Evidence of (in)applicability of Morphological Doubling Theory in Acehnese reduplication

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Abstract

Morphological Doubling Theory (MDT) states that reduplication is a process in morphology, instead of phonology, which calls the second element as a reduplicant to add meaning to the base. This research is to investigate to what extent MDT is applicable to analyze reduplications in Acehnese, an Austronesian language spoken in Indonesia. The research was based on nine literary works called hikayat written in early 20th century or earlier. The number of tokens extracted from the data source is 1076, or 370 tokens after duplicates were removed, consisting of 360 reduplicated words and ten synonym compounds. The data were analyzed using a complete qualitative data analysis procedure consisting of immersion, reflecting, taking apart, recombining, and relating and locating data. The results show that all reduplication patterns in Acehnese – full reduplication, partial reduplication, and rhyming reduplication – can be analyzed using MDT. This result suggests that reduplication in Acehnese is a morphological process, where phonology is involved only in shaping the output of the reduplicant. In this language, a stem is called twice by morphology to satisfy the romantic requirements such as to mark plurality and to emphasize the base.

Keywords: *Acehnese reduplication; Morphological Doubling Theory; MDT application*

INTRODUCTION

Acehnese is an Austronesian language spoken in Indonesia's northwestern region. It is a spoken language that only appears in writing in the form of letters and text messages. According to Yusuf et al. (2022), this language is closely connected to Chamic, an Austronesian language that originated in Cambodia and Vietnam. In the language, one of the word formation process is reduplication (Mustafa, 2022), as in its neighboring languages (Aziz & Nolikasari, 2020; Mulyani et al., 2021).

Reduplication is a morphological operation where a part or the whole part of a base is replicated (Al Mahmoud, 2014). Total reduplication happens when

the entire base is replicated, whereas partial reduplication occurs when only a portion of the base is copied (Jaafar & Ahmad, 2013). In Acehnese, both reduplication patterns have been discovered (Mustafa, 2022). The availability of practically all lexical terms in reduplicated forms to allude to repetition, plurality, mutuality, and other concepts exemplifies the richness of reduplication in Acehnese. In addition to the reduplication in which the reduplicant is phonologically identical to the base, Acehnese also shows reduplication of words which are semantically, but not phonologically, identical. This kind of reduplication supports the most current morphological analysis for reduplication, which is called Morphological Doubling Theory (MDT) and was introduced by Inkelas and Zoll (2005), also appears in Inkelas (2008).

This operation has been handled in previous Acehnese efforts. Durie (1985) gives a brief overview of reduplication, including some instances from his work on Acehnese Grammar, and acknowledges that words can be reduplicated entirely or partly. The similar conclusion was reached by others as well (Devi et al., 2020). Muliawati and Yusnida (2019) conducted another study to look at the use of onomatopoeia in Acehnese and discovered that onomatopoeic words are commonly completely and partially reduplicated. Furthermore, Asyik (1987), in another study of Acehnese grammar, discovered that reduplication is one of the plural marks in the language. A more recent work was conducted by Mustafa (2022) to put forward patterns of Acehnese reduplication comprehensively based on a large corpus of data. However, previous studies looked at reduplication through the lens of standard morphological approach and phonological perspective. Previous research on how Acehnese reduplication operates when seen through the lens of Morphological Doubling Theory has been disregarded. Therefore, the current study used data consisting of over 1,000 tokens extracted from early literary works to examine reduplication rules using Morphological Doubling Theory proposed by Inkelas and Zoll (2005).

Reduplication in Acehnese

Works on Acehnese reduplication are currently limited. The publication which include discussion on reduplication can be found in Mustafa (2022) and Muliawati and Yusnida (2019). Mustafa (2022) puts the primary focus on Acehnese patterns of reduplication in a phonological point of view, and Muliawati and Yusnida (2019) limit the study on Acehnese onomatopoeias, where reduplication is one of the onomatopoeias formation in the language. Almurashi (2016) discusses reduplication in relation to grammar, such as reduplication as plural marking. In addition, Devi et al. (2020) also address reduplication as a morphological process in Acehnese. The interference of reduplication of Acehnese as a local language in the national language writing is addressed by Sitompul et al. (2021).

