Morphological Optionality in Reduplication:
A Lowering Account

Tobin R. Skinner
McGill University

1. Morphological optionality

In this paper, I present a new account of morphological optionality in reduplication. I claim that apparent cases of free variation in certain patterns of reduplication are not solely the result of conditions on phonological output representations, but rather stem from a combination of syntactic, post-syntactic, and phonological conditions.

The data below illustrate the fact that some languages allow multiple possibilities with respect to which morphemes are copied during reduplication. For example, in Tagalog, the locus of reduplication may vary within a specific domain of morphemes (TRANS = transitive; CAUS = causative):

(1) Tagalog (Austronesian)

      Base form
a. ma-   ka-   pag-   pa-   hintay
    ABILITY- COMPLETE- TRANS- CAUS-   wait
    'be able to cause someone to wait'

      (Im)possible reduplicative outputs of (a)
b. * [**maa]**-ma-ka-pag-pa-hintay
c. ma-[**kaa]**-ka-pag-pa-hintay
d. ma-ka-[**paa]**-pag-pa-hintay
e. ma-ka-pag-[**paa]**-pa-hintay
f. ma-ka-pag-pa-[**hii]**-hintay
g. * ma-ka-pag-pa-hin-[**taa**]-tay
    'will be able to cause someone to wait' (*unrealized aspect*)

In (1b-g), we see that reduplication must target a morpheme constituent, rather than simply a prosodic element (i.e. in (1g), reduplication may not occur within the morpheme *hintay*), but may not target the ability marker morpheme *ma-* (1b).

In Ndebele, the reduplicant may optionally target certain affixes when the verb root is sufficiently small (i.e. when the verb root itself cannot satisfy the disyllabic minimality condition on the reduplicant). Note that I assume *–a* (i.e. the mysterious Bantu verb-final vowel) and *–yi* to be epenthetic segments (cf. Hyman et al., in press); reduplication adds the meaning *a bit* or *from time to time*. In the following set of data, we observe that phonological material from the applicative and causative suffixes may optionally be included in the reduplicant, but negative *–i* cannot be (APPL = applicative):

(2) Ndebele (Bantu)

a. [**dl-a-yi**]- dl -a
 [**RED**]- eat -*a*
 'eat a bit/eat from time to time'

b. [**dl-a-yi**]- dl -el -a
 [**dl-e-yi**]- dl -el -a
 [**dl-el-a**]- dl -el -a
 [**RED**]- eat -APPL -*a*
 'eat a bit for'

c. [**dl-a-yi**]- dl -is -a
 [**dl-i-yi**]- dl -is -a
 [**dl-is-a**]- dl -is -a
 [**RED**]- eat -CAUS -*a*
 'make eat a bit'

d. [**dl-a-yi**]- dl -el -i
 [**dl-e-yi**]- dl -el -i
 [**dl-el-a**]- dl -el -i
 *[**dl-el-i**]- dl -el -i
 [**RED**]- eat -APPL -NEG
 'not eat a bit for'

An initial task is to determine where these reduplicative morphemes are generated in the syntax. Following the Inner vs. Outer Aspect distinction proposed by Travis (in prep), I posit that the aspectual reduplicant of Tagalog, which indicates that an event is unrealized, is most appropriately generated in the position of Viewpoint or Outer Aspect, above vP, rather than within the vP as Situation or Inner Aspect (Smith 1991). Likewise, since reduplication in Ndebele encodes information about how an event is situated on a timeline, more or less, I claim that this reduplicative morpheme is also generated in the position of Outer Aspect. This derives a syntactic structure similar to (3), after head-movement of V^0 to v^0, with an intervening affix projection (= AffP):

(3) Pre-Spell-out syntactic hierarchy of a reduplicated verb in Tagalog and Ndebele
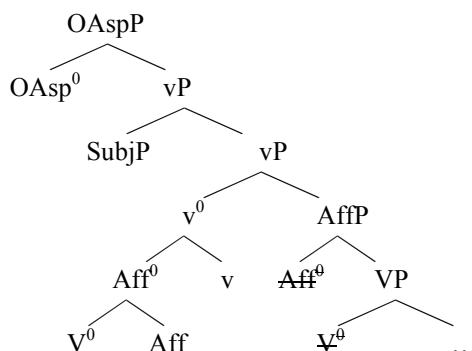
2. Lowering

