

## **A Phonological Study of Syllable Structure and Economy Properties in Bahasa Indonesia: An OT Account**

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### **Abstract**

This paper contains the phonological and economic properties of the syllable structures of the words in Bahasa Indonesia. It determines the behaviour of certain speech segments attached to the root words and elaborates the economy of the syllable structure in tokens. In Bahasa Indonesia, there are various types of segmental processes related to the addition or deletion of the phonemes that affected the root and altered the entire physical mechanism of the words. This paper aims to know the exact economic conditions of syllable structures in words after adding or deleting segments in Bahasa Indonesia. All the types of conflicts between the candidates will be manipulated with the help of constraint rankings in Optimality Theory (Prince and Smolensky, 1993). The general purpose of this paper is to reveal the whole criteria of OT principles and explored the actual framework of syllables within their marginal and obligatory components. The researcher governed the phonological property of consonant clusters with the help of faithfulness constraints and markedness constraints. The architecture of root words wholly varied from the artificial formulation of other words. Still, after the imposition of constraints, we revealed the concrete fact of linguistic items in Bahasa Indonesia. The groundwork of this paper led to the systematic phenomena of epenthesis and syllable structures of vowels or consonants within OT tenets. The researcher considered the typology of the syllable structure of words and the phonological observations of linguistic features. The generalization of each step of the syllable structure and economy of the words should be related to the positional variation of input and output candidates. The conflict between output candidates is solved based on an input candidate's ranking features to find an optimal form in Optimality Theory.

**Keywords:** Optimality Theory; Syllable Structure; Economy; Syllable Typology.

## INTRODUCTION

Bahasa Indonesia is an official language and language of unity in the Indonesian nation. It was inaugurated as the national language after the Proclamation of Indonesian Independence, August 18, 1945. Its stipulation is contained in Article 36 of the 1945 Constitution, which states that "The State Language is Indonesian." Bahasa Indonesia has played an essential role in the country because it is spoken widely among Indonesian people and widespread throughout the nation (Alwi et al. 1993, pp. 1-2). It is used as the medium for science, literature and the arts, and cultural expression. Historically, the initial declaration of the use of Bahasa Indonesia as a national language was made in 1928. This declaration, commonly known as Sumpah Pemuda "Youth Pledge," says: "Kami poetera dan poeteri Indonesia mendjoenjoeng bahasa persatoean, bahasa Indonesia" (Alwi et al., 1993, p. 1). The oath means „We, the young generation of Indonesia, respect the language of unity, Bahasa Indonesia“. According to Yusuf (2013, p. 3), Bahasa Indonesia has become the official language in Aceh since the province became a part of Indonesia in 1950 (Reid, 2005).

The Syllable Structure and Economy are the two critical factors of this paper regarding Bahasa Indonesia. It is noticed that every language has its pattern of segment sequencing and forms a phonological building block of words. The syllable structure is a type of phonological process in which the different segments with different shapes and sizes come together and are fused to the formation of a syllable. The syllable structure may be monosyllabic (V, CV, VC, CVC, VCC, CVCC, etc.), disyllabic (CVCV, CVCCV, VCCV, etc.), trisyllabic (CVCCVC, VCCVCVC, CVCVCVC, etc.), and so on. In the term of Economy, it is generalized that Bahasa Indonesia is involved in adding certain types of elements and generating a new physical mechanism of the syllable structure of words. The word economy determined the addition or deletion of a single segment to the root structure of the words that affected the whole framework of the syllable structures. It examined how many extraneous elements are possible to add or delete in the initial and non-initial position of words and how many syllables are likely to form in a specific environment of Bahasa Indonesia.

OT was first introduced by Alan Prince and Paul Smolensky (1993) and further extended by John McCarthy (1994) to organize the well-formed syllable structure of the words, but soon spread in other areas of Linguistics. According to Gussenhoven and Haikes (1998), Optimality Theory is a pertinent portion of Phonology related to the thought of a universal set of constraints represented in a hierarchically ranked list of language-specific facts. According to McCarthy (2002), "Gen is universal," which means that all candidates produced by Gen for a given input are the same in all languages? These candidates vary from language to language, and Gen's property is called "inclusive or freedom of analysis." Alan Prince and Paul Smolensky (1993) introduced that CON tells us what the substantive constraints are, from which grammars are built. The third significant key component of Universal Grammar is a precise definition of constraints, which is also referred to as EVAL that spells out what it means to be optimal with respect to a ranking of CON.

