Stress Restricts Reduplication[*]

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1 Introduction

There is a typological gap in the distribution of reduplication patterns. Monosyllabic/monomoraic partial reduplication is absent (in particular positions) in languages with the following stress properties: (i) a prohibition on stress clash, (ii) cyclic stress, and (iii) a fixed stress relative to an edge. Among such languages, there are many reduplication systems like Diyari (Austin, 1981 [2013]), but none like *Diyari′*, *Diyari″*, or *Diyari‴*, as shown in (1). Diyari has a **disyllabic** reduplicant; the unattested *Diyari primes* together represent all viable configurations of stress with a **monosyllabic** reduplicant.

(1) <u>Attested and unattested patterns in restrictive languages (Diyari data from Austin, 1981 [2013]: 38-40)</u>

Base	✓ Diyari reduplication	* *Diyari′* reduplication	* *Diyari″* reduplication	* *Diyari‴* reduplication
σ́σ	**<u>σ́σ</u>-σ́σ**	**<u>σ́</u>-σ́σ**	**<u>σ</u>-σ́σ**	**<u>σ́</u>-σσ**
wílha	*<u>wílha</u>-wílha*	*<u>wí</u>-wílha*	*<u>wi</u>-wílha*	*<u>wí</u>-wilha*
yátha	*<u>yátha</u>-yátha*	*<u>yá</u>-yátha*	*<u>ya</u>-yátha*	*<u>yá</u>-yatha*
σ́σσ	**<u>σ́σ</u>-σ́σσ**	**<u>σ́</u>-σ́σσ**	**<u>σ</u>-σ́σσ**	**<u>σ́</u>-σσ́σ**
kánhini	*<u>kánhi</u>-kánhini*	*<u>ká</u>-kánhini*	*<u>ka</u>-kánhini*	*<u>ká</u>-kanhíni*
tyílparku	*<u>tyílpa</u>-tyílparku*	*<u>tyí</u>-tyílparku*	*<u>tyi</u>-tyílparku*	*<u>tyí</u>-tyilpárku*
σ́σσ́σ	**<u>σ́σ</u>-σ́σσ́σ**[1]	**<u>σ́</u>-σ́σσ́σ**	**<u>σ</u>-σ́σσ́σ**	**<u>σ́</u>-σσ́σσ**
wílhapína	*<u>wílha</u>-wílhapína*	*<u>wí</u>-wílhapína*	*<u>wi</u>-wílhapína*	*<u>wí</u>-wilhápina*

This gap arises because the constraints that generate these stress properties conspire to make a single-unit reduplicant (i.e. a reduplicant that is *one syllable* or *one mora* in length) at the same edge as the fixed stress hopelessly ill-formed. This single-unit reduplicant gap holds across multiple stress parameters: unit of metrical computation – syllable vs. mora; orientation of fixed stress – left vs. right; position of fixed stress relative to edge – edgemost or interior; permission of lapses – yes or no; etc.

This paper proposes that this gap can be explained by the existence of a meta-ranking condition on two types of constraints: (i) constraints enacting size preferences for the reduplicant,[2] henceforth "REDSIZE" or "**R**" constraints; and (ii) constraints enacting *stress requirements* (i.e. unviolated stress constraints), henceforth "STRESSREQ" or "**S**" constraints. The typological gap is predicted if there is an *a priori* ranking of STRESSREQ constraints over REDSIZE constraints.

(2) <u>Stress-Reduplication meta-ranking</u>: STRESSREQ » REDSIZE (**S** » **R**)

If the reverse ranking were permitted, it would be predicted that a language could display a fixed reduplicant shape that countermands the stress properties of the language. It is precisely this situation which seems not to be attested.

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[1] Four-syllable roots are not attested with reduplication in Diyari; *<u>wílha</u>-wílhapína* is hypothetical.

[2] Templatic constraints will be employed in this paper for simplicity. See §5 for discussion.

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The **S » R** relationship largely conforms to McCarthy & Prince's [M&P] (1993) restatement of the principles of Prosodic Morphology in OT. However, on careful inspection, it also in part contradicts it.

(3) McCarthy & Prince's "New Prosodic Morphology" (1993: 110, 145)

a. **Prosodic Morphology Hypothesis**
Templates are constraints on the prosody/morphology interface, asserting the coincidence of morphological and prosodic constituents.

b. **Template Satisfaction Condition**
Templatic constraints may be undominated, in which case they are satisfied fully, [or] they may be dominated, in which case they are violated minimally, in accordance with general principles of Optimality Theory.

c. **Ranking Schema**: **P** » **M** [PROSODY » MORPHOLOGY]

The **S » R** meta-ranking basically conforms to the **P** » **M** meta-ranking. Since M&P conceive of templatic constraints (our REDSIZE constraints) as phonology-morphology interface constraints, they fall into the "**M**" category. However, part of their statement of the "Template Satisfaction Condition" is incompatible with the **S » R** meta-ranking: "*templatic constraints may be undominated, in which case they are satisfied fully*." If the STRESSREQ » REDSIZE meta-ranking is correct, templatic constraints may only be undominated (or appear to be undominated) if they do not conflict with the stress requirements of the language.

