

REDUPLICATION ASYMMETRIES IN BAHASA INDONESIA AND THE ORGANIZATION OF THE LEXICON-SYNTAX INTERFACE

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0 Introduction

In this paper, I discuss reduplication in Bahasa Indonesia (BI). The corpus study of four popular newspapers published in Indonesia reveals that there is a curious asymmetry between nominal and verbal reduplication in this language. Specifically, verbal affixes allow only stem reduplication whereas nominal affixes allow both stem and stem-affix reduplication. This asymmetry and the stem-internal reduplication pattern pose non-trivial architectural and empirical challenges for the traditional lexicalist view of the lexicon-syntax interface as in Chomsky 1970, Anderson 1982, Kiparsky 1982/Mohanan 1986, and Di Sciullo and Williams 1987. I propose that these observations receive a straightforward account under the non-lexicalist view of word formation as in Distributed Morphology (Halle and Marantz 1993). Under the proposed analysis, these patterns can be derived as a natural consequence of a particular hierarchical arrangement of certain morphosyntactic features such as Asp and Num in tandem with independently motivated assumptions concerning the cyclic post-syntactic assignment of phonological features. This result, therefore, provide support for the non-lexicalist view of the lexicon-syntax correspondence that attempts to locate all types of word formation within the sole realm of generative syntax.

1 Reduplication Asymmetries in Bahasa Indonesia

To find out existing patterns in nominal and verbal reduplication in BI, Sato and McDonnell in press have conducted a corpus survey of four popular newspapers published in Indonesia. The present corpus contains approximately 160, 000 words, taken from the archives of the following four newspapers: *Tempo*interaktif (www.tempointeraktif.com), *Suarapembaruan* (www.suarapembaruan.com), *Mediaindo* (www.mediaindo.co.id), and *Kompas* (www.kompas.com). The result of this study is given in Table 1 on the next page. I have included here only the results pertaining to derivational affixes; see Sato forthcoming and Sato and McDonnell in press for the expanded result that also contains inflectional affixes.

The results given in Table 1 reveal an asymmetry between nominal and verbal reduplication that has not been noted in the literature on the morphology of BI. Verbal affixes such as *ber-*, *meN-*, *di-*, and *-ter* allow only stem reduplication. Nominal affixes behave differently from verbal affixes in that they potentially allow not only stem reduplication but also stem-affix reduplication. Specifically, certain affixes such as *peN-*, *peN-an*, and *ke-an* have strong tendency to feed stem-affix reduplication whereas other affixes such as *-an* and *per-an* allow both stem and stem-affix reduplication. As is true for the corpus study in general, however, it is difficult to know what reduplicative forms that are not attested in the corpus actually *cannot* be produced by the grammar of BI, though the study does provide indication that the reduplication asymmetry observed here is real. To address this concern, I have conducted a grammaticality judgement task with one native

informant to confirm whether the forms not found in the corpus study are actually unacceptable to the speaker.

Table 1: The Corpus Survey of Four Newspapers in Indonesia (approx.160, 000 words)

		Stem Reduplication		Stem-Affix Reduplication	
		Total Tokens	Unique Forms	Total Tokens	Unique Forms
No Affix		1014	312	N/A	N/A
Verbal Affixes	<i>ber-</i>	89	37	0	0
	<i>meN-</i>	30	23	0	0
	<i>di-</i>	23	20	0	0
	<i>ter-</i>	13	9	0	0
Nominal Affixes	<i>-an</i>	32	22	19	15
	<i>peN-</i>	0	0	8	5
	<i>peN-an</i>	0	0	2	2
	<i>per-an</i>	6	2	9	6
	<i>ke-an</i>	1	1	10	8

The following examples show that the corpus study in Table 1 reflects the grammar of BI. For reasons of space, I concentrate on the verbal affix *ber-* and the nominal affix *-an* in this paper. Consider first the reduplication pattern found with *ber-*. Table 1 indicates that this prefix only allows stem reduplication. This result is confirmed by the contrast between (1a-c) and (2a-c).

- (1) Stem Reduplication with the Verbal Prefix *ber-*
 - a. belit ‘twist’ \Rightarrow [ber [belit-belit]] ‘meander’
 - b. cakap ‘talk’ \Rightarrow [ber [cakap-cakap]] ‘chat’
 - c. jalan ‘walk’ \Rightarrow [ber [jalan-jalan]] ‘stroll’
- (2) Stem-Affix Reduplication with the Derivational Prefix *ber-*
 - a. belit ‘twist’ \Rightarrow *[[ber-belit]-[ber-belit]] ‘meander’
 - b. cakap ‘talk’ \Rightarrow *[[ber-cakap]-[ber-cakap]] ‘talk’
 - c. jalan ‘walk’ \Rightarrow *[[ber-jalan]- [ber-jalan]] ‘stroll’

A similar argument can be made for the finding in Table 1 that the nominal suffix *-an* allows both types of reduplication. That this finding is correct is indeed evidenced by the grammaticality of stem reduplication in (3a-c) and stem-affix reduplication in (4a-c).

