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A Study of Discontinuous Partial Reduplication in Malay Dialect

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ABSTRACT

The Journal of Studies in Language 37.3, 391-405. This study focuses on discontinuous partial reduplication in Perak Malay. The base-initial CV and final segment of the base are copied as a reduplicant, leaving behind some base-medial elements not being copied in consonant-final bases. This copying pattern is motivated by the Anchoring constraint. The neutralized vowel in the reduplicant is achieved by the demand of Reduce, while all base vowels are faithfully realized due to Id-IO(F). On the contrary, only the CV of the base is copied in vowel-final bases due to *VH prohibiting the copy of the base-final vowel. In Standard Malay, the reduplicant copies the base-final syllable intact. It is explained by high-ranked faithfulness constraints and OCP-PM, which bans the copy of the base-initial syllable. Reraking relevant constraints account for the different copying patterns in two Malay dialects. **(Jeonbuk National University)**

Keywords: discontinuity, partial reduplication, constraint, ranking, TETU

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1. Introduction

One of the word-formation processes in languages is reduplication in which every element or part of a base is duplicated, and the copied portion called reduplicant is affixed to a specific edge of the base. The former is dubbed total reduplication, while the latter is termed partial reduplication. Semantically, the output of reduplication generally denotes meaning slightly different from the base, but it typically means plurality, repetition, emphasis, and the things related to the base. Intriguing issues observed in partial reduplication are that the reduplicant often shows a simpler segmental and syllabic structure than those in the base, which has been described as the emergence of the unmarked (hereafter, TETU: McCarthy and Prince, 1994; McCarthy and Prince, 1995). Thus, a structurally less complicated syllable occurs in the reduplicant as shown by Nooka partial reduplication where only base-initial CV is copied as reduplicant even though a base consists of an initial heavy syllable: ***čɨ***-*čims-'i:ɦ* 'hunting

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bear' (Stonham, 1990: 19; McCarthy and Prince, 1994: 10). On the other hand, featurally less marked segments appear in the reduplicant as witnessed in Tübatulabal partial reduplication where the first segment of the reduplicant is realized as unmarked [ʔ] when the first CV of the base is copied as a prefixing reduplication: ***ʔi***-*pitita* 'to turn over' (McCarthy and Prince, 1994: 10, 29).

Another fascinating aspect of partial reduplication is a discontinuity in copying the string of base segments. That is, part of base segments is skipped over in copying while a final segment of the base is copied onto the reduplicant, resulting in the left and the right edge of the base being identically realized in the reduplicant. It is an aberrant implementation of copying in reduplication as shown by Temiar partial reduplication (Benjamin, 1976: 178). In (1), *ē* represents a long vowel.

(1) rəgēg **rɛg**-rəgēg 'to stand conspicuously upright'
bəguy **bɛy**-bəguy 'to waft (smoke)'

As presented in (1), the reduplicant has corresponding initial and final segments of the base, while some medial segments in the base are not copied on the reduplicant.

Interestingly, one of the dialects of Malay called Perak Malay spoken in Perak state shows the intriguing aspects we described for partial reduplication such as segmental TETU in the reduplicant and the discontinuous copying implementation in partial reduplication. Compared to this dialect, Standard Malay also shows partial reduplication whose bases are structurally identical to those in Perak Malay, but neither segmental TETU nor discontinuity occurs in the reduplicant of this dialect.

Thus, the goal of this study is to observe the examples of prefixing partial discontinuous reduplication and point out the motivation of this aberrant pattern of reduplication occurring in the Perak dialect and how one can explain the featural TETU observed in the reduplicant in this dialect. It is argued that the motivation of discontinuous reduplication is the requirement that calls for the corresponding left and right edge of the base and reduplicant. The actual implementation of this requirement depends on the final segment of the base. The segmental TETU in the reduplicant is ascribed to a tendency that a segment in a reduplicant tends to have less marked features compared to those in the base. While some phonological processes in Perak Malay are reflected well in the reduplication process, the expected phonological processes fail to occur in the output of reduplication in Standard Malay. This non-application of expected phonological processes whose environments are created by morpheme concatenation is induced by a strong tendency of preserving features of base segments in the output, and the strong featural identity requirements between the base and the redudplicant. These differences in the two Malay dialects will be explained by re-ranking of commonly used constraints and modified constraints.

This study is structured as follows. Section two briefly introduces the phonological background of Perak Malay, which is followed by an explanation of relevant examples in two Malay dialects. Section three discusses some previous accounts along with their analytic insights and some drawbacks. Section four presents an alternative analysis of partial reduplication in Malay dialects. The summary of the study and theoretical implications will be dealt with in section five.

2. Data Presentation and Phonological Background of Perak Malay

In this section, we first start with a brief phonological background of the Perak dialect. The Perak dialect has 18 consonants /p, b, t, d, k, g, s, č, ǰ, m, n, ɲ, ŋ, w, y, l, ʁ (glottal liquid), h/ (Zaharani, 1991: 25-26). Among them, only /p, t, m, n, ŋ, h/ can appear in all three-word positions such as initial, medial, and final. Perak Malay also has 6 vowels /i, u, ɛ, ə, ɔ, a/, but there are 9 phonetic vowels [i, u, e, ɛ, ə, o, ɔ, ɐ, a]. Among these vowels, only [i, u, ɛ, ə, a] can appear in all three-word positions (Zaharani, 1991: 33-34). The maximal syllable structure of this dialect is CVC in which a prevocalic and postvocalic consonant is optional.