It must first be noted that standard head movement of v^0 to $OAsp^0$ in (3) would not straightforwardly derive the variations in (1) and (2). If v^0 were to simply raise to $OAsp^0$, we would predict a fixed position for the reduplicant in which it can't be interposed between the verb root and

any vP-internal affixes. Likewise, it is not clear how the $OAsp^0$ head would be able to optionally target certain vP-internal affixes from a fixed syntactic position. I propose instead that the observed variations in reduplication are the result of post-syntactic (i.e. post-Spell-out) Lowering of the reduplicative Outer Aspect head into the complex v head of its complement. In their paper on post-syntactic PF transformations, Embick and Noyer (2001) claim that Lowering of a head may only occur to the highest maximal head projection of its complement. Therefore, according to Embick and Noyer, $OAsp^0$ in (3) may only lower to v^0. That is, if $OAsp^0$ lowers, it can only adjoin to the topmost node of the complex v head. I propose the following modification to the definition of post-syntactic Lowering:

(4) *Lowering (revised):*
A Lowering head may adjoin post-syntactically to any zero-level projection of the (potentially complex) head of its complement, e.g. v^0, Aff^0, or V^0 in (3).[1]

Under this revised view, the $OAsp^0$ reduplicative head lowers to adjoin to any X^0 level of the complex head of its complement after Spell-out of the narrow syntactic derivation:

(5) Tagalog: ma-ka-[**paa**]-pag-pa-hintay
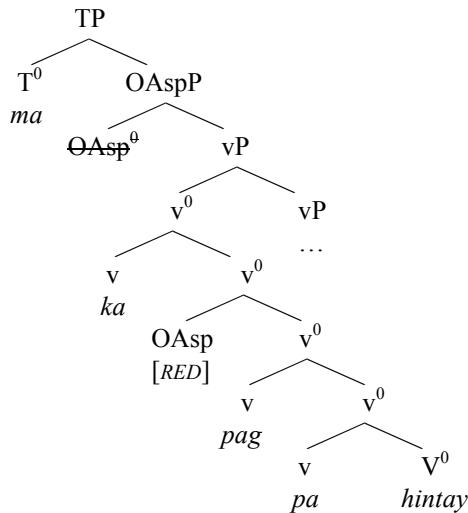
Following the reduplication model of Marantz (1982), I propose that the phonological shape of the reduplicant is determined before the evaluation of output constraints at PF. Under the framework of Distributed Morphology (DM) (Halle and Marantz 1993), I claim that the Vocabulary entry for the reduplicative morpheme consists of a prosodic template that merely lacks any segmental information. In the case of Tagalog, this template is a heavy syllable with no coda, and in the case of Ndebele, the template is disyllabic, also with no final coda.

Recall that under DM, syntactic terminals are merely morphosyntactic feature bundles that lack any phonological features. These morphosyntactic feature bundles are given phonological form only during the post-syntactic process of Vocabulary Insertion (VI). Also, morphemes are linearized with respect to each other only during VI. Thus, I assume the order of operations in (6), where PF evaluation consists of Optimality-Theoretic (Prince and Smolensky 2004) evaluation of input-output constraints on phonological forms. Under this model, Lowering crucially occurs before VI.

(6) Syntactic Spell-out > Lowering > Vocabulary Insertion > PF evaluation
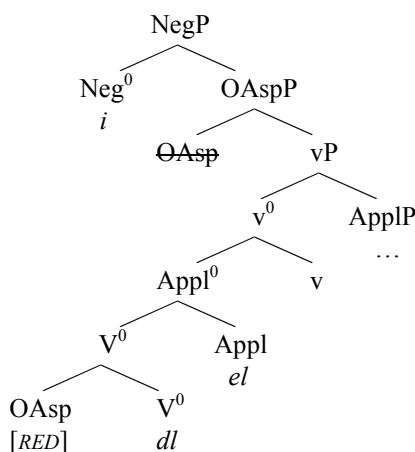
---

[1] Thus, head movement in general targets X^0 as a syntactic constituent/landing site. The landing site in head-raising operations is invariably a simplex X^0, whereas a Lowering head will potentially have many possible X^0 landing sites when Lowering to a complex head.