In general, reduplication in Acehnese comes in two major patterns, i.e. full and partial reduplications, with an additional of rhyming reduplication and affixed reduplication (Mustafa, 2022). Pure reduplication includes full reduplication and partial reduplication. Many word classes can undergo pure reduplication, i.e. nouns, verbs, adjectives, pronouns, adverbs, numbers, and articles. In addition, affixed reduplication is applicable for nouns, verbs, adjectives, pronouns, adverbs, and numbers. Finally, phonological

reduplication, more well known as rhyming reduplication (Voinov, 2012), involves a reduplicant undergoing a vowel changes. It is found in nouns, verbs, adjectives, and adverbs.

In addition to patterns of reduplication, previous studies have looked at the functions of reduplication in Acehnese. Mustafa (2022) states that reduplication in Acehnese can be used to emphasize an action as in *ma-mandum* 'all EMP', pluralize a noun such as *dara-dara* 'girls', and show repeated or prolonged actions as in *mũ ʔā-ʔā* 'a long and continuous cry'. In addition, Ilhamiah et al. (2017) provide an example of reduplicated word which means reciprocal action, i.e. *meumat-mat* 'holding one another'. Finally, reduplication in Acehnese does not change the tune or style, and thus the stylish meaning of the reduplicated words is retained.

Phonological analysis using C-V skeleta

The analysis of reduplication using C-V skeleta is common among linguists. This approach is based on the belief that each reduplicating process can be characterized by a skeleton which is actually the reduplication morpheme (Haugen, 2014). Cruz (2014) shows how verb is reduplicated in Nheengatu, the Tupi-Guarani language spoken by a North American Indigenous tribe. In this language, the reduplication follows the CV structure, where the reduplication skeleton for verbs following CVCV is CVCV.CVCV, and those with CVCVX are CVCV.CVCVX. Using this characteristic of reduplication, the formation of reduplicated words in Nheengatu is presented in (1), explained by (2).

(1) Plural formation in Agta

a) yuká	'kill'	yuká-yuká	'kill repeatedly'
b) sereu	'lick'	sereu-sereu	'lick repeatedly'
c) puku	'long'	puku-puku	'very long'

(2)   s e r e u

         | | | | |

    CVCV + [CVCVV]

To link up some of the phonemes from the stem to the C-V skeleton on the left in (2), Cruz (2014) proposes the use of the reduplicating morphological process, which is different from the non-reduplicating affix process, i.e. the reduplicating affix shares the phonemic melody of the stem to which it attaches itself. To transfer the phonemic melody of the stem to the reduplicating affix, the stem's phonemic melody needs to be copied and the result is shown in 3.

(3)   s e r e u   s e r e u

       | | | | | | | | |

      CVCVV + [CVCVV]

Lin (2012) makes the comment on this early theory that the base for reduplication is the entire stem and the segments which do not link to the skeleton are erased, producing the following partial reduplication. The illustration in (4) shows that the reduplicant occupies the template, and the syllable which does not fit the template or skeleton is deleted.

(4)   s e r e u̶   s e r e u   s e r e s e r e u
        | | | | | | | | → | | | | | | | | |
        CVCV   +   [CVCVV]   CVCVCVCVV

This type of analysis of reduplication has been applied in many previous studies. Enguehard (2017) attempted to observe the forms on verb and adjective reduplications in Russian based on C-V skeleta. In addition, Ejobee (2018) analyzed reduplication in Urhobo, a language of Nigeria, using the same framework.