This paper will present several types of systems where REDSIZE constraints are subordinated to the STRESSREQs. The prosodically-fixed pattern of Diyari (and similar Australian languages) appears to be straightforwardly explainable using a templatic constraint enforcing the size requirement (M&P, 1994a,b). However, the pattern can also be seen to fall out directly from the interaction of the STRESSREQ constraints. The absence of different types of reduplicative systems in languages with equivalent stress facts, though, can only be explained by the latter solution. The **S » R** meta-ranking also generates the prosodically-variable, yet predictable, reduplication pattern of Ponapean (Rehg & Sohl, 1981), which is less obviously explicable via templatic constraints. Lastly, the complex stress system of Ngan'gityemerri (Reid, 2011) displays an apparent counterexample to the generalization about the absence of monosyllabic reduplication patterns. However, on closer inspection of the system, it turns out to be the exception that proves the rule.

2 Reduplication in Australian languages and the over-generation problem

Australian languages commonly display quantity insensitive left-to-right alternating stress (QI L→R) without stressed final syllables.[3] Many also display cyclic stress (Poser, 1989; Crowhurst, 1994; Kenstowicz, 1998; Berry, 1998; Alderete, 2009; Stanton, 2014). When these languages display prefixal partial reduplication, it is exclusively disyllabic. This property follows from the **S » R** meta-ranking.

2.1 *Diyari stress* One of the most well-studied of these Australian languages is Diyari (Austin, 1981 [2013]). It will serve here as the representative example for this pattern of stress and reduplication. In a foot-free stress framework, the stress behavior of these languages can be modeled with the following constraints:[4]

(4) Foot-free stress constraints for QI L→R cyclic stress systems (based in part on Gordon, 2002)

a. **STRESSLEFT**: Assign one violation mark * if the initial syllable is not stressed.
b. **NONFINALITY**: Assign one violation mark * if the word-final syllable is stressed.
c. ***CLASH**: Assign one violation mark * for each sequence of two adjacent stressed syllables.
d. ***LAPSE**: Assign one violation mark * for each sequence of two adjacent unstressed syllables.
e. **BD-IDENT(stress)**: Assign one violation mark * for each syllable in the derivative in which the presence or absence of stress differs from the corresponding syllable of the base (following Benua, 1997).

[3] Left-to-right syllabic trochees, in foot-based terms.
[4] The conclusions of this paper can largely be translated into foot-based terms.

The ranking of these constraints shown in (5) generates the stress pattern of Diyari and other similar languages, both in monomorphemic words and derived words, as demonstrated in tableaux (6) and (7).

(5) Total stress ranking in Diyari

STRESSLEFT *CLASH NONFINALITY BD-IDENT(stress)

*LAPSE

(6) Stress in 3 syllable simplex words: Diyari /pinaru/ → [pínʌru] 'old man' (Austin: 1981 [2013]: 39)

❖ Ranking arguments for STRESSLEFT, *CLASH, NONFINALITY » *LAPSE

/pinaru/	STRESSL	*CLASH	NONFINALITY	*LAPSE
☞ a. pínʌru [100]				*
b. pínʌrú [101]			*!	
c. pínʌ́ru [110]		*!		
d. pinʌ́ru [010]	*!			

(7) Cyclic stress:[5] Diyari /mada-la-n̪t̪u/ → [mʌ́dʌ-lʌ-n̪.t̪u] 'hill-CHARAC-PROP' (Berry 1998: 39)

❖ Ranking argument for BD-IDENT(stress) » *LAPSE

/mada-la-n̪t̪u/ BASE: [mʌ́dʌ-lʌ] (10-0)	NONFINALITY	BD-IDENT(stress)	*LAPSE
☞ a. mʌ́dʌ-lʌ-n̪.t̪u [10-0-0]			**
b. mʌ́dʌ-lʌ́-n̪.t̪u [10-1-0]		*!	
c. mʌ́dʌ-lʌ-n̪.t̪ú [10-0-1]	*!		*

Interpreting this data in light of the **S » R** hypothesis, we can now identify Diyari's "STRESSREQS":

(8) STRESS REQUIREMENTS in Diyari: STRESSLEFT, *CLASH, NONFINALITY, BD-IDENT(stress)

The STRESSREQ constraints will, on their own, be sufficient to generate the disyllabic reduplication pattern, when incorporated into the **S » R** structure.

2.2 *How stress determines Diyari reduplication* As already mentioned, Diyari, like many other Australian languages, has a consistent prefixal disyllabic reduplication pattern (Austin, 1981 [2013]; for analyses see M&P, 1986 [1996], 1994a,b, *et seq*.). The pattern is illustrated in (9):

(9) Diyari Reduplication (Austin, 1981 [2013]: 38-40)

Non-reduplicated stem				Reduplicated stem	
Two syllable bases	a.	'woman'	*wilha*	*wilha-wilha*	[wíd̪l̪ʌ-wíd̪l̪ʌ]
	b.	'boy'	*kanku*	*kanku-kanku*	[kʌ́nku-kʌ́nku]
	c.	'to talk'	*yatha*	*yatha-yatha*	[jɛ́t̪ʌ-jɛ́t̪ʌ]
Three syllable bases	d.	'mother's mother'	*kanhini*	*kanhi-kanhini*	[kʌ́d̪n̪i-kʌ́d̪n̪ini]
	e.	'father'	*ngapiri*	*ngapi-ngapiri*	[ŋʌ́pi-ŋʌ́piri]
	f.	'bird type'	*tyilparku*	*tyilpa-tyilparku*	[t^jílpʌ-t^jílpʌrku]
	g.	'cat fish'	*ngankanthi*	*nganka-ngankanthi*	[ŋʌ́nkʌ-ŋʌ́nkʌn̪t̪i]

If we follow the **S » R** ranking, and subordinate any and all constraints dictating the size of the reduplicant to the STRESSREQS enumerated in (8), we derive this disyllabic reduplicant *before any* REDSIZE *constraints can enter into the evaluation*.

