL's phonetics, phonological and phonotactics structure, particularly within the broader context of language adaptation and phonological shifts among regional languages. For language preservation, this study provides insights valuable for revitalizing GL, especially in the Tomini Bay area, suggesting that integrating phonological structure in language curricula can enhance native speakers' engagement.

ACKNOWLEDGMENTS

The authors would like to thank the Dean of the Faculty of Letters and Culture, Universitas Negeri Gorontalo, for funding this research through "Kemitraan Kawasan Teluk Tomini" research, grant 2024.

AI ACKNOWLEDGEMENTS

The authors admit that this paper was edited and proofread using ChatGPT (https://chat.openai.com). "Proofread the article for "grammatical accuracy and suggest improvements" in clarity and coherence for this section" are two of the prompts that are used. The results of these prompts were used to guarantee grammatical accuracy, improve the article's readability, and enhance the content's general flow.

REFERENCES

Andriani, T. (2015). Revitalisasi naskah syair: Sebuah solusi dalam pengembangan kreativitas mahasiswa untuk mencintai budaya lokal. *Jurnal Pendidikan Bahasa Dan Sastra*, *15*(1), 26. https://doi.org/10.17509/bs_jpbsp.v15i1.796

Astri, N. D., Arista, R., Ginting, E. K. B., & Ginting, S. D. Y. B. (2021). Revitalisasi legenda danau Toba melalui komik. *Jurnal Salaka : Jurnal Bahasa, Sastra, Dan Budaya Indonesia*, *3*(2). https://doi.org/10.33751/jsalaka.v3i2.4562

Badudu, J. S. (1982). *Morfologi bahasa Gorontalo*. Penerbit Djambatan. https://opac.perpusnas.go.id/DetailOpac.aspx?id=551633

Bety, N. (2021). Deret vokal dan deret konsonan dalam bahasa Tunjung (Tonyooi). *LOA: Jurnal Ketatabahasaan Dan Kesusastraan*, *16*(2), 142–152. https://doi.org/https://doi.org/10.26499/loa.v16i2.4131

Chomsky, N., & Halle, M. (1968). *The Sound pattern of English*. Harper and Row. https://archive.org/details/soundpatternofen0000chom

Dako, R. T. (2023). *"Hulontalo, Hulondalo, Hulonthalo, atau Hulondhalo?: Reposisi /nt/ sebagai gugus konsonan (Upaya Konservasi Bahasa Gorontalo di Kawasan Teluk Tomini)*.

Dardjowidjojo, S. (2003). *Psikolinguistik, pengantar pemahaman Bahasa Manusia* (Kedua). Yayasan Pustaka Obor Indonesia. https://books.google.co.id/books/about/Psikolinguistik.html?id=UwO8kdBZW5AC&redir_esc=y

Davidson, L., Martin, S., & Wilson, C. (2015). Stabilizing the production of nonnative consonant clusters with acoustic variability. *The Journal of the Acoustical Society of America*, *137*(2), 856–872. https://doi.org/10.1121/1.4906264

Djou, D. N., Ntelu, A., & Baga, M. (2020). Bahasa Gorontalo dan bahasa Suwawa pada anak usia dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *5*(2), 1359–1367. https://doi.org/10.31004/obsesi.v5i2.895

Ekarina, E. (2022). Consonant clusters in Indonesian loanwords. *Language Literacy: Journal of Linguistics, Literature, and Language Teaching*, *6*(2), 527–534. https://doi.org/10.30743/ll.v6i2.6152

Fishman, J. A. (1991). *Reversing Language Shift: Theoretical and empirical foundations of assistance to threatened languages*. Multilingual Matters. https://books.google.co.id/books/about/Reversing_Language_Shift.html?id=ah1QwYzi3c4C&redir_esc=y

Harminsyah, G. (2017). *Pedoman konservasi dan revitalisasi bahasa* (Vol. 1). Badan Pengembangan dan Pembinaan Bahasa. Harminsyah, G. (2017). *Pedoman konservasi dan revitalisasi bahasa* (Vol. 1). Badan Pengembangan dan Pembinaan Bahasa. https://repositori.kemdikbud.go.id/17233/1/Pedoman%20Konservasi%20dan%20Revitalisasi%20Bahasa.pdf

Hulukati, W., Rahim, M., & Djafar, Y. (2017). Pembelajaran bahasa daerah Gorontalo pada anak usia dini. *JIV-Jurnal Ilmiah Visi*, *12*(1), 81–88. https://doi.org/10.21009/JIV.1201.8

Jubran AL-Mamri, M. (2021). Patterns of consonant clusters in word initial, medial, and final positions in Yemeni Arabic. *JL3T (Journal of Linguistics, Literature and Language Teaching)*, *7*(1), 41–51. https://doi.org/10.32505/jl3t.v7i1.2821

Keshavarz, M. H. (2017). Syllabification of final consonant clusters: A salient pronunciation problem of Kurdish EFL learners. *Iranian Journal of Language Teaching Research*, *5*(2), 1–14. https://doi.org/https://doi.org/10.30466/ijltr.2017.20327

Labov, W. (2010). *Principles of linguistic change*. Wiley. https://doi.org/10.1002/9781444327496