Morphological Doubling Theory

A common analysis of reduplication using C-V skeleta is a phonological form of analysis of reduplication. It emphasizes that reduplication is a phonologically driven process to satisfy the requirements of phonological output. Morphologically, Inkelas and Zoll (2005) propose a different approach to analysis of reduplication based on a new theory, i.e. MDT. This theory suggests that reduplication occurs because it is required by morphology to satisfy a stated semantic requirement. Inkelas (2008) uses Khmer to demonstrate that two different words, which share semantic meaning, come together to form plural nouns in a process termed synonym compounding. Another language which demonstrates such compounding is Sye. Most verb roots in Sye have two different shapes, known as Stem1 and Stem2 (Dolatian & Heinz, 2020). The word 'fall', for example, has *omol* for Stem1 and *amol* for Stem2. These two copies of 'fall' appear in the compound verb phrase *amol-omol* (Stem2-Stem1), which means "fall all over". In addition, Yoruba has many synonym or near-synonym compounds, where Stem2 is used before the Stem1 only to accompany the Stem1 to show emphasis and repeated actions (Orie, 2012). Inkelas and Zoll (2005) suggest that reduplication in Khmer and Sye is motivated by morphology to satisfy such semantic requirements. In reduplication, a word is called twice and the word happens to be single stem (Rabori et al., 2016). MDT points out that reduplication requires two words which are identical semantically, which means there is no difference between synonym compounding in Khmer, doubling in Sye, and reduplication in other languages.

Although MDT states that rather than being based on phonology, two instances of the morphological constituents with the same level of meaning are required in reduplication (Inkelas, 2008), some phonological modification can be found in both or one of the instances (Inkelas & Zoll, 2005). These phonological modifications meet the phonological rules of any given language outside reduplication, as found in Selayarese nasal assimilation. A nasal consonant in Selayarese assimilates with the articulation of the following consonant. The phonological rule for this nasal assimilation is presented in (5).

(5) Nasal assimilation rule in Selayarese

$$[\text{+nasal}] \rightarrow \begin{bmatrix} \text{+nasal} \\ \alpha \text{PA} \end{bmatrix} / \_\_[\alpha \text{PA}]$$

"Nasals assimilate to place of articulation of following consonants by maintaining nasalization"

Data in (6) are presented to show the effect of phonological rule in (1), from non-reduplicated constituent, in reduplication.

(6) Total reduplication in Selayarese
 a) pekaŋ 'hook' pekam-pekaŋ 'hook-like object'
 b) tunruŋ 'hit'   tunrun-tunruŋ 'hit lightly'
 c) jaŋaŋ 'chicken' jaŋaɲ-jaŋaŋ 'bird'
 d) keloŋ 'sing' kelon-keloŋ 'sort of sing'

  This confirms that the phonological effect found in reduplicants is similar to those found outside of reduplication (Inkelas, 2008), as illustrated in (5). In addition, it can be predicted that a partial reduplicant undergoes the same formative process as a non-reduplicant constituent. One way by which partial reduplication is constructed is by truncation: a means of word formation by which an existing form is abbreviated. Data from Ilokano (Alber & Arndt-Lappe, 2020) show that the intensifying adjectival prefix *naka-* 'very' requires a partially reduplicated base, in which the reduplicant is formed by truncating the base to the bimoraic (maximal) syllable.

(7) Prefix *naka-* 'very' selects a doubled stem.
 a) ángot 'smelly' naka-ang-ángot 'stinking very much'
 b) sakit 'sore'   naka-sak-sakit 'very sore'
 c) katáwa 'laughter' naka-kat-katáwa 'very funny'

The prediction that the means of formation of a partial reduplication are similar to those by which a non-reduplicated constituent can be truncated is confirmed by hypocoristic formation in Japanese, presented in (8).

(8) Hypocoristic formation in Japanese (Imanishi, 2013)
 a) Saciko : Sač-čaN
 b) JuNko : JuN-čaN
 c) Takako : Tač-čaN

The suffix -*čaN* selects a truncated name as the base. In the same way, the prefix *naka-* in Ilokano, presented in (7), selects the truncated stems followed by the full stem, which results in partial reduplication. Therefore, MDT is applicable for both total and partial reduplication.

