Toward an OT Account of Yaqui Reduplication*

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1 Presentation of Data

Yaqui[1] is a Uto-Aztecan language spoken in southern Arizona and in Sonora, Mexico. There are two kinds of reduplication in Yaqui: primary and secondary.[2] These can be characterized as morphologically distinct because of their differing semantics: primary reduplication indicates "habitual action", whereas secondary reduplication indicates "distributive" or "iterative" action. Relevant data for these two kinds of reduplication are given in (1) and (2), respectively (the reduplicant is indicated in boldface). I should point out that there are extremely interesting effects of vowel shortening and stress in these data, which are discussed in Demers et al. (1999). These effects are ripe for a treatment in Optimality Theoretic terms, but I will leave this for a more full treatment in the future. For the purposes of this paper I will only be interested in the shape of the reduplicants.

(1) *Primary Reduplication: Red1 = "habitual action"*

a. vaane	**va.**vane	'irrigate'
b. vusa	**vu.**vusa	'awaken'
c. vamse	**vam.**vamse	'hurry'
d. chepta	**chep.**chepta	'jump over'
e. patta	**pat.**patta	'cover'
f. 'eta	**'e.**'eta	'shut'
g. 'amuse	**'a.**'amuse	'go hunting'
h. 'eecha	**'e.**'echa	'plant'
i. 'ivakta	**'i.**'ivakta	'hug someone'
j. hia	**hi.**hia	'sounds'
k. wiuta	**wi.**wiuta	'tear it down'
l. suale	**su.**suale	'believe'

The shifting of stresses and shortening of vowels in the reduplicated forms can be accounted for by following Demers et al.'s (1999) analysis of prominence in Yaqui words. According to their analysis (and based upon argumentation delivered therein), Yaqui coda consonants do not typically count as moraic units. In each case of primary reduplication, the reduplicant copies the first mora of the base, and carries with it any coda consonant which

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[1] All Yaqui data in this paper are taken from Escalante (1985) and/or Shaul et al. (1999). Following the tradition set forth by these sources, I use the official Yaqui orthography throughout (the one exception being my making word-initial glottal stops overt on words which the orthography leaves vowel-initial).

[2] The terms "primary reduplication" and "secondary reduplication" were used in Escalante (1985), and have been subsequently adopted by Demers et al. (1999) and Shaul et al. (1999), and I use these terms here.

appears in the same syllable as that vocalic mora. This trend fulfills a template constraint[3] for primary reduplication in Yaqui (henceforth "Red1"): "Red1=μ". The copying of a coda consonant in a reduplicant only if it occurs in the same syllable as the reduplicated mora is unusual in that it seems to require reference to surface syllable position, in contrast to normal assumptions of syllabification which maintain that syllabification is a surface phenomenon. I will discuss in detail the issues raised by the reduplication of coda consonants (and not onset consonants) in my analysis below, and will provide a way out of this apparent dilemma.

The reduplicant in Yaqui secondary reduplication (henceforth "Red2") always appears as a closed syllable with two moras, where the second mora is occupied through gemination of the onset consonant of the base. I will assume that this is an example of "compensatory lengthening" (Hayes 1989), where the gemination of the onset consonant to coda position of the reduplicated syllable occupies the second mora. Examples can be seen in the data in (2):

(2) *Secondary Reduplication:[4] Red2 = "iterative"*

a. bwiika	**bwib.**bwika	'sing'
b. bwana	**bwab.**bwana	'cry'
c. teeka	**tet.**teka	'lay it across'
d. vahume	**vav.**vahume	'swim'
e. tuuke	**tut.**tuke	'flicker out'
f. yena	**yey.**yena	'smoke (tobacco)'

Unfortunately, I have not found any examples in the literature on Yaqui reduplication which discuss secondary reduplication in words which contain word-medial consonant clusters. For now I will assume that consonants in coda position in the input word (i.e. the unreduplicated form) do not count as moraic units, and those which geminate (i.e. in the reduplicated form) do count as moraic units. It is this difference in moraic weight which accounts for gemination (I will discuss this further, and make predictions, in section 2.2.1).

In sum, there are two distinct reduplicative morphemes: Red1 ("habitual") and Red2 ("distributive/iterative"). The grammatical distinctness of these two abstract morphemes can be demonstrated by examining the different reduplication patterns with a single verb. Here, I will examine the verb *bwiika*, 'to sing':

(3) *Yaqui Reduplication*

/bwiika/		'to sing'
	aapo bwiika	'he is singing'
Red1	aapo **bwi**bwika	'he sings'
Red2	aapo **bwib**bwika	'from time to time he sings'

I will now turn to an Optimality Theoretic analysis of this data.

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[3] A template constraint, based upon McCarthy and Prince (1993), is defined as "Morphological Category = Prosodic Category".