[5] I adopt the Base-Derivative faithfulness account of cyclic stress employed in Stanton (2014). For earlier (non-cyclic) analyses based on morpho-prosodic alignment, see, e.g., Poser (1989), M&P (1994a,b).

(10) Schematic Diyari reduplication according to **S » R**:

/ RED, σσσσ / BASE: [σ́σσ́σ] (1010)		*schematic stress*	*CLASH	STRESSL	BD-IDENT(stress)	RED = σ	RED = 2σ
☞	a. σ́σ-σ́σσ́σ	10-1010				*	✓
	b. σ́-σ́σσ́σ	1-1010	*!			✓	*
	c. σ-σ́σσ́σ	0-1010		*!		✓	*
	d. σ́-σσ́σσ	1-0100			*!**	✓	*

Any candidate with a monosyllabic reduplicant incurs a fatal violation of one of the STRESSREQ constraints. Candidate (b) is faithful to the stress of the base (satisfying BD-IDENT(stress)) and stresses the reduplicant (satisfying STRESSL), but stressing both syllables creates a clash. Candidate (c) is also faithful to the stress of the base, but has left the reduplicant unstressed to avoid the clash, but this comes at the expense of STRESSL. Candidate (d) stresses the reduplicant (satisfying STRESSL) and avoids the clash, but only by changing the stress pattern of the base, violating BD-IDENT(stress). Adding an extra “buffer” syllable to the reduplicant escapes all of these problems. Candidate (a) can thus stress the initial syllable of the reduplicant without causing a clash or changing the stress pattern of the base.

As long as the templatic constraints are subordinated to the STRESSREQs, they play no role in the evaluation. Since this is a disyllabic (≈ foot) “template,” the same result would obtain from a high ranking of RED = 2σ. Such a ranking would be an example of the first clause of M&P’s Template Satisfaction Condition. But, as just demonstrated, the templatic constraint is not necessary to generate the pattern.

On the other hand, if REDSIZE constraints *could* rank above the STRESSREQs (contradicting the **S » R** hypothesis), as would be the case if we used high-ranking RED = 2σ to generate the pattern, there could be a language where RED = σ was highest ranked, as well. If RED = σ can be freely ranked with respect to the Diyari STRESSREQs, we produce (at least) three unattested patterns. These patterns’ unattested status is confirmed by a survey of Australian languages with Diyari-like stress systems.

2.3 *The typology of reduplication systems with freely rankable RED = σ* If RED = σ were freely rankable with respect to the STRESSREQ constraints of the cyclic QI L→R stress systems represented by Diyari (STRESSLEFT, *CLASH, and BD-IDENT(stress)), we would expect (at least) four patterns, corresponding to the four candidates in tableau (10) – which themselves correspond to the patterns presented above in (1) as Diyari and the *Diyari primes*, respectively.

(11) Unrestrained reduplication typology
- (i) Candidate (a) σ́σ-σ́σσ́σ [10-1010] = Diyari
  Would win if : STRESSL, *CLASH, BD-IDENT(stress) » RED = σ
- (ii) Candidate (b) σ́-σ́σσ́σ [1-1010] = **Diyari′*
  Would win if : RED = σ » *CLASH
- (iii) Candidate (c) σ-σ́σσ́σ [0-1010] = **Diyari″*
  Would win if : RED = σ » STRESSL
- (iv) Candidate (d) σ́-σσ́σσ [1-0100] = **Diyari‴*
  Would win if : RED = σ » BD-IDENT(stress)

We have already seen that the first pattern is attested in Diyari. The question is: which of these other patterns are attested in other languages with a Diyari-like stress system?

I conducted a survey to address this question. The survey sought Australian languages which had been described as QI L→R. The initial list was assembled largely based on Gordon’s (2002) survey of quantity insensitive languages, and was supplemented by searching of WALS (wals.info). Of the languages on this list, I was able to access data for a large majority.[6] In most cases, the data was drawn directly from fieldwork grammars. I discarded those languages without evidence of prefixal partial reduplication and

[6] These were accessed through a number of means available through MIT Libraries (MIT Hayden Library, Boston Library Consortium, Borrow Direct, Inter-Library Loan) and freely available electronic resources.

without (some) evidence of cyclic stress (as well as those which were not truly QI L→R). This search ultimately yielded 12 Australian languages (including Diyari) with prefixal partial reduplication and cyclic QI L→R stress, i.e. those which can be characterized by unviolated STRESSLEFT, *CLASH, NONFINALITY, and BD-IDENT(stress). These languages are listed in (12).

(12) Cyclic QI L→R languages with prefixal reduplication:
Arabana-Wangkangurru (Hercus, 1994), Bagandji (Hercus, 1982), Diyari (Austin, 1981 [2013]), Dyirbal (Dixon, 1972), Kalkatungu (Blake, 1979a), Mayi (Breen, 1981), Pitta Pitta (Blake, 1979b), Walmatjari (Hudson, 1978), Wambaya (Nordlinger, 1998), Warlpiri (Nash, 1980), Warrwa (McGregor, 1994), Wirangu (Hercus, 1999)

Among these languages, the *only* attested prefixal partial reduplication pattern is indeed the disyllabic pattern (11.i). The monosyllabic patterns (11.ii-iv) are all unattested in the surveyed languages. One seeming counterexample, Ngan'gityemerri (Reid, 2011), which will be discussed in §4, will turn out to be the exception that proves the rule.