In conclusion, MDT abandons the phonological copying approach inherent in most theories of reduplication. Instead, MDT proposes that reduplication involves semantic (rather than phonological) identity between two identical daughters. Both daughters in the reduplication comply with the phonological rules of a given language.

METHOD

This study utilized a qualitative approach to find out whether the pattern of reduplication in Acehnese can be analyzed using Morphological Doubling Theory. The type of data, data collection, and data interpretation are presented in detail in this section.

Data and source of data

The data in this research were synonym compounds and reduplicated words extracted from *hikayat*, i.e. a fiction narrative written in the form of poem. The example of a part of *hikayat* is given below.

> *Putroe neumoe that meusye-sye*
> *Allah po e sayang raya*
> *Teuma seuot raja nanggroe*
> *Bek Ie tamoe hai adekda*
>
> The queen sobbed sadly
> It was so sad dear God
> Then the king said
> Please stop crying my dear sister

Nine *hikayats* were used as the data source. The publication date of some *hikayats* could not be determined, but the preface in some of the *hikayats* states or implies that they were originally written in early 20th century or earlier. Most of these *hikayats* were originally written in Arabic-like alphabets, proving that it was originally written before the 20th century when Latin alphabets were introduced in Aceh. The number of tokens extracted from the *hikayats* is 1076, which is 370 tokens after duplicates were removed.

Data collection

The tokens were extracted by reading all lines in the *hikayat* and all reduplicated words were listed. Each reduplicated word was written as is, for example, affixed words were written with affix. The pattern of reduplication for each token were assigned by looking at how the words were reduplicated, and the meaning was determined from context. Later, each reduplicated words were rewritten in clean version, where affixes and other attributes were removed.

Data analysis

Qualitative data analysis procedure was applied in this study, following the procedure used by Aghaei et al. (2020). The steps proposed include "immersion, reflecting, taking apart, recombining, and relating and locating data." In this study, the author orient himself to the data by checking each token and converting it into base form, ignoring affixes and other grammatical markers. In

the "reflecting" step, the author used the intuition as a native speaker of the language to match the data, and the intuition to, MDT. Following this step, the author recollected some more tokens, which included rhyming reduplication focusing on consonant alteration such as *tahe gante* /tahə gantə/ 'agape / homelessly surprised'. In the next step, the data were taken apart by removing duplicates, dividing them based on the two broad areas, i.e. synonym compounds and reduplications. Afterwards, the reduplications were re-divided into pattens of reduplications, i.e. full reduplication, partial reduplication, which were then re-divided into rhyming reduplication, and lexicalized reduplication. In the next step, "recombining data", the patterns of reduplication were reassessed to find any possibility to merge if there are any common patterns for simplicity in drawing conclusions. Finally, the results were compared with the literature to find out the novelty based on the data, to assess weaknesses in the data collection, and to see how MDT can be applied to the data.

RESULTS AND DISCUSSION

Results
This study aims to find the extent to which Morphological Doubling Theory (MDT) can be applied to analyze reduplication in Acehnese. The data required to achieve this purpose are synonym compounds and reduplicated words. Synonym compounds are used to show that morphology calls additional stems with similar meaning for semantic purpose. The following table shows the data of synonym compounds in Acehnese.

Table 1. Synonym compounds in Acehnese

Stem 1	Stem 2	Gloss	Compounds	Meaning	Frequency
troh	teuka	to arrive	troh teuka	to arrive EMP	16 tokens
troh	sampoe*	to arrive	troh sampoe	to arrive EMP	12 tokens
teuka	troh	to arrive	teuka troh	to arrive EMP	1 token
woe	gisa	to return	woe gisa	to return EMP	7 tokens
gisa	woe	to return	gisa woe	to keep returning	2 tokens
riwang	woe	to return	riwang woe	to keep returning	3 tokens
woe	riwang	to return	woe riwang	to keep returning	1 token
ci	cuba*	to try	ci cuba	to try EMP	1 token
cuba*	ci	to try	cuba ci	to try EMP	2 token
cuba*	ujoe*	to try	cuba ujoe	to try EMP	1 token