With this brief outline of Perak Malay phonology, we now present examples of partial reduplication. One of the partial reduplication patterns observed in this dialect is employed to indicate plurality for noun bases and repetition or continuity for verb bases as noted by Zaharani (2005: 182, 183). In terms of the copying pattern of partial reduplication, the first element of the base is copied and the following vowel of the base is realized as schwa on behalf of the corresponding vowel in the base. The appearance of schwa in the reduplicant can be observed in the following examples, which are divided into three groups depending on the final segment of the base. The examples are from Farid (1980), Kroeger (1989), and Zaharani (1991, 2005). Reduplicants are bold-faced and underlined in the following data.

(2) Partial reduplication in Perak Malay

a. Base ending in a vowel

kaǰi	study	**kə**-kaǰi	to study repeatedly
čəritɛ	story	**čə**-čəritɛ	all kinds of stories
kɛrɛ	estimate	**kə**-kɛrɛ	by my estimate
dulu	long ago	**də**-dulu	very long ago
mɔlɛ	begin	**mə**-mɔlɛ	at the very beginning
mudɛ	young	**mə**-mudɛ	very young

b. Base ending in an obstruent

baɲak	many	**bəʔ**-baɲaʔ	very much
budak	child	**bəʔ**-budaʔ	all kinds of children
kəček	small	**kəʔ**-kəčeʔ	very small
siket	a little	**səʔ**-siket	very little
gəlap	dark	**gəʔ**-gəlap	very dark

c. Base ending in a nasal

baraŋ	thing	**bəm**-baraŋ	all kinds of things
pətaŋ	evening	**pəm**-pətaŋ	every evening
jaraŋ	seldom	**jən**-jaraŋ	very seldom
jaman	time	**jən**-jaman	for a long time
kəren	dry	**kəŋ**-kəren	very dry

In the first sub-type of prefixing partial reduplication in (2a), the CV of the first syllable in the base is copied, but the vowel is consistently realized as a schwa. The copied part is affixed at the left edge of the base, which ends in a vowel. When a base ends in an obstruent, the same duplicating pattern applies and the final obstruent is also copied as the third

member of the reduplicant. This copied portion is prefixed before the base as represented by the examples in (2b). An interesting phonological issue to note from the examples is that the input final dorsal stop is realized as a glottal stop at the base-final position, and it is copied as the third member of the reduplicant. On the other hand, non-dorsal base-final obstruents do not undergo glottalization at the base final position, and they are copied as the third member of the reduplicant. However, the copied non-dorsal obstruents are realized not as labial or coronal obstruents, but as glottal obstruents when they are followed by an obstruent-initial base.

In the final sub-type of partial reduplication as shown by the examples in (2c), the identical duplication pattern applied in (2b) occurs. The only difference is that a base-final segment in (2c) is nasal, which is copied as the coda of the reduplicant. In output forms, a sequence of nasal plus obstruent is formed across the reduplicant and the base boundary. This derived NÇ is a canonical target of several phonological processes to avoid this marked NÇ. In Malay, a repair strategy of fusion to bypass the marked segmental sequence is adopted: *məŋ$_1$-p$_2$ilih* → *məm$_{1,2}$ilih* 'to choose, to vote'. However, as can be observed in the first, second, and fifth examples, only regressive place assimilation applies, resulting in outputs that are still short of avoiding the marked structure. Thus, the examples in (2b) and (2c) reveal the reduplication pattern that is different from a general duplication pattern where a reduplicant copies a sequence of base segments without skipping any medial segments. In addition to this, derived NCs across the prefix-stem boundary contain laryngeal feature combinations not being preferred in Austronesian languages (Pater, 1996, 1999).

There is one type of partial reduplication in Standard Malay in which a final syllable of the base is copied, and the copied portion is prefixed as in (3). The duplication pattern in (3) is different from those in (2) in that it is not the first syllable of the base, but the second syllable is copied without the constant schwa in the reduplicant. The examples presented in (3) are from Farid (1980) and Zaharani (2005).