- (3) Stem Reduplication with the Nominal Suffix *-an*
- | | | | | | |
|----|-------|-------------|---|--------------------------|----------------------------|
| a. | sayur | ‘vegetable’ | ⇒ | [[sayur-sayur]-an]] | ‘many types of vegetables’ |
| | | | ⇒ | *[[sayur-an]-[sayur-an]] | |
| b. | buah | ‘fruit’ | ⇒ | [[buah-buah]-an]] | ‘many types of fruit’ |
| | | | ⇒ | *[[buah-an]-[buah-an]] | |
| c. | biji | ‘seed’ | ⇒ | [[biji-biji]-an]] | ‘many types of seeds’ |
| | | | ⇒ | *[[biji-an]-[biji-an]] | |
- (4) Stem-Affix Reduplication with the Nominal Suffix *-an*
- | | | | | | |
|----|-------|---------|---|-------------------------|------------|
| a. | pikir | ‘think’ | ⇒ | [[pikir-an]-[pikir-an]] | ‘thoughts’ |
| | | | ⇒ | *[[pikir-pikir]-an]] | |
| b. | tulis | ‘write’ | ⇒ | [[tulis-an]-[tulis-an]] | ‘writings’ |
| | | | ⇒ | *[[tulis-tulis]-an]] | |
| c. | masuk | ‘enter’ | ⇒ | [[masuk-an]-[masuk-an]] | ‘inputs’ |
| | | | ⇒ | *[[masuk-masuk]-an]] | |

(3a-c) show that the nominal suffix *-an* allows stem reduplication while (4a-c) show that the same suffix can also feed stem-affix reduplication. It is important to observe, however, that the choice between the two forms of reduplication is not entirely free with this suffix; rather, the choice is affected by the type of stem that it is identified with. Thus, when this suffix is combined with nominal stems as in (3a-c), it only allows stem reduplication. On the contrary, when this suffix is combined with verbal stems as in (4a-c), it only allows stem-affix reduplication. Thus, it is not the case that a single nominal affix allows both types of reduplication. We have already observed this pattern in the behaviour of circumfixes such as *peN-*, *peN-an*, and *ke-an*, whose dominant reduplication pattern is stem-affix reduplication, as shown in Table 1.

2 Reduplication in Bahasa Indonesia and Lexicalist Theories

The lexicalist theory is one traditional approach to the lexicon-syntax interface. Its central tenet is that there is a strict division of labor between the lexical and syntactic components of the grammar, which can only interact through a restricted set of information that is accessible to both components. Under this view, the products of lexical operations serve as atomic indivisible units that syntactic combinatorial processes operate on as terminal nodes. This view of the lexicon-syntax interface thus yields the so-called *Lexical Integrity Hypothesis*, which states that principles of syntax cannot peek into the internal structure of complex objects created in the pre-syntactic lexical component. This separation comes from the long-standing observation that morphological “words” are somehow distinct from syntactic “phrases” in several dimensions including semantic and phonological idiosyncrasies/compositionality, gaps/productivity, and the derivation vs. inflectional dichotomy.

The purpose of this section is to show that the nominal vs. verbal reduplication asymmetry and the existence of the word-internal reduplication pattern that targets the non-edge of a complex stem cannot be accounted for by several versions of the lexicalist theory as in Chomsky 1970, Anderson 1982, Kiparsky 1982/Mohanan 1986, and Di Sciullo and Williams 1987. I also note that this problem arises precisely because the lexicalist theory adopts a view of the syntax-lexicon interface that postulates the generative lexicon either as the pre-syntactic component responsible for certain types of word formation or the independent word system whose information is encapsulated from the perspective of the syntactic system.

2.1 Chomsky's 1970 Weak Lexicalist Theory

Chomsky 1970 proposes, based on several syntactic and semantic contrasts between derived nominalization (*destroy* \Rightarrow *destruction*) and gerundive transformations (*destroy* \Rightarrow *destroying*), that non-productive, irregular processes take place in the pre-syntactic lexical component while productive, regular processes take place in the syntactic/transformational component. This separation of the two types of complex word formation in terms of their regularity/productivity has been widely taken in the generative literature to define the classical version of the weak lexicalist theory (see Marantz 1997, though, for an alternative interpretation of Chomsky's work).

If we adopt Chomsky's version of the lexicalist hypothesis, *ber-/an-* affixation as observed in (1-4) counts as a lexical/pre-syntactic process. As noted in the literature on the morphology of BI as in McDonald 1967 and Sneddon 1996, the verbal prefix *ber-* may attach to nominal, numeral, and verbal bases that yield highly unpredictable/irregular semantic outcomes. Predicates consisting of this prefix and a nominal base refer to a customary possession of, or to characterization by the referent of the noun, as shown in (5a, b). This type of prefixed predicate can also be used to refer to the act of producing the reference of the noun or making use of it, as shown in (5c, d). When the nominal base refers to a profession or way of life of an animate being, the derived predicate refers to the property of making a living with that possession or by that way of life, as shown in (5e, f).

(5) *ber*-prefixation: Input = Noun/Output= Verb (MacDonald 1967: 44,45)

- | | | | | | |
|----|--------|-----------|---|-----------------|----------------------|
| a. | anak | 'child' | → | [ber [anak]] | 'have children' |
| b. | kaki | 'foot' | → | [ber [kaki]] | 'have feet' |
| c. | kokok | 'cackle' | → | [ber [kokok]] | 'produce a cackle' |
| d. | sepeda | 'bicycle' | → | [ber [sepeda]] | 'use a bicycle' |
| e. | kuli | 'coolie' | → | [ber [kuli]] | 'work as a coolie' |
| f. | tukang | 'artisan' | → | [ber [artisan]] | 'work as an artisan' |

The same prefix can also combine with a numeral, unreduplicated or reduplicated, to yield the complex noun meaning 'forming a group of' and 'in groups of', as shown in (6a-c).