There is a common link that characterizes the unattested monosyllabic patterns (11.ii-iv) to the exclusion of the attested disyllabic pattern (11.i). In each of these rankings, RED = σ dominates one of the STRESSREQs. This ranking possibility can thus be identified as the locus of over-generation. By instituting the **S » R** meta-ranking, we prohibit exactly this set of rankings, and avoid the over-generation problem.

2.4 *Interim conclusions* A survey of QI L→R cyclic stress systems in Australian languages has revealed that all such languages conform to the **S » R** meta-ranking hypothesis. In these systems, preferences for reduplicant shape are invariably subordinated to the stress requirements of the language. In the case of cyclic QI L→R systems, this means that monosyllabic prefixal reduplication is impossible. By enforcing the meta-ranking of STRESSREQ » REDSIZE, we capture all of the attested patterns and prohibit the unattested but otherwise logically possible patterns.

3 Ponapean

In Australian prefixal reduplication, fixed-stress placement restricts the possible reduplication patterns that may occur at the same edge as the fixed stress. Ponapean (Austronesian; Rehg & Sohl, 1981, Rehg, 1993) represents an example of fixed stress and reduplication occurring at opposite ends of the word: rightmost stress, leftmost reduplication. However, the additional fact that Ponapean has *strictly* alternating stress brings it within the scope of the present discussion. Ponapean reduplicant size is *prosodically-variable*, but *predictable*. This comes about because REDSIZE constraints are subordinated to the stress constraints which demand *alternating rhythm*, in addition to fixed stress.

3.1 *Ponapean stress* In Ponapean, the rightmost mora always bears primary stress (Rehg, 1993; Kennedy, 2002: 223), assuming final consonants are non-moraic. (Medial codas are moraic.)

(13) **STRESSR_{μ}** : Assign one violation mark * if the final mora is unstressed.

Counting leftward from this main stress, there is strictly alternating stress by mora. This is enforced by undominated *$CLASH_{\mu}$ and *$LAPSE_{\mu}$.

(14) ***$CLASH_{\mu}$** : Assign one violation mark * for each sequence of two adjacent stressed moras.

(15) ***$LAPSE_{\mu}$** : Assign one violation mark * for each sequence of two adjacent unstressed moras.

This results in a predictable difference in the stress of the initial mora of a word depending on its moraic parity. Odd moraic parity words will have stress on the initial mora (1μ: *pá*; 3μ: *lì.aán, dùupék*), but even parity words will *not* have stress on the initial mora (2μ: *duné*, *dilíp*; 4μ: *ri.àalá, toòroór, soùpisék*; 6μ: *waàntùuké*). This difference will be crucial in explaining the distribution of reduplicant shapes.

3.2 *Ponapean reduplication* Kennedy (2002; building on M&P, 1986 [1996]) shows that the data can be grouped based on mora count of the stem and mora count of the reduplicative prefix.

(16) Ponapean reduplication (Kennedy, 2002: 225)

	1-mora stem	*2-mora stem*	*3-mora stem*	*4-mora stem*
2-mora prefix	**pàa**.pá **tèpi**.tép **dòn$_{\mu}$**.dód	**duǹ$_{\mu}$**.du.né **diǹ$_{\mu}$**.di.líp **sipì**.sipéd	**dùu**.dùu.pék **mèe**.mèe.lél **lìi**.lì.aán	**riì**.ri.àa.lá
1-mora prefix		**dù**.duúp		**tò**.toò.roór **sò**.soù.pi.sék

To this we can also add the one example of a 6μ stem: *waàn$_{\mu}$.tùu.ké* → ***wà***.*waàn$_{\mu}$.tùu.ké* (Kennedy: p. 224). The key to explaining the pattern (as noted by Kennedy: pp. 225-226) is that the reduplicant must always bear a stress. I will encode this with a descriptive constraint STRESS-TO-RED: '*all reduplicants must have at least one stressed mora*'. Once this requirement is instantiated, there is a potential conflict with undominated *CLASH$_{\mu}$. Odd parity stems have initial stress due to the alternating rhythm. If the reduplicant were monomoraic, and bore its required stress, then there would be a clash. To avoid this, odd parity stems always have bimoraic reduplicants:[7]

(17) Odd parity stems → bimoraic reduplicants

a. pá$_{\mu}$ → pà$_{\mu}$a$_{\mu}$-pá$_{\mu}$ (not *pà$_{\mu}$-pá$_{\mu}$)
b. té$_{\mu}$p → té$_{\mu}$pi$_{\mu}$-té$_{\mu}$p
c. dó$_{\mu}$d → dò$_{\mu}$n$_{\mu}$-dó$_{\mu}$d
d. lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n → lì$_{\mu}$i$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n (not *lì$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n)
e. dù$_{\mu}$u$_{\mu}$pé$_{\mu}$k → dù$_{\mu}$u$_{\mu}$-dù$_{\mu}$u$_{\mu}$pé$_{\mu}$k

(18) Odd parity stems → bimoraic reduplicants: lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n → lì$_{\mu}$i$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n

/ RED, li$_{\mu}$a$_{\mu}$a$_{\mu}$n /		STRESS-TO-RED	*CLASH$_{\mu}$	RED = μ
a. li$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n	0-201	*!		
b. lì$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n	2-201		*!	
☞ c. lì$_{\mu}$i$_{\mu}$-lì$_{\mu}$.a$_{\mu}$á$_{\mu}$n	20-201			*

Even parity stems are unencumbered by the clash problem. The alternating rhythm places stress on the peninitial mora, rather than the initial one. This means that a monomoraic reduplicant can be stressed without ever causing a clash. This is indeed the case. Even parity stems with a (super)heavy initial syllable have a monomoraic reduplicant, and this can be seen as the preferred reduplicant shape.