(3) Partial reduplication in Standard Malay

a. Base ending in a vowel

bəli	buy	**li**-bəli	buy
katə	speak	**tə**-katə	speak repeatedly

b. Base ending in an obstruent

budak	child	**daʔ**-budaʔ	all kinds of children
rumãh	house	**mãh**-rumãh	houses
gəlap	dark	**lap**-gəlap	very dark

c. Base ending in a nasal

hitam	black	**tam**-hitam	black
baraŋ	thing	**raŋ**-baraŋ	things
pətaŋ	evening	**taŋ**-pətaŋ	every evening
tikam	stab	**kam**-tikam	stab repeatedly

As shown by the examples in (3), the second syllable of the base, either an open or a closed syllable, is copied and it is affixed at the left edge of the base. There are several phonological issues we should discuss because such issues are different from those we observed in Perak Malay. The first difference is that there is no constant schwa in the

reduplicant, which means that the vowel of the final syllable in the base is faithfully maintained in the reduplicant. The second difference is that the final non-dorsal obstruent of the reduplicant does not undergo glottalization before a base-initial obstruent as shown by the last example in (3b). The third difference is that the reduplicant-final nasal does not assimilate to the base-initial obstruent, which has a different place of articulation. It is illustrated by the final three examples in (3c). Thus, the partial reduplication patterns observed in (2) and (3) are different in segmental realizations, obstruent glottalization, and regressive place assimilation between a nasal and an obstruent. In the following section, we will review several previous accounts and discuss their analytic insights and potential problems.

3. Previous Accounts

In this section, we review former analyses of Perak Malay and Standard Malay partial reduplication. For the Perak dialect of Malay, we go over previous analyses by Zaharani (1991) and Syed Jaafar (2012). We also discuss Zaharani (2005) for partial reduplication in Standard Malay.

For explaining the examples in (2), Zaharani (1991: 111-113) proposes the following three rules:

(4) a. R → C_1__C_1VCV (C)#: where C_1 refers to the first consonant of the base.

b. ∅ → ʔ / # C_1__C_1 V C_2 V C_3 #
[-son, -cont]

c. ∅ → ŋ / # C_1__C_1 V C_2 V C_3 #
[+nasal]

The examples in (2a) can be explained by the rule in (4a) through which the initial consonant of the base is duplicated, and it is followed by a constant schwa on behalf of the vowel in the first syllable of the base. On the other hand, the examples in (2b) are accounted for by (4b). This rule epenthesizes [ʔ] between the first consonant of the base plus a schwa and the first consonant of the base, producing *[C_1əʔ-]*. ʔ-insertion implies that this consonant is not the copied segment of a base-final consonant.

The same analytic approach applies to the examples in (2c) where the final segment of the reduplicant is epenthesized */ŋ/* as pointed out by the rule in (4c). This inserted nasal undergoes regressive place assimilation triggered by the base-initial obstruent. The proposed rules in (4) seem to explain the reduplication examples in (2). However, this analysis contains several problems that should be ironed out. The first problem is that two insertion rules (4b/c) do not have proper motivation in reduplication. It is not clear why the glottal stop and velar nasal are epenthesized between a constant schwa and the base-initial obstruent. The second problem is that why newly formed NCs only undergo regressive place assimilation.

The fact that the results of regressive assimilation are still short of modifying the marked sequence of a nasal plus a voiceless obstruent in Austronesian languages (Pater, 1996, 1999) should be explained.

The second account of partial reduplication in (2) is framed in constraints and their ranking (Syed Jaafar, 2012). In order to explain the examples, Syed Jaafar employs the following constraints.

(5) a. Morpheme Syllable Correlation (Russell, 1997: 121; Downing, 2006: 120)
Each morpheme and prefix root contains exactly one syllable.
b. NoCoda: syllables are open.
c. Reduce: Vowels lack quality.
d. Max-BR: All segments of the base are contained in the reduplicative morpheme.
e. Right Anchor-BR: Any element at the designated periphery of S_1 has a correspondent at the designated periphery of S_1.

Syed Jaafar divides the examples in (2) into two types: Light reduplication and Heavy reduplication. Reduplicant of the former consists of CV while the latter of CVC where the nucleus of each reduplicant is constantly realized as a schwa. She also adopts the concept of co-phonology (Antilla, 2002; Inkelas and Zoll, 2005; Orgun, 1996) which argues that each morphological form commands different phonology. Thus, in the constraint-based theoretical framework, each morphological form is explained by a different constraint ranking. Based on this, we can expect that one constraint ranking is needed for light reduplication and the other for heavy reduplication in Perak Malay. However, the constraint ranking between them is not radically different from each other, because the only difference between the two morphemes in partial reduplication has to do with constraints such as NoCoda and Right Anchor-BR. It is because the reduplicant morpheme of light reduplication satisfies NoCoda while it violates Right Anchor-BR. Concerning the shape of the reduplicant, it can be distinguished by the re-ranking of those two constraints. The following table shows how the constraint ranking for light reduplication selects the optimal output. We demonstrate the realizations of light reduplication by using one of the examples from (2a). Note that Reduce and NoCoda only apply to the reduplicant in Syed Jaafar's analysis.