(6) *ber*-prefixation: Input = Numeral/Output= Numeral (MacDonald 1967: 47)

- | | | | | | |
|----|--------|-----------|---|----------------|----------------|
| a. | dua | 'two' | → | [ber [dua]] | 'two together' |
| b. | ratus | 'hundred' | → | [ber [ratus]] | 'in hundreds' |
| c. | karung | 'sack' | → | [ber [karung]] | 'in sackfuls' |

The same prefix also may create intransitive verbs by attaching to verbal bases that otherwise do not occur alone, as in (7a, b). If the root is reduplicated, an additional meaning of variety, repetition or lack of purpose is implied, as in (7c, d).

(7) *ber*-prefixation: Input = Verb/Output= Verb (MacDonald 1967: 47,48)

- | | | | | | |
|----|---------|---------|---|---------------------|------------------|
| a. | -henti- | 'stop' | → | [ber [henti]] | 'come to a stop' |
| b. | -pikir- | 'think' | → | [ber [pikir]] | 'be cogitating' |
| c. | belit | 'twist' | → | [ber [belit-belit]] | 'meander' |
| d. | cakap | 'talk' | → | [ber [cakap-cakap]] | 'have a chat' |

The function of the nominal suffix *-an* is no more complex. It serves as nominalizer when it attaches to verbal bases as in (4a-c). It serves as a kind of classifier meaning ‘types of’ when it attaches to nominal bases, as in (3a-c). These considerations suggest that the two affixes are irregular morphemes and that the affixation involved is a lexical/pre-syntactic process in Chomsky’s sense. In section 3, I show that the two functions of *-an* can be determined by two different attachment sites in the syntax.

By contrast, reduplication is a fully productive, hence syntactic process under Chomsky’s productivity-based division of the two types of word formation. Reduplication of any countable noun produces a grammatical form that is specifically plural. Thus, reduplication in BI is a productive realization of the Number in the nominal domain. It is not apparently as clear whether the corresponding argument can be made for the verbal domain to show that verbal reduplication is really productive. The literature on the verbal reduplication in BI as in MacDonald 1976 and Sneddon 1996 notes that reduplication of a verb yields an interpretive consequence of adding emphasis of an action denoted by the base stem and yielding outcomes related to variety, multiplicity, and atelicity. Sneddon 1996, for example, gives a variety of meanings as in (8a-d):

(8) Semantic Effects of Verbal Reduplication (Sneddon 1996: 20)

- a. With some verbs reduplication gives a connotation of action done in a causal or leisurely way.
Examples: *duduk* ‘sit’ \Rightarrow *duduk-duduk* ‘sit about’
berjalan ‘walk’ \Rightarrow *berjalan-jalan* ‘walk about, go for a stroll’
- b. With many verbs reduplication indicates continued action, either an action done over a period of time or an action performed repeatedly
Example: Bu Yem mengurut-urut rambut anaknya.
Mrs Yem stroked-RED hair child-her
‘Mrs.Yem stroked her child’s hair.’
- c. With some verbs reduplication gives a meaning somewhat different from that of the single form, usually conveying a sense of intensity.
Examples: *menjadi* ‘become’ \Rightarrow *menjadi-jadi* ‘get worse’
meminta ‘request’ \Rightarrow *meminta-minta* ‘beg’
- d. Accompanied by *tidak* ‘not’ reduplication of the verb can indicate that the action has not occurred, usually implying that this is contrary to expectation.
Example: Sudah dua hari Pak Tanto tidak muncul-muncul.
yet two day Mr TantoNeg turn up-RED
‘Mr Tanto has not turned up for two days now.’

The following two considerations show that verbal reduplication in BI is more like a syntactic process rather than a lexical process in the lexicalist sense. First, the examples in (1a-c) seem to all belong to the type (8a) in Sneddon’s classification. This semantic effect as well as the other three in (8b-d) are in keeping with the general notion of plurality/emphasized quantity, a crosslinguistically attested effect of reduplication, as evidenced by the extensive investigation of the function of reduplication conducted by Moravcsik 1978. Though Moravcsik herself concludes (p. 325) that “no explanatory or predictive generalization about the meanings of reduplicative constructions can be proposed,” as Travis 1999 argues, the results of her investigation should be construed as suggesting that reduplication serves some abstract quantificational function which is diversely instantiated as plural, causality,

distributivity, multiple iterative event readings, reciprocals, emphasis, and so on. The existence of this quantificational effect of reduplication suggests that reduplication in BI is a syntactic process in Chomsky's sense, as the quantificational effect can only be dealt at the phrase-level system (see also section 2.4).