In the present cases, after the OAsp reduplicative morpheme lowers, VI associates the underlying prosodic template with the reduplicant's morphosyntactic feature bundle. However, since VI is responsible for giving segmental information to all terminals, this prosodic template is filled by copying the phonological segments of its sister. Therefore, by the end of the VI process, all morphemes, including the reduplicant, will have segmental information. Taking the hierarchical input from (5), VI from the bottom up produces the linearization cycles in (7), where the direction of affixation is determined by the individual Vocabulary item during the linearization process:[2]

(7) Cycle 1: [pa * hintay]
    Cycle 2: [pag * pa * hintay]
    Cycle 3: [σ * pag * pa * hintay]
    Cycle 3': [**paa** * pag * pa * hintay] (*phonological features of sister copied into σ template*)
    Cycle 4: [ka * **paa** * pag * pa * hintay]
    Cycle 5: [ma * ka * **paa** * pag * pa * hintay]

Not surprisingly, morphemes that may not be targeted for reduplication are simply generated above the base syntactic position of OAspP, explaining why the ability marker *ma* may not be reduplicated, in addition to why the negative suffix in Ndebele cannot be targeted for reduplication, as shown in (8-9).[3]

(8) Ndebele: [**dlayi**]-dl-el-a

```
                    NegP
                   /    \
               Neg⁰      OAspP
                i       /     \
                    O̶A̶s̶p̶      vP
                            /    \
                          v⁰      ApplP
                         /  \       …
                     Appl⁰    v
                    /    \
                  V⁰      Appl
                 /  \      el
             OAsp    V⁰
            [RED]    dl
```

(9) Cycle 1: [$\sigma\sigma$ * dl]
    Cycle 1': [**dl** * dl] (*phonological features of sister copied into $\sigma\sigma$ template*)
    Cycle 1": [**dlayi** * dl] (*epenthesis to satisfy remainder of required phonological template*)[4]
    Cycle 2: [**dlayi** * dl * el]
    Cycle 3: [**dlayi** * dl * el * i]

So, phonological features of morphemes that are linearized subsequent to the linearization of the reduplicative morpheme will not be available targets for phonological copying. Only phonological features from those morphemes over which the reduplicant takes syntactic scope after Lowering may be copied during VI. Crucially, I argue that reduplication is a process of phonological copying, rather than an operation in which morphemes themselves are copied into the reduplicant (cf. Inkelas and Zoll

---

[2] I omit the first VI cycle from these representations, as it applies only to the root morpheme.
[3] The tree in (8) represents an intermediate stage of the derivation after Lowering of OAsp⁰ to v⁰, but before Raising of v⁰ to Neg⁰. See section 4.
[4] It is unclear whether epenthesis of these segments occurs at this stage of the derivation, or during the later stage of PF evaluation. I leave this as an open question.

2005). The apparent morphological optionality that we observe is due simply to the effects of Lowering and the structural scope relations that it derives.

The derivation in (10) and (11) shows another possible scenario for Lowering in Ndebele. In this case, $OAsp^0$ has lowered to a position from which it takes scope over both the root and the applicative morpheme.

(10)
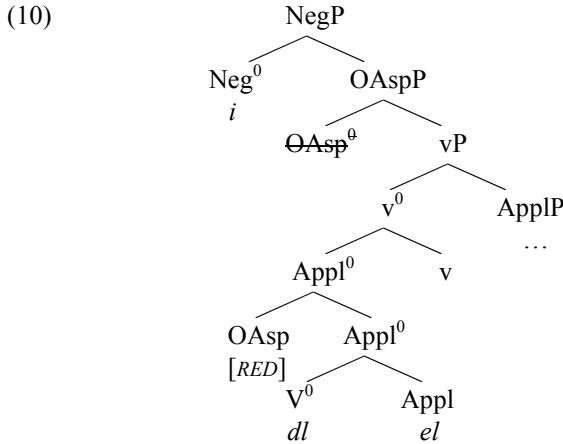
(10) derives the linearizations in (11) upon VI:

(11) Cycle 1:   [dl * el]
      Cycle 2:   [$\sigma\sigma$ * dl * el]
      Cycle 2': [**dlel** * dl * el]   (*phonological features of sister copied into $\sigma\sigma$ template*)[5]
      Cycle 2": [**dlela** * dl * el] (*epenthesis to satisfy remainder of phonological template*)
      Cycle 3:   [**dlela** * dl * el * i]

Thus, in these cases of morphological optionality in reduplication, the variations are simply the result of the availability of multiple possible landing sites when lowering into a complex head.[6]

3. Syntactic restrictions and phonological ineffability

It may at first seem that this model overgenerates possible morpheme orderings and outputs. However, I suggest that certain constructions that may be derived under the proposed system are ruled out at the later stage of PF evaluation. I will illustrate this with the case of Tagalog *mag-*.