This study reveals the phonological properties of syllable structures and their economic observation regarding the addition and deletion of segments from the root

words in Bahasa Indonesia. There is a straightforward way to formalize the various types of syllable structures and find out the numeral categories of how much a root word can bear the load of external segments. The groundwork of this study is that after the addition or deletion of segments from the root words, we will apply the principles of Optimality Theory to find out the exact dominating form of the candidate. This study will examine the conflicts between input and output candidates and will be solved based on constraints of OT. After the implications of constraint rankings will determine one of the best candidates for all output candidates as an optimal candidate. In the account of the economy, how many segments are possible to the addition or deletion, and what will be happening with the physical mechanism of the syllable structure of words.

Correspondence diagram for the interaction between input and output candidates

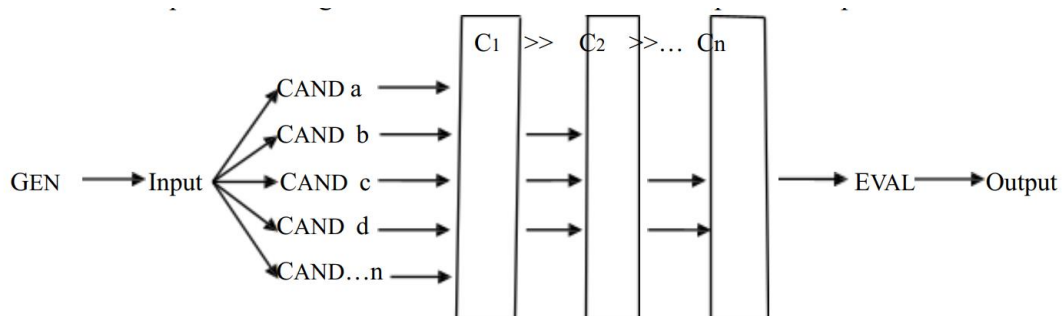


Figure 1: the interaction between constraints and their candidates

Table 1. The Consideration of constraints and candidates with the reference of input

/input/	CONSTRAINT 1	CONSTRAINT 2	CONSTRAINT 3
a. Candidate „a“	*!	*	*
b. Candidate „b“		*!	
c. Candidate „c“			*

The research objectives of this study are relevant to the whole phenomena of epenthesis and elision at the level of syllable structures and their economic behavior of segments in words. There are various types of objectives, but this paper reveals some specific procedures of elements with the utilization of constraint rankings such as:

- a. To know the typological structure and economy of the syllables based on the aspects of the addition or insertion of the speech segments in Bahasa Indonesia.
- b. To explore the status of the output candidates based on the ranking features of the input to find out the best candidate with the help of the hierarchy of constraints.

## METHOD

In conducting research, we need research design. The research design refers to the strategy to integrate the different components of research projects cohesively and coherently. Some experts have different opinions about what is meant by research design. According to Creswell (2009:3), the research design is plans and procedures for research with detailed data collection and analysis methods.

Meanwhile, Bogdan and Biklen (1992) state that qualitative research is descriptive in which the data is collected in the form of words or pictures rather than numbers. Data in the form of quotes from documents, field notes, and interviews or excerpts from videotapes, audiotapes, or electronic communications are used to present the study's findings.