*) probably borrowed words from Indonesian, the lingua franca, i.e. *sampai*, *coba*, and *uji*

Table 1 shows that the second stem is used to express the emphasize the meaning of the first stem or to indicate repetitive action. The limited number of tokens makes it too premature to generalize the purpose of the second stem. The data in the table also shows that the language does not restrict the order of the stem, as *troh teuka* and *teuka trok* suggest similar meaning, as do *woe gisa* and *gisa woe* or *ci cuba* and *cuba ci*.

Acehnese reduplications can be majorly divided into two pattens, i.e. full and partial reduplications. Full reduplications in Acehnese are more frequent than the other pattern of reduplication. Many reduplicated words come in affixed forms, most with affixed left part such as *meuputa-puta* 'keep circling',

and affixed right parts are also found but the case is extremely rare. However, some cases with both parts affixed as in *meuhah-meuhah* '(laughing) out loud' with *hah* 'open' as the stem. The first ten most commonly found full reduplicated tokens in the *hikayats* are presented in Table 2.

Table 2. Full reduplicated words in Acehnese

Stem	Gloss	Reduplicated	Meaning	Frequency
sang	as, like	sang-sang	as if	65 tokens
that	very	that-that	very EMP	47 tokens
jan	when	jan-jan	whenever	19 tokens
pue	what	pue-pue	whatever	18 tokens
ron	to sweep	ron-ron	to scatter	17 tokens
jareueng	rare, rarely	jareueng-jareueng	rarely EMP	14 tokens
jeup	every	jeup-jeup	every EMP	14 tokens
preh	to wait	preh-preh	to keep waiting	13 tokens
padum	how much, how many	padum-padum	several	12 tokens
ban	like	ban-ban	any ways	11 tokens

Table 2 shows that additional meaning has been assigned to reduplicated words. There is also a change in part of speech for the stem *padum* 'how much or how many', which is an interrogative determiner or interrogative pronoun, and it changes into a quantifier. Although a quantifier is one type of the determiner, the reduplicated form *padum-padum* 'several' can no longer be used as an interrogative pronoun. In addition to full reduplication, tokens appearing as partial reduplications are provided in Table 3.

Table 3. Partial reduplicated words in Acehnese

Stem	Gloss	Reduplicated	Meaning	Frequency
ube	as big	ube-be	as big (for plural)	4 tokens
bandum	all	ban-bandum	all EMP	1 token
singoh	tomorrow	singoh-ngoh	later	1 token
siploh	ten	siploh-ploh	ten by ten	1 token
adohma	bemoan	adoh-adohma	keep bemoaning	1 token

The table above shows that partial reduplication is not as common in Acehnese, but some tokens are found more than once. Interestingly, Acehnese allows reduplicants to precede the stem as in the case of *ban-bandum* 'all'. Although this case is found, the same tokens were also found in full reduplicated version *bandum-bandum* with no obvious difference in semantic meaning.

Finally, the reduplications which are often found in the data, more frequent than partial reduplication, is rhyming reduplication. The instances of this reduplicated words are provided in Table 4.

Table 4. Rhyming reduplicated words in Acehnese

Stem	Gloss	Reduplicated	Meaning	Frequency
-	-	aloh-alah	to get tired	3 tokens
-	-	ka'a-ka'u	crowded	3 tokens
-	-	apoh apah	to struggle	2 tokens
-	-	grang-gring	sounds of ...	2 tokens

-	-	a-'u	sounds of cry (sad)	1 token
-	-	ang-eung	sounds of cry (sad)	1 token
-	-	cham-chum	sounds of cannon	1 token
-	-	crang-cring	sounds of jewellery	1 token
-	-	crat-cruet	sound of jumping horses	1 token
cre	separate	cre-bre	to get separated	1 token
-	-	jeungkhang-jeungkhe	to walk fast and unbalanced	2 tokens
-	-	tang-ilang	to go here and there	2 tokens
-	-	cak-coe	sound of sword	1 token
-	-	suy-gumuy	unorganized	1 token

Table 4 reveals an interesting finding that most all tokens do not have any stem because they are words imitating sounds of people, animals and inanimate objects.