The second related argument to support the syntactic nature of the reduplication in BI comes from the event structural effects of reduplication. Davies 2000 shows that reduplication forces the multiple event reading of a verb based on his examination of reduplicative constructions in Madurese, a Javanic language closely related to BI. There seems to be a general agreement in the lexicalist literature, including Chomsky 1970, at least tacitly, that the lexicon creates complex words based on lexical categories (N, V, A, P) but never on functional categories (Aspect, T, C). This assumption is natural because time or event reference must crucially depend upon the rules of sentence formation. The following examples from BI, modelled after the corresponding examples in Madurese provided by Davies 2000: 127-129, show that reduplication of a verb in BI also creates a variety of new interpretations unavailable to its unreduplicated counterpart, such as multiple event readings, interleaved activity readings, and temporally displaced readings.

(9) Semantic Effects of Reduplication: Multiple Events Readings

- a. Esti meng-elus(-elus) rambut anak-nya.
Esti AV-stroke-RED hair child-her
'Esti stroked her child's hair many times.'
- b. Aini dan Lina me-motong(-motong) kayu selama dua jam dan menanam bibit
Aini and Lina AV-cut-RED wood for two hours and plant seed
'Aini and Lina cut down trees for two hours and planted seeds.'
- c. Aini dan Lina men-cubit(*-cubit) adik-nya yang lucu. Aini mem-cubit-nya hari
Aini and Lina AV-pinch-RED child-their that cute Aini AV-pinch-her day
Senin Lina hari Selasa.
Monday Lina day Tuesday
'Aini and Lina pinched their cute baby. Aini did so on Monday and Lina did so on Tuesday.'

(9a) illustrates the multiple event reading whereby the telic event of stroking a child's hair occurred several times. If reduplication does not occur, by contrast, the sentence is ambiguous between the single event reading and the multiple event reading. This event-related property caused by reduplication can also be seen in (9b). Although judgments are subtle, according to my two language informants, (9b) with reduplication allows the interpretation where the event of tree-cutting is interspersed with the event of seed-planting; for example, this sentence is true in the situation where Aini and Lina continued the activity of tree cutting for one hour, then did seed-planting for some time, and then resumed the tree-cutting activity for another hour. This interspersed activity reading is impossible without reduplication of the verb in (9b). Similarly, (9c) shows that the activity of the reduplicated verb can be spaced over time. For example, (9c) is acceptable with reduplication under the reading where Aini pinched her baby on Monday but Lina did so on Tuesday. The acceptability of this example with reduplication is what we predict because the reduplication of a verb feeds multiple event readings. This reading, however, is unacceptable without reduplication in the same example. What is important about (9a-c) is that the availability of these three readings, derived by verbal reduplication, makes crucial reference to the notion of time or event. Again, this reference should not be possible in

the lexical component to the extent that the above-mentioned assumption holds, namely, that the lexicalist sense of lexicon does not contain functional elements such as Aspect, T and C. The readings forced by reduplication in BI as in (9a-c), therefore, provide an argument for treating BI reduplication as a syntactic/non-lexical process.

With these observations in mind, consider whether the examples of stem-reduplication and the nominal vs. verbal reduplication asymmetry in BI might be accounted for under Chomsky's classical weak lexicalist theory. Examples of stem-reduplication as illustrated in (1a-c) and (3a-c) instantiate the word-internal reduplication, namely, that an affix (either *ber-* or *-an*) is attached to the complex stem created by reduplication. In other words, the affixation applies word-internally. This pattern of reduplication poses an inverse ordering problem for Chomsky's version of the lexicalist hypothesis. The formation of the stem reduplicated forms such as *belit-belit* and *sayur-sayur* requires the syntactic process of reduplication because reduplication is a productive process. The *ber-/an* affixation applies to this stem-reduplicated form to yield the grammatical forms such as [[*ber*-[*belit-belit*]] and [[*sayur-sayur*]-*an*]]. This ordering, however, should be impossible under the lexicalist architecture of the lexicon-syntax interface that posits the lexicon as a pre-syntactic system because the generation of these forms requires that the syntactic process of reduplication precede the lexical/pre-syntactic process of affixation. Furthermore, it seems that Chomsky's variant of the weak lexicalist hypothesis does not have anything to say about why there is an asymmetry between nominal and verbal reduplication in BI, as illustrated in the examples in (1-4) and Table 1, where nouns allow both stem and stem-affixation whereas verbs only allow stem reduplication. Chomsky's 1970 weak lexicalist theory, therefore, has serious architectural and empirical shortcomings in face of the existing reduplication patterns in BI.

2.2 Anderson's 1982 Weak Lexicalist Theory

Anderson 1982 develops a different version of the weak lexicalist theory from Chomsky's 1970 version that does not depend on the notion of productivity. He argues that inflectional morphology is treated in the syntax whereas derivational morphology is treated in the lexicon. He defines the inflectional/syntactic nature of a word formation process as follows:

(10) The Definition of Inflectional Morphology in Anderson 1982

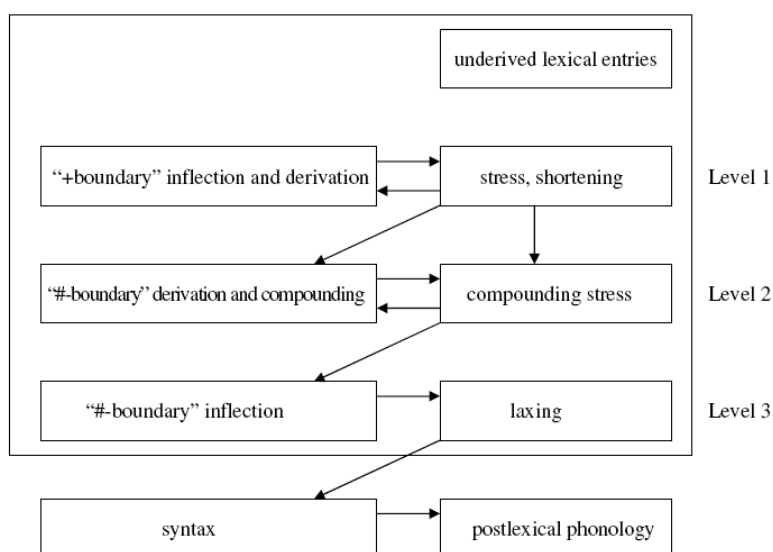
Inflectional morphology is what is relevant to syntax. (Anderson 1982: 587)

This definition requires that any affixation that has relevance to syntax such as agreement, tense, event structure should be treated in the syntactic manner. This conception of the weak lexicalist theory is particularly problematic in face of BI reduplication. The affixation of *ber-/an* counts as a lexical/pre-syntactic process because it does not seem to have syntactic effects such as agreement, tense, and event structure. However, we have seen in section 2.1 that reduplication in BI has clear event-structural/syntactic accounts in the form of the plural quantification of nominal denotations and the event multiplication of verbal denotation. This means that reduplication is an inflectional process to be treated in the syntax under Anderson's 1982 system. Then, the word-internal reduplication pattern illustrated in (1a-c) and (3a-c) should be ungrammatical because the generation of such a pattern requires the application of the syntactic rule to be followed by the application of the lexical rule. Anderson's 1982 version of the weak lexicalist theory also has nothing to say about the reduplication asymmetry observed in BI.

2.3 Kiparsky's 1982/Mohanan's 1986 Strong Lexicalist Theory

The same reduplication asymmetry and the word-internal reduplication pattern also refute one well-known version of the strong lexicalist theory known as Lexical Phonology (Kiparsky 1982; Mohanan 1986). This theory maintains that morphology and phonology interact in tandem with each stratum/cycle governing operations with certain characteristics. Specifically, affixational/inflectional processes with irregular phonological and morphological consequences occur in Stratum 1 while regular inflectional processes with transparent consequences occur in a later Stratum (Stratum 3 in Kiparsky/Stratum 4 in Mohanan). Kiparsky's 1982 model of the Lexical Phonology is given in (11) below. See Mohanan 1986 for a further development of Kiparsky's original model, which I am not going to discuss here.

(11) Kiparsky's 1982 Model of Lexical Phonology in English (Kiparsky 1982: 133)



This model assumes that the word formation rules and the lexical phonological rules are partitioned into an ordered series of levels/strata/cycles. “+boundary” inflectional affixes in Level 1 include the umlaut of *tooth-teeth*, the ablaut of *sing-sang* and other stem-changing morphology whereas “+boundary” derivational affixes include what have been called Level 1 affixes in the Level-Ordering Hypothesis of Siegel 1974 such as *-al*, *-ous*, and *-im* (as in *refusal*, *pious*, and *impotent*). “#-boundary” derivation in Level 2 involves what have been called Level 2 affixes in the Level-Ordering Hypothesis such as *un-*, *-ness*, and *-er* whereas compounding is a process of combining two independent root elements such as *black board*, *nurse shoes*, and *red coat*. Finally, “#-boundary” inflection in Level 3 deals with the affixation involving the rest of the regular inflectional affixes such as plural *-s*, and past tense *-ed* in English.

One theoretical tenet of Lexical Phonology which is important for the purposes of this paper lies in the *Bracketing Erasure Convention*. This convention deletes all brackets at the end of each stratum/level of word formation and thus has the effect of rendering access to the previously available internal structure of complex words opaque in later strata/cycles. This convention, thus, derives one version of the lexical integrity hypothesis, namely, that word formation processes in Level 2 and 3 cannot look into the morphological makeup of complex morphological objects created by word formation processes in Level 1 and Level 2, respectively. Lexical Phonology, therefore, makes an explicit prediction that no processes in a particular level