The Tagalog prefix *mag-* (*m-* + *pag-*) may not be reduplicated (AT = Actor Topic marker):

(12) mag-   linis   (= m + pag - linis)
      AT.TRANS-   clean
      'cleans'

---

[5] Note that an alternate realization of this form is *[dl-e-yi]-dl-el-i*, in which not all phonological information appears to have been copied from the applicative suffix. I will not discuss this difference here, but suggest that this is due to phonological competition of epenthetic *–a* and *–yi*.

[6] As a sidenote, I claim that the intermediate X^0 levels that I propose as possible landing sites for Lowering operations are lost upon Vocabulary Insertion, since Vocabulary Insertion erases all intermediate hierarchical structure. In this way, all of Embick and Noyer's observations about the limitations on post-VI transformations, such as Local Dislocation, still hold.

(13)   a.   mag-[**lii**]-linis
       b.   *[**maa**]-mag-linis
       c.   *[**maa**]-pag-linis

(14)   Pre-Lowering structure:
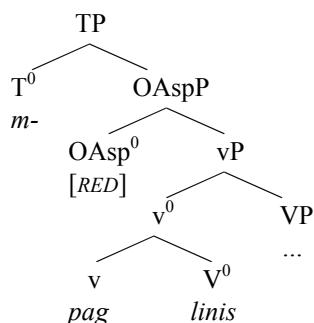
In the structure in (14), the Actor Topic morpheme *m-* will never be within the scope of the reduplicant, thus ruling out the possibility of a form such as **[maa]-mag-linis* in (15), where the reduplicant would need to take syntactic scope over the Actor Topic morpheme. However, we note that the form in (16) **[maa]-pag-linis* should be possible if $OAsp^0$ lowers to v^0, deriving a structure in which the reduplicant targets the transitivity marker *pag-*, and then undergoes nasal coalescence with the Actor Topic morpheme.

(15)   *[**maa**]-mag-linis = [**m-paa**]-m-pag-linis   ← post-syntactically impossible

(16)   *[**maa**]-pag-linis = m-[**paa**]-pag-linis   ← post-syntactically possible

    To rule out the form in (16), we look to conditions on phonological well-formedness. This may be done by implementing a CONTROL model of phonological evaluation (Orgun and Sprouse 2002), in which the optimal output candidate from EVAL undergoes a further evaluation of strictly inviolable constraints in the subsequent evaluation module CONTROL. If the most optimal output candidate from EVAL violates any of the constraints in CONTROL, the form is ungrammatical, and a lexical gap is created (cf. Prince and Smolensky's 2004 MPARSE model).
    Here, I follow McCarthy and Prince's (1995) model of nasal coalescence; however, note that there are additional factors that contribute to nasal coalescence which have been omitted due to space limitations:

(17) $*NC_{[-voc]}$
         No nasal-voiceless consonant clusters.

(18)   UNIFORMITY
       No element in the output has multiple correspondents in the input.

(19)   ANCHORLEFT(RED, BASE)
       Any element at the designated periphery [Left] of S_1 [RED] has a correspondent at the designated periphery of S_2 [Base].

(20)

EVAL		
m$_1$-[**p$_2$aa**]-paglinis	*NC$_{[-voc]}$	UNIFORMITY
a. m$_1$-[**p$_2$aa**]-paglinis	*!	
☞ b. [m$_{1,2}$aa]-paglinis		*

CONTROL	ANCHORL(RED, BASE)
✂	*!

Since the most optimal output from EVAL violates the inviolable ANCHORL constraint in CONTROL, the output crashes. In this way, considerations of syntax, post-syntax, and phonology all play a role in determining what is possible and impossible in the cases of morphological optionality; clearly, a derivation must converge at all levels/interfaces in order to be successful. Similar claims may be made for other ineffable phonological forms in both Tagalog and Ndebele, though I leave the illustration of these for future work.