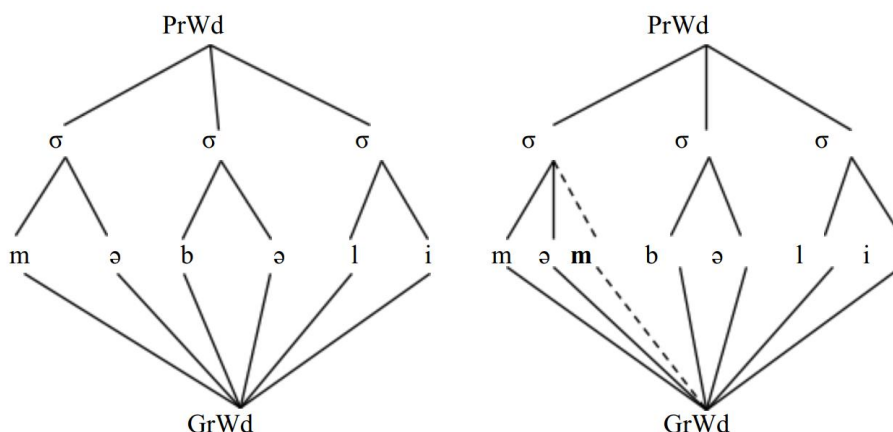
The researcher used data from the Big Indonesian Dictionary (KBBI). The author use documentation as a means of data collection (Arikunto, 1993:202). We select numerous samples from the lexicon that illustrate the problem's phenomena and then use Optimality Theory to evaluate the samples further. The analysis' findings should be able to explain the wonders of the situation in this study.

## FINDINGS

The syllable structure is a property of phonological process in which the speech segments are organized in a particular way to construct a building block of words in a language or across the languages. In terms of the phonological conditioning, each segment is congregated in a different manner to show the specific grammatical category of words. In phonological conditioning, the syllable structure and economy revealed the factors of marginal and obligatory positions of the speech segments. The term economy stands for the determination of the frequency of syllable structures after the addition or deletion of segments in the words. For example, Bahasa Indonesia speakers have the process of addition or deletion of certain types of segments in initial, medial or final position of words:

a. /mə- + bəli/	—————>	[məmbəli]	“to buy”
b. /mə- + fitnah/	—————>	[məmfitnah]	“to slander”
c. /mə- + pəjaruhi/	—————>	[məmpəjaruhi]	“to influence”
d. /mə- + karaŋ/	—————>	[məjarəŋ]	“to compose” .
e. /mə- + hiləŋ/	—————>	[məŋhiləŋ]	“to lose”
f. /mə- + goreŋ/	—————>	[məŋgoreŋ]	“to fry”
g. /mə- + dukun/	—————>	[məndukun]	“to support”
h. /mə- + cuci/	—————>	[məntʃutʃi]	“to wash”
i. /mə- + jəmur/	—————>	[mənjəmur]	“to dry”

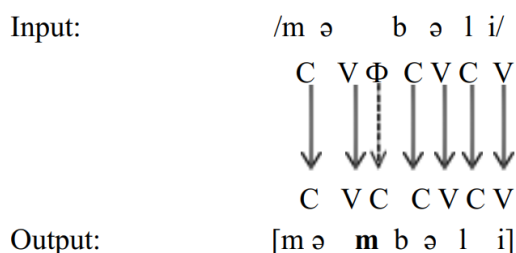
The essential representation of the prosodic and morphological structure of the syllables is concerned with the generalization of the addition or insertion of an external speech segment that broke the framework of the consonant clusters in Bahasa Indonesia:



The above data shows that there is the insertion of the nasal consonants after the prefix *mə-* to cover the features of the place and voicing assimilation. It is notified that the inserted segments break the process of the consonant clusters in the syllable structure of the words. To explain the phonological properties of the inserted segments, we have to use OT principles for the determination of an optimal candidate:

- i. [mə.bə.li] satisfied with DEP-IO and \*CODA, but violated to AGREE and AGREE (VOI)
- ii. [məm.bə.li] satisfied with AGREE (VOI), but violated to DEP-IO, AGREE and \*CODA
- iii. [məb.bə.li] satisfied with AGREE and AGREE (VOI), but violated to DEP-IO and \*CODA

In the account of OT principles, the correspondence diagram represented the familiar framework of the phonological process to generalize the ranking features of the input and output candidates:



In the correspondence diagram, the unbroken lines remained the position of the speech segments, while the broken line denoted the process of insertion of a voiced nasal consonant. Now, we have to focus on the level of the constraint rankings for the classification of the best candidate in Bahasa Indonesia:

Tableau for the analysis of an input candidate /mə.bə.li/ in Bahasa Indonesia

Table 2. phonological conditioning of the syllable structure in the words

/mə.bə.li/	*CODA	DEP-IO	AGREE	AGREE (VOI)
a. [məm.bə.li]	*!	*	*	
b. [mə.bə.li]			*!	*
c. [məb.bə.li]	*!	*		

The strengthening of the constraints is based on the presence and absence factors of the dominance and precedence in a particular language or across the languages. In this framework, the power and potential of the output candidates are generalized through the significant aspects of the input candidate:

\*CODA >> DEP-IO >> AGREE >> AGREE (VOI)

- i. [məŋ.a.raŋ] satisfied with AGREE (VOI), but violated to DEP-IO, AGREE, and \*CODA
- ii. [mə.ka.raŋ] satisfied with DEP-IO and \*CODA, but violated to AGREE and AGREE (VOI)
- iii. [məŋ.ga.raŋ] satisfied with AGREE and AGREE (VOI), but violated to DEP-IO and \*CODA

Table 3. the process of anaptyxis in the syllable structure of the words

/mə.ka.raŋ/	*CODA	DEP-IO	AGREE	AGREE (VOI)
a. [məŋ.a.raŋ]	*!	*	*	
b. [mə.ka.raŋ]			*!	*
c. [məŋ.ga.raŋ]	*!	*		

In the account of the phonological conditioning of the words, it is determined that the anaptyxis is a prominent aspect of the phonological process in which an outer segment is inserted between a prefix and lexical item that did not maintain the property of the syllable structures.

- i. [mə.du.kuŋ] satisfied with \*COM-CODA and DEP-IO, but violated to AGREE and \*CODA
- ii. [mənd.uk.uŋ] satisfied with AGREE, but violated to \*COM-CODA, \*CODA, and DEP-IO
- iii. [mən.duk.uŋ] satisfied with AGREE and \*COM-CODA, but violated to DEP-IO and \*CODA
- iv. [mənd.u.kuŋ] satisfied with AGREE, but violated to DEP-IO, \*CODA, and \*COM-CODA

Tableau for the analysis of an input candidate /mə.du.kuŋ/ in Bahasa Indonesia

Table 4. economy in the syllable structure of the words

/mə.du.kuŋ/	*COM-CODA	DEP-IO	AGREE	*CODA
a. [mənd.uk.uŋ]	*!	*		**
b. [mə.du.kuŋ]			*!	*
c. [mən.duk.uŋ]		*!		***
d. [mənd.u.kuŋ]	*!	*		*

In the account of the economy, the frequency of the syllable structures is determined based on the factors of the constraint rankings. The constraint rankings revealed the phonological properties of the output and input candidates to find out the best candidate in a particular language or across the languages. There is a hierarchy of the constraints to denote the proper solution of the conflicts that happened among the output candidates:

COM-CODA >> DEP-IO >> AGREE >> \*CODA

## DISCUSSION

In Bahasa Indonesia, the structure of the syllables is not maintained due to the addition or insertion of a particular speech segment in words. It is determined that a common prefix mə- (to become active) is added to the beginning of the words to know the vision of the inserted segment in words. It is revealed that the voiced bilabial nasal /m/ is inserted between prefix mə- and the root words beginning from voiceless and voiced bilabial stops /p/ and /b/ and voiceless labio-dental fricative /f/. The voiced alveolar nasal /n/ is inserted between prefix mə- and the root words beginning from voiced alveolar stop /d/, voiceless postalveolar affricate /tʃ/, and voiced palatal semivowel /j/. The voiced velar nasal /ŋ/ is inserted between prefix mə- and the root words beginning from voiceless and voiced velar stops /k and /g/ and voiceless glottal fricative /h/. The inserted segments agreed with the voicing and pattern (place and manner of the articulation) of the following speech segments of the root words to maintain the properties of the assimilations. The inserted segments increased the frequency of the syllables but not maintained the process of the consonant clusters in words. It is notified that these segments are inserted only to add a common prefix mə- at the beginning of the words. It is evaluated that Bahasa Indonesia native speakers need a prefix to insert a speech segment in words to maintain the phonological properties of the whole structure. They did not preserve the account of the consonant clusters due to the insertion of the speech segments in the syllable structure of the words.