(6) kɛrɛ → **kə**-kɛrɛ 'by my estimate'

L Red-$k\varepsilon_1r\varepsilon_2$	MorSyll	NoCoda	Reduce	Max-BR	R Anch-BR
$k\varepsilon_1$-$k\varepsilon_1r\varepsilon_2$	*		*!	**	*
☞**kə**-$k\varepsilon_1r\varepsilon_2$	*			***	*
$k\varepsilon_1$r-$k\varepsilon_1r\varepsilon_2$	*	*!	*	*	*
$k\varepsilon_1r\varepsilon_2$-$k\varepsilon_1r\varepsilon_2$	**!		**		
kəʔ-$k\varepsilon_1r\varepsilon_2$	*	*!		***	*

The given constraint ranking in (6) selects the second candidate as optimal. Its close competitor is the first candidate, but it is edged out due to its violation of Reduce, which is satisfied by the optimal form. The other three suboptimal candidates lose out to the optimal candidate due to their violation of high-ranked MorSyll and NoCoda. Thus, the only option a candidate can take is to duplicate the initial segment of the base, which is followed by the fixed nucleus schwa in the reduplicant. If the initial CV is duplicated without the constant nucleus schwa, it incurs a violation of Reduce as in the first candidate.

Heavy reduplication examples can be accounted for by re-ranking the relevant constraints such as Right Anch-BR and NoCoda as presented by the following table which represents an example that ends in an obstruent.

(7) budak → **bəʔ**-budaʔ ‘all kinds of children’

H Red-bu$_1$da$_2$k	MorSyll	R Anch-BR	Reduce	Max-BR	NoCoda
bu$_1$-bu$_1$da$_2$ʔ	*	*!	*	***	
bə-bu$_1$da$_2$ʔ	*	*!		****	
bu$_1$d-bu$_1$da$_2$ʔ	*	*!	*	**	*
bu$_1$da$_2$ʔ-bu$_1$da$_2$ʔ	**!		**		*
☞**bəʔ**-bu$_1$da$_2$ʔ	*			***	*
bək-bu$_1$da$_2$ʔ	*	*!		***	*

The optimal candidate is the penult one that fares better on Right Anch-BR than all the other candidates except for the fourth candidate, which is eliminated by two violations of MorSyll. Since the optimal form is selected by the two high-ranked constraints such as MorSyll and Right Anch-BR, the other three constraints do not seem to play a role in (7).

The evaluation of the second case of heavy reduplication examples ending in a nasal is illustrated by the following table.

(8) pətaŋ → **pəm**-pətaŋ ‘every evening’

H Red-pə$_1$ta$_2$ŋ	MorSyll	R Anch-BR	Reduce	Max-BR	NoCoda
pə$_1$-pə$_1$ta$_2$ŋ	*	*!		***	
pət-pə$_1$ta$_2$ŋ	*	*!		***	*
pə$_1$taŋ-pə$_1$ta$_2$ŋ	**!		*		*
☞**pəm**-pə$_1$ta$_2$ŋ	*			***	*

The constraint ranking chooses the final candidate as optimal where the base-final nasal is copied as a reduplicant coda, and it undergoes regressive place assimilation triggered by the base-initial segment. The first two candidates are suboptimal because of their violation of Right Anch-BR while the third output is eliminated by the violation of the highest-ranked MorSyll. Thus, to satisfy high-ranked constraints such as Right Anchor-BR, a candidate must copy the final segment of the base even at the cost of violating the constraint like Contiguity (McCarthy and Prince, 1995, 2004).

The proposed constraints and their ranking by Syed Jaafar seem to explain so-called discontinuous partial reduplication in Perak Malay. There are, however, several analytic problems that we can draw from the account. Firstly, the Right Anch-BR constraint is incorrectly evaluated due to misinterpretation of the constraint. It is because Anchoring only checks the presence of edge segments, but it does not examine the featural identity of corresponding edge segments. If we apply Right Anch-BR to the final candidate [**bək**-budaʔ] with the general interpretation of the constraint, the candidate satisfies Right Anch-BR. This satisfaction enables the last candidate in (7) to be equally harmonic with the optimal form [**bəʔ**-budaʔ]. Thus, there must be a constraint that can eliminate [**bək**-budaʔ] from the competition. At the same time, another possible candidate such as [**bək**-budak] also should be filtered out by a certain constraint.

Secondly, the given constraint ranking cannot edge out the candidate [**pəŋ**-pə$_1$taŋ] where the final nasal of the reduplicant does not undergo regressive place assimilation in (8). It is because this suboptimal candidate fares equally on all constraints with the actual optimal form. Thus, the constraint ranking in (8) will select two outputs [**pəm**-pə$_1$taŋ] and [**pəŋ**-pə$_1$taŋ] as optimal. Thirdly, the constraint ranking cannot eliminate a possible output [**təm**-pətaŋ] which will

also be selected as another optimal form along with the actual optimal final candidate (8). It is because Right Anch-BR only checks the right edge of the base and the reduplicant. Finally, partial reduplication in Perak Malay does not have to be separated into light and heavy reduplication because the two patterns can be explained by one constraint ranking.

For partial reduplication observed in Standard Malay whose examples are given in (3), this subclass of partial reduplication is mentioned by Zaharani (2005). He provides a simple description of the reduplicating pattern in (3) along with an outline of the analysis. In order to explain, Zaharani adopts the concept of template, which is either CV or CVC, and the possible constraints such as Anchor, Contiguity, *NC̣, and Align-Nasal, without an actual analysis. This type of description is very similar to what Syed Jaafar describes as the discontinuous partial reduplication in (2). This subclass of partial reduplication shows a different copying pattern from that of the Perak dialect although bases of both types of reduplication have similar syllable structures. Since this is the case, a theoretical account of this reduplication pattern may refer to some concepts and constraints used for Perak Malay.