4. Towards a theory of Lowering

There has long been the not uncontroversial assumption that some heads satisfy their feature-checking requirements by raising other syntactic constituents from a lower position, and that, less often, other heads satisfy these requirements by lowering. However, the reasons behind this asymmetry are not very well understood. I will attempt to provide a very preliminary account for this asymmetry, starting with the following assumptions:

- ♦ All pre-VI movement (both Raising and Lowering) is feature-driven.
- ♦ Narrow syntactic head-raising is preferred cross-linguistically.
- ♦ Post-syntactic head-lowering is a last resort operation.

Thus, if head-raising is preferred, why do certain syntactic heads lower? Curiously, most, if not all, heads that lower are base-generated in positions that are commonly assumed to be structurally adjacent to a phase boundary;[7] that is, Lowering heads often seem to take phases as their complements (e.g. Tense in English lowers when it takes vP as a complement). So, I suspect that the answer to this question lies in the effects of cyclic/phase Spell-out on complex heads. With this in mind I propose that:

① A phase head (e.g. v) must undergo Spell-out/linearization along with its complement; a phase head must be spelled-out/linearized before it is extracted from the phase.

② Linearization of a complex head deletes all intermediate hierarchical structure, and retains only the category feature of the topmost node, i.e. embedded syntactic category features X, Y, and Z of a complex head will 'disappear' at Spell-out (perhaps due to phase impenetrability; Chomsky's 2001 PIC).

③ A Lowering head contains an uninterpretable feature X, Y, or Z. This head must therefore lower (if possible) before linearization of the complex head of its complement and the subsequent disappearance of its embedded features.
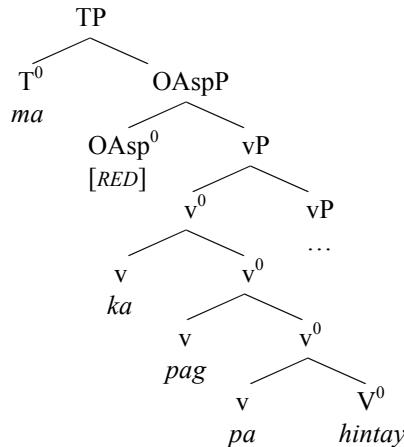
---

[7] I adopt a theory of phases similar to that presented in Chomsky (2001).

(21)

```
              γP
           /      \
          γ       αP
               /      \
              α        …
           /     \
          β       α
```
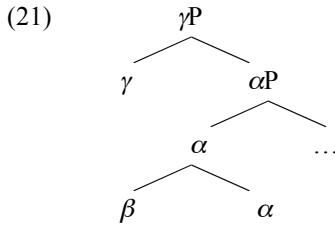
Taking into account the skeletal structure in (21), where α is a phase head and γ carries an uninterpretable β-feature, if α is to raise to γ, it must first undergo Spell-out, losing the category feature β, since all embedded structure and category information is erased upon linearization. Therefore, γ may lower to α before α is linearized (i.e. during the Spell-out process of α), as a last resort operation to check its uninterpretable β-feature.

In terms of the current analysis of reduplication, I suggest that the Outer Aspect head in Tagalog and Ndebele carries an uninterpretable V-feature, which is checked as a last resort via Lowering to the complex v head before this complex head is linearized and loses its V-feature. To illustrate, consider the pre-Lowering syntactic structure in (22).

(22)   Tagalog: ma-[**RED**]-ka-pag-pa-hintay (pre-Lowering)

```
                 TP
              /      \
            T⁰        OAspP
            ma      /      \
                 OAsp⁰       vP
                 [RED]     /    \
                         v⁰      vP
                       /    \     …
                      v      v⁰
                      ka   /    \
                          v      v⁰
                         pag   /    \
                              v      V⁰
                              pa    hintay
```

T^0 *ma*; $OAsp^0$ [*RED*]; v^0; v^0; v^0; V^0

Tagalog is normally considered to be a verb-raising language, as suggested by the VSO surface order in (23).

(23)   Tagalog
Bumili   siya   ng   aklat.
AT.buy   he   DET   book
'He bought a book.'

So, the complex v head in (22) presumably raises out of vP. However, as has already been noted, standard head-raising to or through the Outer Aspect head will not derive the observed positional variations of the reduplicant. However, if the complex v head must be linearized before it is extracted from the vP phase, and if the Outer Aspect head has an uninterpretable V-feature that it must check, then Outer Aspect must lower to the complex v head before that head is linearized. This is the only way that Outer Aspect can check its V-feature. If Outer Aspect does not lower, then the linearization of the complex v head will cause the interpretable V-feature embedded in that complex head to be lost, and the uninterpretable V-feature on Outer Aspect will go unchecked, causing the derivation to crash. Therefore, during the Spell-out process of the complex v head, Outer Aspect lowers into that head to check its V-feature, attaching to any X^0 position of the complex head, as claimed above.