(19) Heavy-syllable–initial even parity stems → monomoraic reduplicants

a. du$_{\mu}$ú$_{\mu}$p → dù$_{\mu}$-du$_{\mu}$ú$_{\mu}$p (not *du$_{\mu}$ù$_{\mu}$-du$_{\mu}$ú$_{\mu}$p)
b. to$_{\mu}$ò$_{\mu}$.ro$_{\mu}$ó$_{\mu}$r → tò$_{\mu}$-to$_{\mu}$ò$_{\mu}$.ro$_{\mu}$ó$_{\mu}$r
c. so$_{\mu}$ù$_{\mu}$.pi$_{\mu}$.sé$_{\mu}$k → sò$_{\mu}$-so$_{\mu}$ù$_{\mu}$.pi$_{\mu}$.sé$_{\mu}$k
d. wa$_{\mu}$à$_{\mu}$n$_{\mu}$.tù$_{\mu}$u$_{\mu}$ké$_{\mu}$ → wà$_{\mu}$-wa$_{\mu}$à$_{\mu}$n$_{\mu}$.tù$_{\mu}$u$_{\mu}$ké$_{\mu}$

The reason for the variation within even parity stems is not stress-related, but instead based on an independent phonotactic restriction. When an even parity stem begins with a light initial syllable, it displays a bimoraic reduplicant, contrary to the preferred monomoraic shape, despite not needing it for clash purposes.

(20) Light-syllable–initial even parity stems → bimoraic reduplicants

a. du$_{\mu}$.né$_{\mu}$ → du$_{\mu}$ǹ$_{\mu}$-du$_{\mu}$.né$_{\mu}$ (not *dù$_{\mu}$-du$_{\mu}$.né$_{\mu}$)
b. di$_{\mu}$.lí$_{\mu}$p → di$_{\mu}$ǹ$_{\mu}$-di$_{\mu}$.lí$_{\mu}$p
c. si$_{\mu}$.pé$_{\mu}$d → si$_{\mu}$.pì$_{\mu}$-si$_{\mu}$.pé$_{\mu}$d
d. ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$ → ri$_{\mu}$ì$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$

[7] The difference in outcomes of the bimoraic reduplicant (for any stem parity) is driven by phonotactic restrictions on possible codas. I will not provide a full analysis here – see Kennedy (2002) for details.

A monomoraic reduplicant built to these forms would lead to two identical light (i.e. monomoraic) syllables next to each other. Therefore, a constraint which bans adjacent identical *light* syllables generates the data.[8] I propose to use a version of Yip's (1995) *REPEAT constraint:

(21) ***REPEAT(light)**: No identical adjacent light syllables.[9]

When *REPEAT(light) outranks RED = μ, it will cause light-syllable–initial roots to extend their reduplicants to two moras, but have no effect on heavy-syllable–initial roots.

(22) Light-syllable–initial even parity stems → *REPEAT effect: ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$ → ri$_{\mu}$ì$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$

/ RED, ri$_{\mu}$a$_{\mu}$a$_{\mu}$la$_{\mu}$ /		STRESS-TO-RED	*CLASH$_{\mu}$	*LAPSE$_{\mu}$	*REPEAT (light)	RED = μ	RED = 2μ
a. ri$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$	0-0201	*!		*	*		*
b. rì$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$	2-0201				*!		*
☞ c. ri$_{\mu}$ì$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$	02-0201					*	
d. rí$_{\mu}$i$_{\mu}$-ri$_{\mu}$.à$_{\mu}$a$_{\mu}$.lá$_{\mu}$	20-0201			*!		*	

(23) Heavy-syllable–initial even parity stems → no *REPEAT effect: du$_{\mu}$ú$_{\mu}$p → dù$_{\mu}$-du$_{\mu}$ú$_{\mu}$p

/ RED, du$_{\mu}$u$_{\mu}$p /		STRESS-TO-RED	*CLASH$_{\mu}$	*LAPSE$_{\mu}$	*REPEAT (light)	RED = μ	RED = 2μ
a. du$_{\mu}$-du$_{\mu}$ú$_{\mu}$p	0-01	*!		*			*
☞ b. dú$_{\mu}$-du$_{\mu}$ú$_{\mu}$p	2-01						*
c. du$_{\mu}$ú$_{\mu}$-du$_{\mu}$ú$_{\mu}$p	02-01					*!	
d. dú$_{\mu}$u$_{\mu}$-du$_{\mu}$ú$_{\mu}$p	20-01			*!		*	

Abstracting away from the different instantiations of the bimoraic reduplicants, this gives us the following ranking:

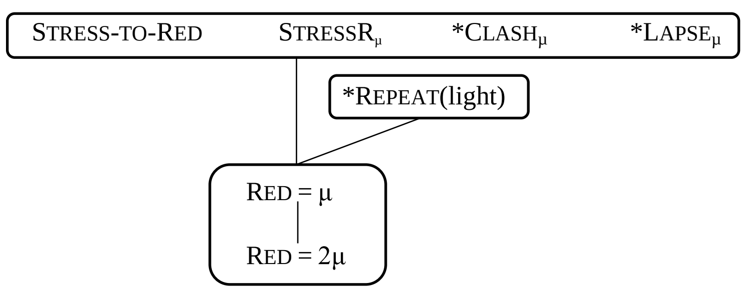
(24) Ponapean stress and reduplication ranking

Stratum 1: STRESS REQS

Stratum 2: other markedness[10]