4. An Alternative Analysis

In this section, we provide a theoretical analysis based on constraints and their ranking. We first introduce constraints to be employed for explaining discontinuous partial reduplication in Perak Malay. The following constraints are for the bases ending in vowels, and the relevant examples are presented in (2a).

(9) a. *Vowel Hiatus=*VH: Adjacent vowels are not allowed.
b. Ident-IO(F): Input and output correspondents are identical in their feature specifications.
c. Reduce: Vowels lack quality (Syed Jaafar, 2012: 99).
d. Anchor-BR=Anch (McCarthy and Prince, 1995: 261)
Base left/right edge elements have correspondents at the left/right edge of the reduplicant.
e. NoCoda: Syllables are open.
f. Max-BR: Every element of the base has a correspondent in the reduplicant.
g. Ident-BR(F): Base and reduplicant correspondents are identical in their feature specifications.

As we have observed in (2a), Perak Malay copies the first two segments of the base in which the vowel is traditionally assumed to be a fixed epenthetic one. In this analysis, we assume, however, that the vowel is not epenthetic, but it is realized as schwa due to the constraint interaction between Id-IO(F) and Reduce. The former, which calls for faithful featural realizations of input segments in the output, is ranked higher than the latter which requires vowels not to have specific features. This context-free marked constraint dominates the lowest-ranked Id-BR(F), which is generally violated if the base-initial vowel is not a schwa. This constraint ranking motivates the copy of first base-consonant plus a neutral schwa in the examples in (2a).

Concerning the size of the reduplicant, it is determined by the constraint ranking of NoCoda over Max-BR. Thus, only the first two elements of the base are duplicated as reduplicants in (2a) even though it can copy the following onset of the second syllable in the base to fare better on Max-BR. However, this possibility is forfeited by the high-ranked NoCoda. Two high-ranked constraints such as *VH and Anch are in conflict. To satisfy Anch, the final vowel of the

base must be copied as the third element of the CV reduplicant, and it will result in two adjacent vowels in the reduplicant, CVV. However, this is banned by the highly-ranked *VH. Thus, *VH must dominate Anch in the analysis.

As to the ranking between Anch and Reduce, they do not seem to have a specific ranking between them, but we rank Anch over Reduce in the analysis, which will be further discussed shortly when we explain the bases ending in a consonant. In addition to this, the high-ranked *VH and Id-IO(F) do not show a particular ranking between them in the analysis. This constraint ranking also implies that Id-IO(F) dominates Anch due to the transitivity of ranking.

The constraint ranking between Anch and NoCoda is not specified, but Anch should be ranked higher than NoCoda in the bases that end in a consonant. It is because satisfying Anch results in incurring a violation of NoCoda in (2b) and (2c). The two markedness constraints, Reduce and NoCoda, do not show a specific ranking between them in the analysis. At the same time, the Id-BR(F) and Max-BR do not show any ranking between them, either. Based on the ranking relations we have discussed so far, we show how the constraint ranking filters out suboptimal candidates while choosing an optimal form. In this study, since we are only dealing with partial reduplication, we do not include fully reduplicated candidates in the table to clearly show interactions among the partially reduplicated candidates so that how an optimal candidate is selected over the other partially reduplicated candidates through constraint interactions.

(10) mɔlɛ → mə-mɔlɛ ‘at the very beginning’

Red-mɔ$_1$lɛ	*VH	Id-IO(F)	Anch	Reduce	NoCoda	Max-BR	Id-BR(F)
mɔ$_1$l-mɔ$_1$lɛ			*	***!	*!	*	
mə$_1$l-mɔ$_1$lɛ			*	**	*!	*	*
mɔ$_1$-mɔ$_1$lɛ			*	***!		**	
☞**mə**$_1$-mɔ$_1$lɛ			*	**		**	*
mə$_1$-mə$_1$lɛ		*!	*	*		**	
mə$_1$ɛ-mɔ$_1$lɛ	*!			***		*	*

High-ranked *VH and Id-IO(F) filter out the final two outputs that have undergone feature changes of an input vowel in the base and have two adjacent vowels, respectively. The final output is the only candidate that satisfies Anch but at the cost of violating the high-ranked *VH in (10). The penult candidate fares best on Reduce but at the cost of violating the high-ranked Id-IO(F).

The least marked nature of reduplicant vowel is controlled by the action of Reduce, which calls for a vowel to be the least marked schwa in the output (McCarthy and Prince, 1995; Kager, 1999). The constraint eliminates the first and third candidates from the competition, and they become sub-optimal due to their faithful copying the first vowel of the base, which is more marked than the schwa. It leads the candidates to add one more violation of Reduce to the full vowels in the base.

The second and the fourth candidates fare equally on all constraints except for NoCoda, so this constraint becomes critical. The fourth candidate satisfies NoCoda by only copying the first CV of the base, while the losing candidate duplicates the first CVC of the base. Due to this copying size difference, the fourth candidate emerges as optimal. The constraint ranking in (10) reveals the typical case of TETU concerning vowel features: Id-IO(F) ≫ Reduce ≫ Id-BR(F). This ranking implies the emergence of schwa in the reduplicant.