In the OT account, it is discussed that there are different types of constraints applied on the structure of the output candidates that matched the ranking features to the input for the description of an optimal form in Bahasa Indonesia. The constraints are universally used to solve the conflicts between the output candidates to become optimal candidates in a particular language or across the languages. Each constraint has its unique level of features and powers that appeared in a hierarchy to know the factors of dominance

and precedence in a specific environment of the languages. In tables 2 and 3, there are four kinds of constraints applied on the structures of the output candidates similar to the ranking features of the input to mark the best candidate.

The candidate „a“ is satisfied with the lowest rank of the constraint AGREE (VOI) (voicing of the output segments must correspond to the input), while violated to the highest, a higher. Lower rank of the constraints \*CODA (final marginal consonant must be in the syllables), DEP-IO (output segments must be input correspondence), and AGREE (similarity between preceding and following speech segments must be identical). It has the highest rank of the constraints, and the least number of the ranking features similar to the input candidate to become an optimal form. The candidate „b“ is satisfied with the highest and higher rank of the constraints \*CODA and DEP-IO, while violated to the lower and lowest AGREE and AGREE (VOI). It has the minor rank of the constraints, and a maximum number of the ranking features similar to the framework of the input candidate. The candidate „c“ is satisfied with the lower and lowest rank of the constraints AGREE and AGREE (VOI), while violated to the highest and higher \*CODA and DEP-IO. It has the highest and higher rank of the constraints violated to the ranking features of the input candidate. It is finalized that the candidate „b“ has the minimum account of the violations (\*) and fatal violations (!) and maximum rank of the features similar to the structure of the input candidate compared to the candidate „a“ and „c“ in Bahasa Indonesia. Based on the factors of OT principles, it is evaluated that the candidate „b“ is declared the best candidate marked as an optimal candidate indicated by in Bahasa Indonesia.

In table 4, four types of constraints are applied on the different kinds of output candidates matched to the input's ranking features to find an optimal candidate in Bahasa Indonesia. The candidate „a“ is satisfied with the lower rank of the constraint AGREE, while violated to the highest, higher, and lowest rank of the constraints \*COM-CODA (coda must be simple in the syllables), DEP-IO, and \*CODA. It has the procedure of the violations and fatal violations affected to the ranking features of the input candidate to become an optimal form. The candidate „b“ is satisfied with the highest and higher rank of the constraints \*COM-CODA and DEP-IO while violating the lower and lowest AGREE and \*CODA. It has the minor rank of the constraints within the maximum values of the ranking features similar to the input candidate to become an optimal candidate in Bahasa Indonesia.

The candidate „c“ is satisfied with the highest and higher rank of the constraints \*COM-CODA and AGREE, while violated to the higher and lowest DEP-IO, and \*CODA. The candidate „d“ is satisfied with the lower rank of the constraint AGREE, while violated to the highest, higher, and lowest rank of the constraints \*COM-CODA, DEP-IO, and \*CODA. It is evaluated that the candidate „b“ has more identical ranking features similar to the input candidate compared to others in Bahasa Indonesia. So, the candidate „b“ became the best candidate marked an optimal form indicated by. In the hierarchy of the constraints, the dominant form is represented by >> to know the power implemented on the output candidates. The left-most constraint is more powerful, while the right-most is least in the hierarchy used to solve the conflicts between the output candidates.



## CONCLUSION

Phonological conditioning of the syllable structure and economy affected the sound systems of a particular word to cover assimilation and anaptyxis in Bahasa Indonesia. It is determined that Bahasa Indonesia native speakers account for the assimilation and anaptyxis within the conventional properties of the prefix and root word. They did not maintain the phonological properties of the consonant clusters due to the insertion of the speech segments in the syllable structure of the words. It is considered that the nasal sounds got the position between a common prefix and the roots. These nasal sounds are agreed with the voicing features of the beginning elements of the root words. It is notified that the economy of the syllable structures is generalized and evaluated base on OT principles to find out the best candidate. It is concluded that Bahasa Indonesia native speakers increased the economy of the syllable structures based on factors of the constraint rankings in a particular hierarchy.

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