Stratum 3: preferred REDSIZE

Stratum 4: dispreferred REDSIZE



The crucial point vis-à-vis **S » R** is the alternation between bimoraic reduplicants in odd parity stems, on the one hand, and the monomoraic reduplicants in the even parity stems which are not extended by *REPEAT(light), on the other. The extension in the monomoraic stems is driven by a need to satisfy *CLASH$_{\mu}$. This comes at the expense of creating a longer reduplicant, which is dispreferred by the

[8] The restriction to *light* syllables is crucial here, since, in trimoraic stems with an initial long vowel, the reduplicant is identical to the first syllable of the root: dù$_{\mu}$u$_{\mu}$pé$_{\mu}$k → dù$_{\mu}$u$_{\mu}$-dù$_{\mu}$u$_{\mu}$.pé$_{\mu}$k, not *du$_{\mu}$ù$_{\mu}$.pi$_{\mu}$-dù$_{\mu}$u$_{\mu}$.pé$_{\mu}$k. A general constraint against all sorts of adjacent identical syllables would rule out such forms, and thus is not the formulation we want.

[9] This constraint (without the restriction to light syllables) is employed by Kennard (2004) as part of her analysis of Tawala durative reduplication. Tawala is an Austronesian language related to Ponapean (both are in the Oceanic sub-group). Given that the Ponapean reduplication pattern under discussion is indeed the durative, this serves as fairly strong comparative evidence for the use of such a constraint in the analysis.

[10] It is not strictly necessary to separate this into a different stratum than the STRESSREQS.

constraint preferring monomoraic reduplicants. This is precisely the sort of relationship predicted by **S » R**, where constraints which are unviolated in the general language necessarily override preferences for reduplicant shape. This case is also interesting compared to Australian in that it is not (directly, at least) the constraints inducing a fixed stress that control reduplicant shape, but rather the constraints inducing rhythmic stress that do the job.

4 Ngan'gityemerri

Among the languages examined in the survey of Australian languages, there was one language which has QI L→R characteristics but also permits leftward monosyllabic reduplication: Ngan'gityemerri (Reid, 2011).[11] Its stress is not cyclic, so BD-IDENT(stress) is not at stake. What is at stake, though, is the behavior of reduplication relative to *CLASH. What sets Ngan'gityemerri apart from the other QI L→R Australian languages is its permission of stress clashes in certain morphological contexts. *CLASH is therefore not a member of the STRESSREQ set in this language. **S » R** thus allows for the possibility that a REDSIZE constraint *could* outrank *CLASH in this language, which is indeed the case. Therefore, monosyllabic reduplication in this language is **S » R**-compliant.

4.1 *Ngan'gityemerri stress* The stress pattern in this language is fairly complex, and differs significantly by morphological domain. In monomorphemic nominals, Ngan'gityemerri shows classic QI L→R behavior:

(25) Stress in monomorphemic nominals (Reid, 2011: 90, ex 2-95):
- a. 2σ: fépi 'rock, hill', mípurr 'man', dágum 'dew', gánggi 'high, upstream'
- b. 3σ: détyengi 'today', mínati 'big'
- c. 4σ: ápudèrri 'pubescent girl', ánemùni 'sweetheart'

These can be explained with the same constraint ranking used for Diyari: STRESSL,[12] *CLASH, NONFINALITY » *LAPSE.

Stress operates very differently in the verbal domain (Reid: pp. 97-99). The "complex verb" consists of an auxiliary stem followed by a verbal stem (marked below as [$_{\text{AUX}}$ ...] and [$_{\text{V}}$ ...], respectively, and separated by a stem-boundary marked as " = "). In the complex verb, each stem bears stress on its leftmost syllable, even if this results in a stressed final syllable (26a) or a clash (26b). With one exception, there are no additional stresses elsewhere within the complex verb, even if this creates lapses or extended lapses (26c). The exception to this generalization comes when the verbal stem contains a reduplicated string (marked {$_{\text{BR}}$ ...} below, with reduplicant underlined). If two syllables are standing in Base-Reduplicant correspondence, they must match in stress. When one such syllable is stem-initial, this requirement causes an additional stress to be placed on the syllable with which it stands in BR-correspondence, even if this creates a stressed final syllable (26d) or a clash (26d,e).[13]

(26) Stress in the complex verb (examples from Reid: pp. 97-98)[14]

a.	[$_{\text{AUX}}$ yé-ni-ny]=[$_{\text{V}}$ pàp]	3SG-go-PERF=climb	'He climbed up'
b.	[$_{\text{AUX}}$ yú]=[$_{\text{V}}$ tyèrr-dum]	2SG.slash=mouth-bury	'Shut the door!'
c.	[$_{\text{AUX}}$ yé-nim]=[$_{\text{V}}$ mì-wap-nyine]	3SG-go.PRES=VAL-sit-FOC	'She's married now'
d.	[$_{\text{AUX}}$ wí-rr-ing-gu]=[$_{\text{V}}$ {$_{\text{BR}}$ dà-<u>dà</u>}]	3-PL-sit-DL={sing-RED}	'They (dual) are singing'
e.	[$_{\text{AUX}}$ yé-mi-ngiti]=[$_{\text{V}}$ {$_{\text{BR}}$ <u>fì</u>-fìtyi}-pagu-pe]	2SG-hand-1SG.IO={RED-roll}-HITH-FUT	'Roll me some (smokes)!'

[11] Stress is described on pages 90-101, including discussions of stress in reduplicated forms. Verbal reduplication is described more fully on pages 152-154, 185-189.

[12] The effect of STRESSL will be duplicated by constraints demanding left-edge stress of morphological categories.

[13] The same interaction is evidenced in nominal compounding (Reid: p. 92).