should be able to apply *within* a complex object that is derived by word formation processes characteristic of earlier levels. This prediction is clearly falsified by the reduplication pattern attested in BI. We have seen in section 2.1 that reduplication is a fully productive process. Under Kiparsky's model, this process is located in Level 3 on a par with regular inflectional affixes such as plural *-s*, and past tense *-ed*: recall that any countable noun and semantically appropriate verb can be input for reduplication just as any countable noun and verb can be affixed by *-s* and *-ed* in English, respectively. We have also seen there that affixes like *ber-* and *-an* yield a set of semantic irregularities when attached to a stem. This unpredictable behaviour leaves affixation of these pieces in Level 1 on a par with irregular umlaut and ablaut rules as in *tooth-teeth* and *sing-sang*. Now, to derive the word-internal reduplication pattern as illustrated in (1a-c) and (3a-c) under Kiparsky's model, the Level 1 affixation (*ber*-affixation and *-an* suffixation) must be preceded by the Level 2 inflectional process (reduplication), an ordering that should be impossible in Lexical Phonology due to its central hypothesis that each level/stratum is strictly ordered and hence cannot be traversed. To illustrate it with *ber-belit-belit*, under Lexical Phonology, the base *belit* is submitted to Level 1, at which *ber*-prefixation would apply to yield [*ber-belit*]. This complex object is submitted to Level 3, at which reduplication applies to the whole object to create the output [[*ber-belit*]-[*ber-belit*]]. Importantly, this output is ill-formed as shown in (2a), even though this is the only output that is predicted to be possible under the strict layering of levels in Lexical Phonology. BI reduplication is also problematic for Lexical Phonology in three other respects. First, due to the Bracketing Erasure Convention, Kiparsky's model above makes a prediction that reduplication must target the right or left edge of the whole complex object because at the time this process applies in Level 3, the input transferred from Level 2 enters the Level 3 as an atomic unanalyzable element as the result of the erasure of all word-internal constituent boundaries. However, the existence of forms like [*ber*-[*belit-belit*]] shows that reduplication does target part of the complex stem rather than the left or right edge of it. Second, Kiparsky's 1982 assumes that the output of each level is itself a full-fledged lexical item. However, the ill-formedness of forms such as **belit-belit* shows that this is not always the case. Finally, Kiparsky's theory of Lexical Phonology does not seem to provide us with any way of explaining why the asymmetry between nominal and verbal reduplication obtains in BI.

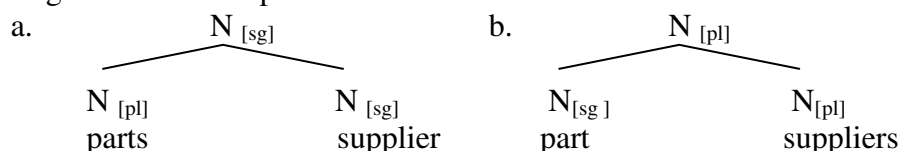
2.4 Di Sciullo and Williams' 1987 Strong Lexicalist Theory

Di Sciullo and Williams 1987 develop the most comprehensive defence of the strong lexicalist theory. They maintain that morphology and syntax are two different domains of inquiry with two different primes (e.g., stems, affixes, roots vs. NPs, VPs, CPs) and operations (compounding, θ -identification vs. movement, quantification). Thus, for Di Sciullo and Williams 1987, the so-called lexicalist hypothesis/the lexical integrity hypothesis/the lexical atomicity "is not a principle of grammar but rather a consequence of the conception that grammar contains two subparts, with different atoms and different rules of formation" (p.2). Assuming this strict division of labor between the word system and the phrase system, Di Sciullo and Williams 1987 maintain that the morphology and syntax can still communicate with one another through a restricted range of shared vocabulary, specifically, the "topmost properties of words, the features and argument structure of the topmost words." (p. 45).

Let us consider what their version of the strong lexicalist theory could tell about the reduplication patterns in BI. Note that the argument against their system cannot be made on the basis of relative productivity of reduplication and the lack thereof in *ber-/an* affixation, as in Chomsky's weak lexicalist theory, because they argue that morphological objects and syntactic

objects alike show productivity. Therefore, I provide an argument based on what they take to be top-most properties of the morphological word that work as shared information between morphology and syntax. Di Sciullo and Williams 1987 illustrate this cross-modular communication with compounding in English. Compounding involves the creation of what they call morphological objects that derive their agreement features from the percolation of the features of the right-hand head (Williams 1981). Crucially, it is the output agreement recorded on the top-most level of the compound (namely, the topmost N in (12a, b)) that is used for the purposes of syntactic subject-verb agreement, as the contrast between (13a) and (13b) shows.

(12) English N + V compounds



- (13) a. Parts-supplier is/*are mean to me.
 b. Part-suppliers *is/are mean to me.

This agreement pattern correctly falls out from Di Sciullo and William's 1987 system because the feature specification for the non-head member of the compound is invisible from the perspective of syntax. Thus, this pattern is one way in which the syntax and morphology can communicate through a restricted range of shared vocabulary though the atomicity thesis above still blocks the syntax from accessing the internal composition of compounds.

The word-internal reduplication pattern in (1a-c) and (3a-c) pose a serious difficulty for Di Sciullo and Williams' version of the strong lexicalist theory. Since they assume that affixes are one type of primitive in their morphological system, it is reasonable to think that *ber-/an-* affixation in BI is a morphological operation in this system. We have seen in section 2.1 that reduplication in BI yields new quantification (plural) and event-structural (multiple event) interpretations, which cannot be produced by lexical operations since such an operation belongs to the sentence system. This observation is important because Di Sciullo and Williams explicitly state (p. 50) that "the atomicity of words prevents word-internal time reference from being assigned time values in the way that 'tense' is." Then, the availability of the multiple event readings, interspersed activity readings, and the displaced time reading in (9a-c) in verbal reduplication suggests that reduplication belongs to the sentence system under their system.