Discussion

In phonology point of view, reduplication is believed to be the result of stem copying, either in part or in full. The stem is called once and is copied to form reduplication. Morphologically, the stem is not copied but the left part and the right part in reduplication are considered two stems. Those stems are called by morphology because this is required by semantic identity. Clear evidence to support this theory, drawn from some of the world's languages, is presented by Inkelas (2008), who shows that synonym compounding is a form of doubling in morphology. In synonym compounding, two words which share the semantic, not necessarily phonological, identity are compounded in the same way as for reduplication. Inkelas provides examples of synonym compounding in Khmer and Vietnamese. In both languages, two synonyms which do not share phonological identity form a compound.

Synonym compounding also exists in Acehnese. A compound word, which is known as mother, is built up of two members, known as daughters, which have similar semantic identity but are phonologically distinct. This result suggests that MDT is expected to be applicable in Acehnese. This theory claims that in reduplication, the reduplicant was called by morphology, instead of a requirement of phonology. The case in Table 1 shows that the second stem does not share any phonological feature of the first stem, suggesting that phonology is not responsible for the process of reduplication in Acehnese.

The stem *ci* 'try', which is commonly referred to daughter, is one of the most productive stems for synonym confounding. It can choose two kinds of synonymous daughter, even a daughter which is phonologically and semantically identical to it, i.e. *ci* 'to try'. The process of compounding is shown in the following figure.
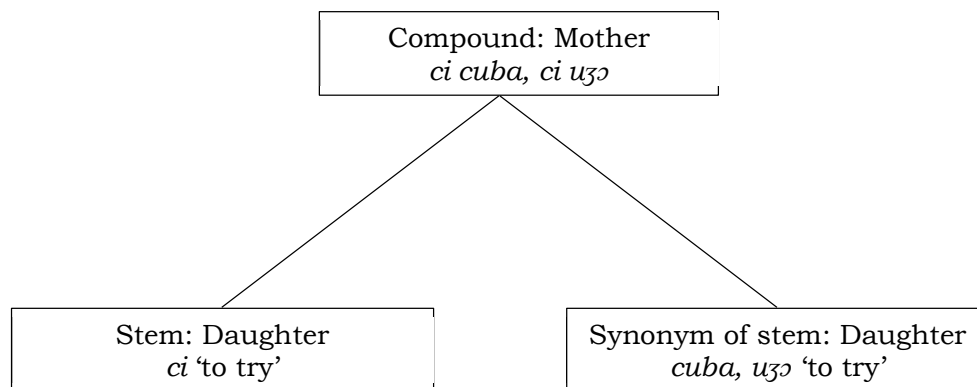
Figure 1. Process of compounding of synonyms in Acehnese

The unrestricted selection of synonyms by the phonological identity for the word *ci* shows that the synonym compounding is not phonologically required. For emphasizing, the stem *ci* selects one of the two synonyms, i.e. *cuba, uʒɔ*. However, when the stem *ci* selects a stem which is phonologically identical to it, i.e. *ci*, becoming *ci-ci*, it indicates that the selection of synonym is aimed at satisfying the semantic identity, i.e. to mark repeated action. *trok* and *woe* in Table 1 can also form a compound with three other daughters, i.e. two which shares semantic identity and one which shares both semantic and phonological identity. The occurrence of *ci ci, troh troh,* and *woe woe,* which indicates that morphology calls those stems twice because they are semantically required, demonstrates how reduplication is formed in the perspective of MDT.

The case of partial reduplication is not as simple as that of full reduplication. This reduplication involves truncation, which is a process of cophonology where the input is mapped to an output of a certain size (Sande et al., 2020). Such process can be found in Acehnese nicknames, which allows the output of left and right part.