Macrae, T., Hoge, R., & Farquharson, K. (2022). Consonant cluster productions in preschool children who speak African American English. *Journal of Speech, Language, and Hearing Research*, *65*(4), 1370–1385. https://doi.org/10.1044/2021_JSLHR-21-00288

Mahsun. (2005). *Metode penelitian bahasa: Tahapan, strategi, metode, dan tekniknya*. Rajawali Press. https://books.google.co.id/books/about/Metode_penelitian_bahasa.html?id=UwC4NwAACAAJ&redir_esc=y

Malah, Z., & Rashid, S. Md. (2015). Contrastive analysis of the segmental phonemes of English and Hausa Languages. *International Journal of Languages, Literature and Linguistics*, *1*(2), 106–112. https://doi.org/10.7763/IJLLL.2015.V1.21

Mayr, R., Howells, G., & Lewis, R. (2015). Asymmetries in phonological development: the case of word-final cluster acquisition in Welsh–English bilingual children. *Journal of Child Language*, *42*(1), 146–179. https://doi.org/10.1017/S0305000913000603

Nafilah, I., Agustin, Y., & Setiawati, S. (2019). Comparison of consonant clusters and diphthongs in the language Betawi and Indonesian. *Hortatori : Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, *1*(1), 98–103. https://doi.org/10.30998/jh.v1i1.42

Nguyen, H. T., & Dutta, H. (2017). The adaptation of French consonant clusters in Vietnamese Phonology: An OT Account. *Journal of Universal Language*, *18*(1), 69–103. https://doi.org/https://doi.org/10.22425/jul.2017.18.1.69

O'Neal, G. (2015). Consonant clusters and intelligibility in English as a Lingua Franca in Japan. *Pragmatics and Society*, *6*(4), 615–636. https://doi.org/10.1075/ps.6.4.07one

Pardede, P. (2018). Improving EFL students' English pronunciation by using the Explicit Teaching Approach. *Journal of English Teaching*, *4*(3), 143–155. https://doi.org/https://doi.org/10.33541/jet.v4i3.852

Pateda, M. (1981). *Kaidah bahasa Gorontalo* (Pertama). Viladan. https://books.google.co.id/books/about/Kaidah_bahasa_Gorontalo.html?id=DqJbAAAAIAAJ&redir_esc=y

Pateda, M. (1991). *Kamus Indonesia - Gorontalo* (Pertama). Balai Pustaka. https://openlibrary.org/books/OL1693966M/Kamus_Indonesia-Gorontalo

Pateda, M. (1994). *Kaidah Bahasa Gorontalo* (1st ed., Vol. 1). Viladan. https://books.google.co.id/books/about/Kaidah_bahasa_Gorontalo.html?id=DqJbAAAAIAAJ&redir_esc=y

Pateda, M. (2003). *Pengantar fonologi* (Rusnan, Ed.; Pertama). Viladan. https://e-library.sma1gorontalo.sch.id/index.php?p=show_detail&id=4729

Rabiah, S. (2018). *Revitalisasi bahasa daerah Makassar melalui Pengembangan bahan ajar bahasa Makassar sebagai Muatan Lokal*. https://doi.org/10.31227/osf.io/bu64e

Rachmawati, D., & Diharti, S. (2022). Gugus konsonan bahasa Jawa dialek Surabaya. *Ideas: Jurnal Pendidikan, Sosial, Dan Budaya*, *8*(4), 1511. https://doi.org/10.32884/ideas.v8i4.1089

Rahardini, N. A., & Niswah, A. A. (2022). Revitalisasi bahasa minoritas di Indonesia. *ETNOLINGUAL*, *6*(2), 113–134. https://doi.org/10.20473/etno.v6i2.35947

Rungruang, A. (2017). Consonant cluster acquisition by L2 Thai speakers. *English Language Teaching*, *10*(7), 216. https://doi.org/10.5539/elt.v10n7p216

Setyadi, A. (2019). Fonem Deret konsonan dalam bahasa Indonesia. *Nusa: Jurnal Ilmu Bahasa Dan Sastra*, *14*(1), 53–64. https://doi.org/https://doi.org/10.14710/nusa.14.1.53-64

Vergara, P., Bernhardt, B. M., Pérez, D., & Diez-Itza, E. (2021). Consonant cluster acquisition in Chilean children with typical and protracted phonological development. *Clinical Linguistics & Phonetics*, *35*(10), 964–982. https://doi.org/10.1080/02699206.2020.1851306

Verhaar, J. W. M. (2001). *Asas-asas linguistik umum* (Ketiga). Gadjah Mada University Press. https://ugmpress.ugm.ac.id/id/product/budaya/asas-asas-linguistik-umum

Wijana, I. D. P. (2011). *Berkenalan dengan linguistik* (2nd ed., Vol. 1). A.Com Advertising. https://www.academia.edu/11003696/Berkenalan_dengan_Linguistik

Wong, J. W. S. (2015). The impact of L2 proficiency on vowel training. In *Investigating English Pronunciation* (pp. 219–239). Palgrave Macmillan UK. https://doi.org/10.1057/9781137509437_10