For the examples where a base ends in an obstruent, two more constraints are needed to explain such examples given in (2b). It is because obstruents, occurring in the coda and word-final position, undergo changes in the outputs.

Furthermore, a base-final obstruent is duplicated as a third member of the reduplicant, which copies the first CV of the base as in (2a). The following constraints reflect the behavior of obstruents in Perak Malay.

(11) a. *k#: A voiceless velar stop is prohibited word-finally.

b. *C_{pl}C: An obstruent does not have its place when followed by a consonant across a syllable boundary.

*k# is undominated in the analysis and it seems to be a language-specific constraint. On behalf of the word-final [k], it is realized as [ʔ] in Perak Malay, which is explained by Glottal Formation Rule by Zaharani (1991: 43). In Malay, dorsal is assumed to be the least marked place since prefix /məN-/ is realized as [məŋ-] before a vowel-initial stem as in məŋ-isi 'fill'. Thus, the least marked dorsal obstruent in Malay is subject to undergo weakening word-finally, realizing as [ʔ] just like the least marked coronal stop /t/ is realized as [ʔ] word-finally in spontaneous speech. However, the other two voiceless stops /t, p/ are not affected by the rule. One thing the voiceless stops have in common is that they lose their place features when followed by another obstruent across a morpheme boundary. This behavior of voiceless stops before an obstruent is controlled by *C_{pl}C. It reflects obstruent weakening before another obstruent, because a voiceless plosive generally is not released before another obstruent, and it is more strongly implemented in Perak Malay. These two markedness constraints do not show any ranking between them, and they are ranked highest in the analysis.

On the contrary, *k# must dominate Id-IO(F) because a base-final /k/ is suppressed by *k# at the cost of violating Id-IO(F). It also implies that *C_{pl}C should be ranked higher than Id-IO(F). In the analysis, we do not include *VH, NoCoda, and low-ranked Max-BR.

(12) a. baŋak → bəʔ-baŋaʔ 'very much' b. siket → səʔ-siket 'very little'

a. Red-baŋak	*k#	*C_{pl}C	Id-IO(F)	Anch	Reduce	Id-BR(F)
bəŋ-baŋak	*!			*	**	*
bak-baŋak	*!	*!			***	
bək-baŋaʔ		*!	*		**	**
☞**bəʔ**-baŋaʔ			*		**	*
bəʔ-bəŋaʔ			**!		*	
bə-baŋaʔ			*	*!	**	*
b. Red-siket						
siʔ$_1$-siket$_1$					***!	*
sik-siket$_1$		*!		*	***	
sək-siket$_1$		*!		*	**	*
sət$_1$-siket$_1$		*!			**	*
☞**səʔ**$_1$-siket$_1$					**	**
səʔ$_1$-səket$_1$			*!		*	*

In (12a), *k# and *C_{pl}C eliminate the first three candidates because they either maintain the base-final [k] or keep the place feature of an obstruent before another consonant, or retain both in the output. The second candidate from the last is suboptimal due to its one more violation of Id-IO(F) by neutralizing the first input vowel to schwa. The optimal candidate and the final candidate are ties for Id-IO(F), but the final output is edged out by the optimal form because of

its critical violation of Anch. The final form incurs a violation of Anch because the right-most element of the base is not copied in the reduplicant, leading it to a violation of Anch.

On the other hand, *k# does not play an important role when a base ends in non-velar obstruents in (12b). In such a base, the base-final non-velar obstruents are copied as the third member of the reduplicant, but these copied reduplicant codas undergo glottalization before the base-initial obstruent to meet the requirement of *$C_{pl}C$ at the cost of violating low-ranked Id-BR(F). It is well-reflected in the optimal candidate while all other suboptimal forms except for the first output violate either *$C_{pl}C$ or Id-IO(F). The appearance of the least marked vowel in the reduplicant is achieved by the demand of Reduce, which is ranked higher than Id-BR(F). The first candidate has one more violation of Reduce than the optimal form, and this extra violation leads the candidate to be suboptimal.

The final type of partial reduplication is shown in (2c) where the base ends in a nasal consonant. This nasal is copied as a coda of the reduplicant just like the base-final obstruents, and the nasal undergoes regressive place assimilation triggered by a base-initial consonant, producing homorganic NC clusters across the morpheme boundary. In order to explain this, we use a general constraint that calls for the same place of articulation between a nasal and its following obstruent.

(13) Agree-NC=AgrNC: A sequence of nasal plus obstruent has the identical place of articulation.

NC clusters across the morpheme boundary are formed as a result of copying the base-final nasal as the third element of the reduplicant to meet the requirement of Anch. The newly formed NCs must have the same place of articulation, which is required by AgrNC in (13). Thus, this constraint should be ranked very high in the analysis and it does not show any ranking with *$C_{pl}C$.