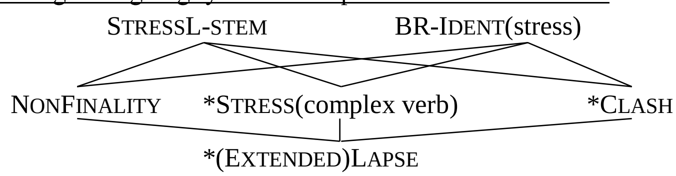
[14] < ny, ty, y > = IPA [ɲ, t^j, j]; < y > never indicates a vowel.

To describe this pattern, we will need the constraints in (27). Their rankings are motivated in (28) and summarized in (29).

(27) Stress constraints for Ngan'gityemerri complex verb
a. **StressL-stem**: One * for each stem whose leftmost syllable does not bear a stress.
b. ***Stress(complex verb)**: One * for each stressed syllable in a complex verbal structure.
c. **BR-Ident(stress)**: Assign one violation mark * for each syllable in the reduplicant in which the presence or absence of stress differs from the corresponding syllable of the base.[15]

(28) Ranking arguments
StressL-stem » NonFinality (26a): yé-ni-ny=pàp > *yé-ni-ny=pap
StressL-stem » *Clash (26b): yú=tyèrr-dum > *yú=tyerr-dum, *yu=tyèrr-dum
StressL-stem » *Stress(complex verb) » *(Extended)Lapse
(26c): yé-nim=mì-wap-nyine > *yé-nim=mì-wap-nyìne
BR-Ident(stress) » *Stress(complex verb), *Clash, NonFinality
(26d): wí-rr-ing-gu={dà-dà} > *wí-rr-ing-gu={dà-da}

(29) Stress ranking for Ngan'gityemerri complex verbal constructions



4.2 *Ngan'gityemerri reduplication* There are two types of reduplication that occur in the complex verbal domain in Ngan'gityemerri: total reduplication (probably rightward) and, of direct importance to the **S » R** question, leftward *monosyllabic* reduplication.

(30) Monosyllabic reduplications in the complex verb

a.	[$_{AUX}$ ngí-ni]=[$_{V}$ {$_{BR}$ kù-kùluk}-tye]	'I was coughing'	(p.98, ex. 2-117)
b.	[$_{AUX}$ yé-mi-ngiti]=[$_{V}$ {$_{BR}$ fì-fìtyi}-pagu-pe]	'Roll me some (smokes)!'	(p.98, ex. 2-118)
c.	[$_{AUX}$ yé-rr-mi-gi]=[$_{V}$ mì-{$_{BR}$ fa-fala}-pe]	'Keep showing it!'	(p.186, ex. 3-255c)[16]

In light of our predictive theory of reduplicant size, the data in the monomorphemic nominal forms in (25) suggests that we might expect these forms (at least (30a,b)) to have a *disyllabic* reduplicant, as we have seen elsewhere in languages with that stress pattern. Copying only one syllable forces a violation of *Clash, due to the need for Base-Reduplicant stress identity. Copying a second syllable would alleviate the clash, but this does not occur. (30c) does not display a clash. This is because the reduplicant, being non–stem-initial, does not receive a stress; therefore, BR-Ident(stress) does not place an additional stress on the corresponding syllable of the root. Given the behavior of Ponapean, where reduplicant length varied depending on whether or not a clash needed to be avoided, we might expect disyllabic reduplication in stem-initial position but monosyllabic reduplication in stem-medial position. This is clearly not the pattern.

The constraint ranking which derives verbal stress, when viewed from the perspective of **S » R**, explains why monosyllabic reduplicants are permitted in this language. There are only two conditions that are fully surface-true, and thus could fall into the category of "StressReq": StressL-stem and BR-Ident(stress). Even though *Clash is never violated in simplex nominals, it is violable in service of StressL-stem, as in (26b) *yú=tyèrr-dum*. Since *Clash can be violated, *it is not a stress requirement in this language*. According to **S » R**, RedSize constraints are only required to be dominated by StressReq constraints; otherwise violated stress constraints can be subordinated to RedSize constraints. Since *Clash

[15] Notice that this is the Base-Reduplicant version of BD-Ident(stress) (constraint (4e)).
[16] Reid does not provide stress marking on the forms in Section 3 of his grammar. Stress marks in (30c) are mine, based on his detailed description in Section 2.

is not a STRESSREQ, the REDSIZE constraint RED = σ is permitted to dominate it. Therefore, the ranking in (31), which is demonstrated in the tableau in (32), is consistent with the **S » R** hypothesis.

(31) Ngan'gityemerri stress and reduplication ranking

Stratum 1: STRESS REQs — STRESSL-STEM, BR-IDENT(stress)

Stratum 2: REDSIZE constraints — RED = σ

Stratum 3: dominated stress constraints — NONFINALITY, *STRESS(complex verb), *CLASH » *(EXTENDED)LAPSE

(32) Monosyllabic reduplicant in complex verb: *yé-mi-ngiti=fì-fìtyi-pagu-pe*

/ yemingiti=RED-fityipagupe /	STRESSL-STEM	BR-IDENT (stress)	RED = σ	*CLASH	*STRESS (complex verb)
☞ a. yémingiti=fì-fìtyipagupe				*	***
b. yémingiti=fì-fityipagupe		*!			**
c. yémingiti=fi-fityipagupe	*!				*
d. yémingiti=fìtyi-fìtyipagupe			*!		***

Ngan'gityemerri thus actually perfectly conforms to the **S » R** hypothesis, since the REDSIZE constraint can be dominated by the stress constraints which are unviolated and still exert its force.