Given the foregoing observation, the word-internal reduplication pattern illustrated in (1a-c) and (3a-c) pose an empirical problem for Di Sciullo and Williams's atomicity thesis because *ber-/an-* affixation, a morphological process, takes the output of the reduplication, a syntactic process, as its input. This should not be possible, since the morphological operation must apply only to morphological primitives such as stems, roots, and so on. One might counter that these affixes attach to the top-level object created by syntax but this possibility seems unlikely within their framework in light of the observation that the communication of the word system and the phrase system is asymmetrical because phrases are derived out of words but not vice versa. Another problem for Di Sciullo and William's 1987 theory comes from the availability of both stem and stem-affix reduplication with respect to certain derivational nominal affixes such as *-an*. As I show in the next section, the suffix *-an* has two different functions in the stem reduplication and the stem-affix reduplication, depending on the

height of syntactic projections that it is merged within. Thus, the functions of this polysemous suffix are determined by the syntactic environment in which it is found. If this analysis is tenable, it is not clear whether Di Sciullo and Williams' system morphological could capture this correlation between the functions of the suffix *an-* and their structural height because *an-* suffixation should not be able to interact with syntactic information such as structural height that is solely available within the syntactic system due to their atomicity thesis. The arguments developed here thus provide evidence against the general architecture of the lexicon-syntax interface as in Di Sciullo and Williams's 1987 strong lexicalism.

2.5 The Lexicon as the Source of Embarrassment

To summarize this section, I have shown that the reduplication within lexically/pre-syntactically derived complex stems in BI pose non-trivial empirical and architectural problems for a number of well-known versions of the weak and strong lexicalist theory as presented in Chomsky 1970, Anderson 1982, Kiparky's 1982a/Mohanan 1986, and Di Sciullo and Williams 1987. I have also shown that those lexical approaches would have little to tell about how the asymmetry between nominal and verbal reduplication arises in this language. Thus, those facts on BI reduplication provide strong arguments against certain versions of the weak/strong lexicalist theory. It is important to note that this type of inverse ordering is a problem only when we postulate the lexicon/morphology as the pre-syntactic generative component that is responsible for certain types of word formation characterized by productivity, semantic/phonological compositionality, the relevance of morphological primes to the syntax, and so on. In other words, this problem does not (or cannot) arise in non-lexicalist theories of the lexicon-syntax interface that do not posit such an independent component prior to/in addition to the generative system of syntax. In light of this consideration, in the next section, I pursue an alternative, non-lexicalist analysis of the reduplication in BI within the more recent framework of Distributed Morphology.

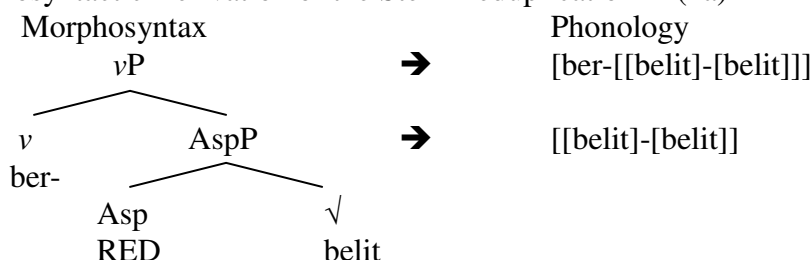
3 A Distributed Morphology Approach to Reduplication in Bahasa Indonesia

In this section, I show that the asymmetry between nominal and verbal reduplication and the word-internal reduplication pattern receive a straightforward account within the non-lexicalist theory of Distributed Morphology (Halle and Marantz 1993). Specifically, I propose that these facts are explained as a natural consequence of a particular hierarchical arrangement of morphosyntactic features such as Aspect and Number in BI. I assume, in line with much recent work on reduplication conducted within a number of different theoretical frameworks (see Marantz 1982, McCarthy and Prince 1995, and Travis 1999, among others) that this process consists in affixation of the reduplicative null morpheme RED (UPLICATION) that triggers copying on a stem on its local environment;

3.1 Verbal Reduplication

Consider first verbal reduplication. As we have seen in section 2, verbal affixes can only allow stem reduplication. This pattern is naturally explained if verbal reduplication is mediated by the Inner Aspect head (Travis 1999) that dominates the reduplicative null morpheme. This assumption is supported by the fact that, as noted in section 3.1, verbal reduplication has effects on the event structure of the verb. Under these assumptions, then the morphosyntactic derivation for (1a), [ber-[belit-belit]], will be as in (14).

(14) The Morphosyntactic Derivation of the Stem-Reduplication in (1a)



In this derivation, the Asp head merges with the acatgeorial root *belit* ‘twist’. The object that results from this merger is phonologically realized as the reduplicative form, [[belit]-[belit]], because the only stem that the RED morpheme in the Asp head triggers copying of is the root *belit* on its local c-commanding environment. The Asp head undergoes further merger with the verbalizing prefix *ber-*. The complex morphosyntactic object then is interpreted at the syntax-external phonological component as [ber-[[belit]-[belit]]], as desired. It is important to note that the reduplicative morpheme intervenes between the *v* head and the root in this derivation. Accordingly, the RED morpheme cannot reach up to the position of the *v* head to include the verbalizing prefix in its domain for reduplication to yield the ungrammatical form as in *[[ber-belit]-[ber-belit]]. This derivation thus correctly predicts the unavailability of the stem-affixation reduplication pattern for verbal affixes such as *ber-*. In this way, the fact that verb affixes only allow stem reduplication naturally falls into place once we assume a particular hierarchical arrangement of certain morphosyntactic features/heads.