(9) Truncation of nicknames in Acehnese
    a) Ibra<u>him</u>   →   Him
    b) Za<u>karia</u>   →   Kari / Karya
    c) Zu<u>lki</u>fli   →   Dun
    d) <u>Jafar</u>uddin   →   Jafar
    e) <u>Fakrud</u>din   →   Pakron
    f) Is<u>lahud</u>din   →   Lahut

Illustration in (9) shows that truncation in Acehnese is rather flexible with different sizes as the output. Inkelas and Zoll (2005) claim that this process considered by MDT in explaining the partial reduplication. This claim can be used to explains the process of partial reduplication in Acehnese, where the reduplicants are sometimes truncated to the left part as in *singoh-ngoh* 'later (tomorrow or after that)' and to the right part as in *ube-be* 'as big as'. The data

did not show copying of internal part or conclude the truncation size due to limited tokens for this type of reduplication in our data.

Finally, despite its capability to explain the reduplication, traditional analysis using C-V skeleta, reduplication to match the skeleton, cannot explain the formation of rhyming reduplication in Acehnese as shown in (10).

(10) Rhyming reduplication
a) tuloŋ	'to help'	tuloŋ-mūloŋ	'to help one another'
b) rɯʔoh	'very tired'	rɯʔoh-rɯʔah	'very tired'
c) tahə	'surprised'	tahə-gantə	'hopelessly surprised'

The reduplicants in (10) are not lexical words while the stems are. *mūloŋ* in (10a) only occurs as a reduplicant of *tuloŋ* 'to help'. The changes from /t/ to /m/ in *mūloŋ* and to /g/ in *gantə* is not phonologically motivated or the insertion on /n/ in *gantə*. Neither is the change in vowel /o/ to /a/ in *rɯʔah* in (10b) phonologically motivated as both vowels occur in an identical environment, i.e. between voiceless glottal consonants, which means the change in phonology is not required at all. More complex segment alternations are found in (10c). All consonants in the stem are replaced in the reduplicant, with an additional consonant inserted into the reduplicant. In short, none of the reduplicants in (10) would exist as lexical words if they were not reduplicants of those stems, as the case found in Isbukun Bunun (Lin, 2018). In this case, C-V skeleta cannot explain how reduplication in (10) is constructed. However, morphology can call anything to be the second daughters of the compound because they are required by morphology to satisfy the semantic identity, even the words that do not independently exist. In addition, the case of *suy-gumuy* 'unorganized' where the reduplicant size is larger than the base *suy* (archaic word to mean 'messy' which is also found in use as a reduplicated only form *suy-suy* 'to make messy') cannot be used to fit the skeleton. Therefore, MDT is more appropriate to explain rhyming reduplication in Acehnese because it does not limit the output size (Inkelas, 2008).

CONCLUSION
The results of the analyses show that MDT can be used is applicable for full reduplication, partial reduplication, and rhyming reduplication in Acehnese. In the case of rhyming reduplication, especially when consonants change, MDT is more appropriate for reduplication analysis than C-V skeleta. The results have shown that reduplication in Acehnese is more of morphological process, which calls the second word as a reduplicant due to semantic requirements for emphasis, to express reciprocity, repetition, plural markings, prolonged action, reciprocity, collective and distributive meaning, and to mean 'somewhat.'

Despite large number of tokens, this study has some limitations. First, the data were extracted from *hikayats*, which emphasize importance on rhyming than accurate meaning. However, the number of tokens for rhyming reduplication is limited, as is partial reduplications. Therefore, some results are inconclusive such as the functions of

reduplication. Further study is recommended to extract tokens of reduplication from real speech such as sermon or political talk where the emphasis is on the expressed meaning. In addition, more advanced phonological analysis should be applied to rhyming reduplication, such as Optimality Theory as used by Musa and Altakhaineh (2015), and Lin (2020) to explain the output in the reduplicants.

ACKNOWLEDGEMENTS

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