The scenario suggested here has quite a few consequences for the theories of phase Spell-out,

head movement, feature-checking relations, and basic syntactic constituency, among others, including the typology of verb-raising versus tense-lowering languages. I leave these questions for future research.

5. Conclusion

In this paper, we have seen that certain patterns of morphological optionality in reduplication may be uniformly accounted for via a revised theory of post-syntactic Lowering in which a head, when lowering to a complex head, may adjoin to any one of many possible landing sites in that complex head. Additionally, we have ruled out ungrammatical examples via the limitations of our proposed syntactic hierarchy and via constraints on phonological outputs. In this process, we have moved one step closer to more adequately identifying some of the effects of the syntax-phonology interface.

References

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

—. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A Life in Language*, 1-52. Cambridge, MA: MIT Press.

—. 2004. Beyond explanatory accuracy. In Adriana Belletti (ed.), *Structures and Beyond: The Cartography of Syntactic Structures, Volume 3*, 104–191. Oxford University Press.

Chung, Sandra. 1990. VP's and verb movement in Chamorro. *Natural Language and Linguistic Theory* 8.4: 559-620.

Embick, David. 2006. Linearization and local dislocation: Derivational mechanics and interactions. Ms., University of Pennsylvania.

Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32: 555-595.

Fox, Danny, and David Pesetsky. 2005. Cyclic linearization of syntactic structure. *Theoretical Linguistics* 31: 1-45.

Ghomeshi, Jila, Ray Jackendoff, Nicole Rosen, and Kevin Russell. 2003. Contrastive focus reduplication in English. *Natural Language and Linguistic Theory* 22: 307-357.

Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Ken Hale and Samuel J. Keyser (eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, 111-167. Cambridge, MA: MIT Press.

Hyman, Larry, Sharon Inkelas, and Galen Sibanda. In press. Morphosyntactic correspondence in Bantu reduplication.

Inkelas, Sharon, and Cheryl Zoll. 2005. *Reduplication: Doubling in Morphology*. Cambridge: Cambridge University Press.

Marantz, Alec. 1982. Re reduplication. *Linguistic Inquiry* 13: 435–482.

McCarthy, John, and Alan Prince. 1995. Faithfulness and reduplicative identity. In Jill Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk (eds.), *University of Massachusetts Occasional Papers 18: Papers in Optimality Theory*, 249-384. Dept. of Linguistics, University of Massachusetts, Amherst.

Orgun, Orhan, and Ronald Sprouse. 2002. From MPARSE to CONTROL: Deriving ungrammaticality. *Phonology* 16: 191-220.

Prince, Alan, and Paul Smolensky. 2004. *Optimality Theory: Constraint Interaction in Generative Grammar*. Malden, MA: Blackwell.

Rackowski, Andrea. 1999. Morphological optionality in Tagalog aspectual reduplication. *Papers on Morphology and Syntax, Cycle Two, MITWPL 34*. Cambridge: MITWPL.

Smith, Carlota. 1991. *The Parameter of Aspect*. Studies in Linguistics and Philosophy. Dordrecht: Kluwer.

Travis, Lisa de Mena. In prep. *Inner Aspect: The Articulation of VP*.

Proceedings of the 26th West Coast Conference on Formal Linguistics

edited by Charles B. Chang and Hannah J. Haynie

Cascadilla Proceedings Project   Somerville, MA   2008

Web access and citation information

This entire proceedings can also be viewed on the web at www.lingref.com. Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Skinner, Tobin R. 2008. Morphological Optionality in Reduplication: A Lowering Account. In *Proceedings of the 26th West Coast Conference on Formal Linguistics,* ed. Charles B. Chang and Hannah J. Haynie, 420-428. Somerville, MA: Cascadilla Proceedings Project.

or:

Skinner, Tobin R. 2008. Morphological Optionality in Reduplication: A Lowering Account. In *Proceedings of the 26th West Coast Conference on Formal Linguistics,* ed. Charles B. Chang and Hannah J. Haynie, 420-428. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #1698.