5 Conclusion

We have now seen several different types of languages where the application of fixed stress and other unviolated stress considerations restrict the range of possible reduplication patterns. Leftmost stress, plus clash avoidance and cyclic stress, prevents monosyllabic prefixal reduplication in Australian languages. In Ponapean, the need to avoid clashes induces prosodic variability in the reduplicant through the interaction of strictly alternating R→L rhythmic stress and the requirement to stress the reduplicant. In Ngan'gityemerri, clashes are licensed by morphologically-based stress preferences; this evidence for the violability of *CLASH licenses its domination by the constraint preferring monosyllabic reduplication, thus allowing a monosyllabic reduplicant even when it leads to a clash. These effects are consistent with a meta-ranking condition holding of the relationship between stress requirements and reduplicant size preferences:

(33) Stress-Reduplication meta-ranking: STRESS REQUIREMENT » REDUPLICANT SIZE (**S** » **R**)

This proposal partially contradicts M&P's (1993) formulation of the "Template Satisfaction Condition." M&P allow for the possibility of undominated templatic constraints. But, as we have seen, this over-generates. It predicts that monosyllabic reduplicants should be possible for cyclic QI L→R stress systems. The survey of Australian languages indicates that these patterns are unattested. This gap can be accounted for by prohibiting undominated templatic constraints – at least in cases where they would conflict with the stress requirements.

Invariant template satisfaction occurs only when the stress requirements happen to be compatible with the preferred templatic constraint. This is the case for Diyari and other similar Australian languages, in which the fixed disyllabic (or foot-sized) reduplicant turns out to be the only shape which fully satisfies the STRESSREQs. Invariant template satisfaction could also be achieved in non-stress languages, where the **S » R** requirement will be vacuous, as the STRESSREQ set is the empty set. (It is an interesting question whether any similar relationships exist between tone and reduplicant shape.) Similarly, there will be no effect of the meta-ranking in languages where the STRESSREQ constraints happen not to interact with reduplication; for example, languages which place a single stress at the opposite edge of the word from the reduplicant.

S » R also refines M&P's "**P » M**" proposal. In M&P (1993), the PROSODY » MORPHOLOGY meta-ranking makes no differentiation between unviolated and violated prosodic constraints. Monosyllabic reduplication in Ngan'gityemerri shows us that size preferences can countermand otherwise violated prosodic constraints: RED = σ » *CLASH. Furthermore, total reduplication patterns in Australian languages can induce extra lapses: for example, Dyirbal *gúlgiṛi* → *gúlgiṛi-gúlgiṛi* 'lots of prettily painted men' (Dixon, 1972: 242-3). The language's standard cyclic QI L→R system gives independent evidence for violation of *LAPSE in service of NONFINALITY and BD-IDENT(stress) (see Stanton, 2014). Yet, if the size preference dictating total reduplication was dominated by *LAPSE, this form would be impossible, since it is inducing a lapse for the sake of reduplicating totally. If it were the case that all prosody constraints dominated all morphological constraints, as suggested by **P » M**, these patterns could not occur.

The **S » R** proposal introduces two formal constraint meta-categories: STRESSREQ and REDSIZE. The nature of the system gives STRESSREQ constraints a sort of priority which is unusual in standard conceptions of OT. The determination of the membership of the STRESSREQ set must be made *prior* to constructing the ranking for reduplication. Ngan'gityemerri shows that this calculation takes into account complex morphological structures, as it is evidence from the complex verb (and also nominal compounding) that reveals that *CLASH is not a STRESSREQ in the language. We might wonder if this could be an effect of acquisition order. The subordination of REDSIZE constraints might be logical if it were the case that (the detailed morphophonology of) partial reduplication patterns are acquired relatively late in the time course of acquisition, well after the details of the stress pattern have already been fixed. Evidence from the acquisition of reduplication in Turkish may suggest that this could be true (Sofu, 2005), but much further investigation is required.

The nature of the REDSIZE constraints also bears further discussion. In this paper, I have employed templatic constraints; however, these constraints have done very little work in generating the forms. In each case examined in this paper, the optimal form in every circumstance has been the *minimal* phonotactically-licit reduplicant which satisfies all high-ranked markedness constraints. In Ponapean, under the ideal circumstances of even mora-parity and a heavy initial syllable, the reduplicant is monomoraic. The reduplicant is only extended beyond its minimum when *CLASH or *REPEAT(light) are at issue. Diyari's disyllabic reduplicant is the shortest reduplicant which can simultaneously satisfy all the STRESSREQs. Ngan'gityemerri's light monosyllabic reduplicant is the shortest possible (phonotactically-licit) reduplicant, and surfaces as such because no higher-ranked constraints force extension. These facts point to a solution (at least for these sorts of languages) without templatic constraints, but rather with a *size restrictor* (see, e.g., Spaelti, 1997, Hendricks, 1999, Riggle, 2006). When the size restrictor dominates MAX-BR, the reduplicant will be as small as possible, subject to the needs of higher-ranked constraints. (Total reduplication would be achieved with the reverse ranking.) When reduplicant size is determined by the interaction of the size restrictor with prosodic constraints, we derive M&P's (1986 [1996]) generalization that reduplicative "templates" must take the shape of prosodic categories, without any mention of templates. While further investigation will be needed to determine how non-minimal templates emerge in non-stress languages (e.g., the disyllabic pattern commonly found in Bantu languages – see Hyman, 2009), the **S » R** hypothesis coupled with the size restrictor approach provides a restrictive account of the cross-linguistic typology of reduplicant size in partial reduplication.

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