(14) pətaŋ → pəm-pətaŋ ‘every evening’

Red-pətaŋ	*$C_{pl}C$	AgrNC	Id-IO(F)	Anch	Reduce	Id-BR(F)
pət-pətaŋ	*!			*	*	
pəʔ-pətaŋ				*!	*	*
pə-pətaŋ				*!	*	
pəŋ-pətaŋ		*!			*	
☞**pəm**-pətaŋ					*	*
pəm-pətəŋ			*!			**

Copying the first CVC of the base results in a violation of Anch by the first two candidates. The first output also incurs a violation of *$C_{pl}C$ because the copied obstruent fails to undergo glottalization before an obstruent. The third candidate also violates Anch by only copying the first CV of the base. All three constraints are suboptimal in (14). The optimal form copies the CV of the base along with the base-final nasal, which in turn undergoes regressive place assimilation at the cost of violating the low-ranked Id-BR(F). Both fourth and sixth outputs are edged out by the winning form due to their violations of AgrNC and Id-IO(F), respectively.

So far, we have accounted for the examples in (2) which show slightly different reduplication patterns depending on the segmental composition in the base. The constraint rankings we have employed are presented in (15).

(15) a. *VH, Id-IO(F) ≫ Anch ≫ Reduce, NoCoda ≫ Max-BR, Id-BR(F)
b. *k#, *C_{pl}C ≫Id-IO(F) ≫ Anch ≫ Reduce ≫ Id-BR(F)
c. *C_{pl}C, AgrNC ≫ Id-IO(F) ≫Anch ≫ Reduce ≫ Id-BR(F)
d. Combined ranking: *k#, *C_{pl}C, AgrNC ≫ *VH, Id-IO(F) ≫ Anch ≫ Reduce, NoCoda ≫ Max-BR, Id-BR(F)

In each constraint ranking, we only listed the constraints we have included in the tables. The constraints not appearing in the tables do not affect the selection of the optimal form in each table.

The constraints and their rankings in (15) cannot explain the partial reduplication pattern in Standard Malay observed in (3) where skipping of some medial segments in the base does not occur. On behalf of not copying medial segments, the final syllable of the base, either being an open or a closed, is copied and the copied portion is prefixed in (3) just like we have seen partial reduplication in Perak Malay. Thus, this reduplication type is not a discontinuous duplication pattern seen in (2), which is controlled by the requirement of Anch. A noticeable issue of this reduplication is that all segmental features of the base-final syllable are faithfully realized in the reduplicant. That is, the reduplicant resists any phonological processes such as vowel neutralization, glottalization of an obstruent before another consonant, and regressive place assimilation in a newly formed NC. In order to account for the data in (3), we adopt the constraints used for the data in (2) except for *k#, Reduce, and NoCoda. In addition to this, we also modify Anch, and introduce a new constraint. We introduce a modified constraint of Anch and a new constraint along with some constraints from Perak Malay.

(16) a. Ident-IO(F): Input and output correspondents are identical in their feature specifications.
b. Ident-BR(F): Base and reduplicant correspondent are identical in their feature specifications.
c. AgrNC: A sequence of nasal plus obstruents has an identical place of articulation.
d. Max-BR: Every element of the base has a correspondent in the reduplicant.
e. *C_{pl}C: An obstruent does not have its place when followed by a consonant across a syllable boundary.
f. OCP-PA/MA=OCP-PM: The leftmost segment of the base and the reduplicant do not have an identical place and manner features (Chung, 2018: 789).
g. Anch-R: The base right edge element has correspondent at the right edge of the reduplicant (McCarthy and Prince, 1995: 261).

Two faithfulness constraints, Id-IO(F) and Id-BR(F) are highly ranked since there are no featural changes from input to output and from base to reduplicant. On the other hand, Max-BR is ranked low to explain partial reduplication. Two markedness constraints such as *C_{pl}C and AgrNC are ranked low to reflect the preservation of place feature of the reduplicant-final consonant before an obstruent-initial base and to prohibit regressive place assimilation in an NC cluster.

To limit the segmental source of reduplicant to the base-final syllable, OCP-PM is highly-ranked to prohibit the copy of the base-initial syllable. High-ranked OCP-PM is further substantiated by another high-ranked Anch-R to specify the reduplicant to the copy of the base-final syllable. Specific strategies such as changing feature of base- and reduplicant-initial segment to bypass OCP-PM are suppressed by the high-ranked Id-IO(F) and Id-BR(F). Thus, the

only way to satisfy OCP-PM, Anch-R, Id-IO(F), and Id-BR(F) is to duplicate the base-final syllable. Concerning the ranking of high-ranked constraints, faithfulness and markedness constraints do not show any particular ranking. These constraints dominate AgrNC, *C_{pl}C, and Max-BR, and this implies that expected phonological processes do not occur and reduplication is partial, respectively.