It is also to be stressed here that the state of affairs observed above in which the functional heads are linearized in the direction predicted by the hierarchical alignment of morphosyntactic features is exactly what is expected under the theory of Distributed Morphology. Within this framework, word formation of any kind is conducted by the single generative procedure as the sentence formation of any kind. Accordingly, the verbal reduplication pattern in BI is simply the direct consequence of the grammatical architecture of the Distributed Morphology. On the contrary, under non-lexicalist views of the syntax-lexicon interface, there is no reason to expect that the syntactic structure and the morphological structure match in this manner, as the interface between the lexicon and syntax is indirect. Thus, the reduplication for verb stems in BI can be construed as one good testing ground to tease apart the predictions of the two competing theories. The proposed analysis of verbal reduplication in BI also supports the locality of phonological feature assignment at the syntax-external interface; it crucially rests on the idea that the post-syntactic late insertion of phonological material at the interface closely mirrors the way the syntactic derivation proceeds; *ber-* cannot be included as part of input for verbal reduplication because it is merged in a structurally higher position than the object (AspP) that becomes the target for reduplication; only the root must be included for reduplication because it is in the c-commanding domain of the RED morpheme. Therefore, the stem-affix reduplication pattern as in *[[ber-belit]-[ber-belit]] is simply underivable under the interpretive nature of the phonological component, as assumed in Distributed Morphology.

3.2 Nominal Reduplication

Nominal suffixes in BI allow both stem and stem-affix reduplication, as we have seen in section 2. The choice between the two types of reduplication is not entirely free but rather is

final output [[sayur]-[sayur]-an]]. Since the RED morpheme can have access to the *nP* in its local c-commanding domain, *-an* cannot be included for nominal reduplication. Thus, forms such as *[[sayur-an]-[sayur-an]] are simply ungeneratable. The derivation in (16) is crucially different from that in (15) in that the base stems are all verbal. Accordingly, they must undergo zero-derivation into nominal stems by the suffixation of the nominalizing suffix *-an* to serve as the complement that can satisfy the categorial restriction imposed by the Num head. Since the RED morpheme contained in this head includes the nominalizing suffix as well as the base stem in its local c-commanding domain, the syntactic derivation dictates that the phonological component include both elements as input for reduplication, thereby closely following the path curved by syntactic derivation in a local manner and yielding the correct output [[pikir-an]-[pikir-an]]. Under this derivation, then, the stem reduplication pattern as in the hypothetical *[[[pikir]-[pikir]]-an] is simply underivable due to the way syntactic derivation proceeds and the way a particular set of morphosyntactic features is organized as shown in the derivation in (16). This way, the proposed non-lexicalist, morphosyntactic analysis provides a straightforward explanation for the fact that the choice between the stem and stem-affix reduplication correlates with the underlying category of the input stem (verbal vs. nominal).

4 Conclusions

In this paper, I have introduced the results of my corpus study of four popular newspapers published in Indonesia. This study has revealed that a) nominal affixes such as *-an* in principle allow both stem and stem-affixation reduplication whereas verbal affixes such as *ber-* allow only stem reduplication and that b) both nominal and verbal stems may allow reduplication to target part of a morphologically/lexically derived complex word rather than its left or right edge. I have also shown that these results of the corpus study are indeed verified by native speakers' intuition by conducting a grammaticality judgment task. Then, I have demonstrated that these two facts concerning BI reduplication pose non-trivial architectural and empirical challenges for a number of well-known versions of the weak and strong lexicalist theory as in Chomsky 1970, Anderson 1982, Kiparsky 1982/Mohanan 1986, and Di Sciullo and Williams 1987. I have also emphasized that the inverse ordering paradox caused by the word-internal reduplication pattern only arises in a theory of the lexicon-syntax interface that postulates the generative lexicon as an autonomous pre-syntactic/parallel generative component. Accordingly, the inverse ordering problem ceases to be a problem under non-lexicalist theories of the interface because we do not have such a component in the first place. Based on this consideration, I have argued that the two facts on BI reduplication noted above receive a straightforward explanation within the more recent, non-lexicalist, morphosyntactic theory of Distributed Morphology outlined in Halle and Marantz 1993 if we take seriously a particular hierarchical arrangement of certain morphosyntactic features/heads such as Asp and Num as well as the underlying syntactic category of input stems for reduplication. One key assumption of the proposed analysis is that the post-syntactic phonological feature assignment closely mirrors the bottom-up derivation of morphosyntactic structures; the phonological component requires the reduplicative morpheme to target only the constituent within its c-commanding domain and the assignment of phonological feature applies from bottom up in a strictly cyclic manner. According to this analysis, the stem-affix reduplication as in *[[[sayur]-an]-[sayur]-an]] and *[[[ber-[belit]]-[ber-[belit]]]] or the stem reduplication as in *[[[pikir]-[pikir]-an]] are simply underivable as the natural consequence of the way syntactic derivation proceeds. The overall result in this paper, therefore, provides a strong piece of evidence against the traditional lexicalist architecture of the syntax-lexicon

interface, and, at the same time, argues in favour of non-lexicalist theories as in the recent Distributed Morphology framework that attempt to locate all types of word formation within the sole realm of the syntactic derivation.

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