(17) katə → **tə**-katə ‘speak repeatedly’

Red-$k_1at_2ə$	Id-IO(F)	Id-BR(F)	Anch-R	OCP-PM	Max-BR
k_1a-$k_1at_2ə$			*!	**!	**
k_1at-$k_1at_2ə$			*!	**!	*
$k_1ə$-$k_1at_2ə$				**!	**
$p_2ə$-$k_1at_2ə$		*!		*	**
$t_2ə$-$p_1at_2ə$	*!			*	**
☞**$t_2ə$**-$k_1at_2ə$				*	**

As shown by the winning candidate, the base-final syllable [tə] is copied, and it is prefixed while all other suboptimal forms are short of being optimal due to their violation of higher-ranked constraints than Max-BR. Thus, featural changes during the duplication process are preempted by the high-ranked constraints.

(18) a. gəlap → lap-gəlap ‘very dark’ b. tikam → kam-tikam ‘stab repeatedly’

a. Red-$g_1əl_2ap_3$	Id-IO(F)	Id-BR(F)	Anch-R	OCP-PM	*C_{pl}C
$g_1ə$-$g_1əl_2ap_3$			*!	*!*	
$g_1əl_2$-$g_1əl_2ap_3$			*!	*!*	
g_1ap_3-$g_1əl_2ap_3$				*!*	*
g_1ap_3-$t_1əl_2ap_3$	*!	*!		*!	*
$l_2a?_3$-$g_1əl_2ap_3$		*!			
☞**l_2ap_3**-$g_1əl_2ap_3$					*
b. Red-$t_1ik_2am_3$	Id-IO(F)	Id-BR(F)	Anch-R	OCP-PM	AgrNC
t_1i-$t_1ik_2am_3$			*!	**!	
t_1ik_2-$t_1ik_2am_3$			*!	**!	
t_1am_3-$t_1ik_2am_3$				**!	*
k_2an_3-$t_1ik_2am_3$		*!		*	
k_2am_3-$p_1ik_2am_3$	*!			*	
☞**k_2am_3**-$t_1ik_2am_3$				*	*

As the violation of the lower-ranked *C_{pl}C and AgrNC by the optimal forms in (18a) and (18b) each implies, phonological processes such as place neutralization of an obstruent before a consonant and anticipatory place assimilation fail to occur because of requirements by high-ranked faithfulness constraints. Skipping the base-initial syllable in copying is motivated by the requirement of two high-ranked markedness constraints in Malay partial reduplication. The constraint ranking used to account for the data in (3) is provided in (19).

(19) Id-IO(F), Id-BR(F), Anch-R, OCP-PM ≫ *C_{pl}C, AgrNC, Max-BR

So far we have accounted for two different cases of partial reduplication in Perak Malay and Malay by using two different constraint rankings. In one case, the reduplicant has both left and right segments of the base if the base ends in a consonant, showing peculiar features of discontinuous partial reduplication. On the contrary, the reduplicant only copies the final syllable of the base even though the base is structured identically with the base of discontinuous reduplication. In the following section, we conclude the study by summarizing the analysis and its implications for linguistics.

5. Conclusion

In this study, we analyzed two different types of partial reduplication in Perak Malay and Standard Malay. In Perak Malay, the reduplicant has correspondents of both left and right edge elements of the base if the base ends in a consonant. This discontinuous reduplication is motivated by Anch and Reduce calling for the reduplicant vowel to be unmarked compared to the vowels in the base. It represents the emergence of the unmarked in reduplicant concerning vowel features (McCarthy and Prince, 1994, 1995; Kager, 1999). However, if the base ends in a vowel, the reduplicant fails to have a correspondent that represents a base-final segment due to the high-ranked *VH. The regular phonological processes occurring in reduplication are triggered by *k#, $C_{pl}C$, and AgrNC.

On the other hand, the partial reduplication in Standard Malay faithfully copies the final syllable (CV or CVC) of the base, which implies that an optimal output resists an obstruent place neutralization before a consonant and regressive place assimilation in an NC. These are secured by low-ranked *$C_{pl}C$ and AgrNC. The base-final syllable copy is guaranteed by OCP-PM to prohibit the identical place and manner left-elements between the base and the reduplicant. Thus, the two Malay dialects can be explained by some common constraints but with their different constraint rankings.

We can discuss several implications from the current analysis. Firstly, there seems to be a status difference between reduplicative affixes and general affixes in Malay. It is because nasal substitution occurs in NÇ across the boundary between prefix and stem: *məŋ$_1$+p$_2$ukul* → *məm$_{1,2}$ukuk* 'scold' (Karim, 1995; Syed Jaafar, 2011) to avoid the marked NÇ structure. However, this marked NÇ only undergoes regressive place assimilation as shown by the examples in (2c), and the resulting NC fails to avoid the marked structure in Perak Malay. Interestingly, Standard Malay preserves all segmental features of the base segments in the output and reduplicant, tolerating the marked NÇ. It is executed by high-ranked faithfulness constraints. Secondly, high-ranked faithfulness constraints have farfetched effects on vowel neutralization in the reduplicant in Standard Malay so that TETU and other phonological processes are blocked in the reduplication processes.

In the opposite case of Perak Malay where faithfulness constraints are not highly ranked, TETU and all other phonological processes freely apply in the reduplication process. Thirdly, the current analysis does not have to differentiate the size of the reduplicants in Perak Malay, but it is naturally decided by the constraint ranking in the analysis.

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