[4] Some verbs have semantic restrictions on one or both of these kinds of reduplication, which gives the reduplication of those verbs specialized meanings:

e.g.	koce 'sleeping'		**kok**koce 'falling asleep (on and off)'
	nooka 'speaking'		**non**noka 'gossiping'
	(Shaul et al. 1999)		

2 Analysis

I will offer an analysis of Yaqui reduplication in terms of Optimality Theory (OT) (Prince and Smolensky 1993; McCarthy and Prince 1993), and specifically Correspondence Theory (McCarthy and Prince 1995). Crucial to my analysis and to the theory in general is the strict ranking of constraints to rule out certain candidates while preserving others. The consideration of all constraints and all candidates in parallel will yield the optimal candidate for each underlying input, given the particular set of ranked constraints.

2.1 Yaqui Primary Reduplication

The first constraints that are required will define the reduplicant and where it is aligned in the word. These constraints include AlignRedLeftWordLeft (AlignRedLWdL) and L-AnchorBR. AlignRedLWdL aligns the reduplicant to the left edge of the word, yielding a prefix, rather than an infix or a suffix. The anchor constraint makes sure the left edge of the reduplicant corresponds to the left edge of the base. The result of this anchoring is that the reduplicant and the base both begin with an identical segment.

As mentioned above, we will assume a template constraint for Red1: Red1=μ. This template constraint requires the reduplicant to be composed of a syllable containing only one mora. Because coda consonants generally do not count as moraic units in Yaqui, coda consonants which get reduplicated should not count as violations of this template. Thus, for a word such as *vusa* 'awaken', and given just this one template constraint, the template can be met by either of two output forms, as shown in (4), wherein for the time being the other constraints (AlignRedLWdL and L-AnchorBR) are assumed):[5]

(4)

Red1 + /vusa/	Red1=μ
a. ☺ **vu** vusa	
b. ❽ **vus** vusa	
c. **vusa** vusa	*!

Candidate c is immediately ruled out because it, being a full copy of a disyllabic base, violates the template constraint allowing a syllable with only one mora. Since coda consonants in Yaqui do not always constitute moraic units (and I will not formalize here when they do), candidate b does not violate the template. Instead, we can rule out candidate b through some other constraint, such as *Coda, which insists that syllables do not have codas. This is shown in (5):

(5)

Red1 + /vusa/	Red1=μ	*CODA
a. ☺ **vu** vusa		
b. **vus** vusa		*!
c. **vusa** vusa	*!	

[5] The symbols that I will use are as follows: '☺' denotes the correct output form that is correctly chosen by a particular constraint ranking; '☹' denotes the correct output which fails to be chosen by a particular constraint ranking; and '❽' denotes an incorrectly selected candidate.

With just these two constraints (in addition to the assumed AlignRedLWdL and L-AnchorBR) we predict the correct winning candidate and rule out other candidates for this input. However, these two constraints alone will not be sufficient for the cases where there is a word-medial consonant cluster, such as the form *vamse* 'hurry'. As we see in (6), the same constraint ranking that worked before now predicts the wrong output candidate:

(6)

Red1 + /vamse/	Red1=μ	*Coda
a. ❽ **va** vamse		
b. ☹ **vam** vamse		*
c. **vamse** vamse	*!	

This time we actually want candidate b to win, yet it is ruled out by a well-formedness constraint, and another candidate is incorrectly deemed optimal.

At first glance what seems to be required here is some kind of constraint which not only allows what surface as coda consonants in the input word to be reduplicated with (or perhaps even as a part of) the mora associated with the vowel which gets copied, but also requires this. What I will temporarily propose is a correspondence constraint which requires that segments in the reduplicant be faithful to the syllabic position of those segments in the base. This constraint is formalized in (7):

> (7) MAX-σ-POSITION: Every coda consonant in the input must be in coda position in the output, and every onset consonant in the input must be in onset position in the output.[6]

If we rank this faithfulness constraint between the template and *Coda, then we produce the desired results, as demonstrated in (8):

(8)

Red1 + /vusa/	Red1=μ	MAX-σ-position	*Coda
1a. ☺ **vu** vusa			
b. **vus** vusa		*!	*
c. **vusa** vusa	*!		

Red1 + /vamse/	Red1=μ	MAX-σ-position	*Coda
2a. **va** vamse		*!	
b.☺ **vam** vamse			*
c. **vamse** vamse	*!		*

Thus, if we were to assume such a constraint, we see that the crucial violation of candidate b in (5) above (1b in (8)) was not actually *Coda, but MAX-σ-position. That is, *Coda can be violated without punity if the constraint that requires syllable faithfulness (MAX-σ-position) is ranked above *Coda.

[6] Presumably, such a constraint, if we were to keep it, would also require that vocalic peaks remain vocalic peaks.

Crucial to such an analysis is the fact that all information in a copied syllable must appear in the reduplicated syllable. I would like to pose the constraint MAX-σ-position as a variation on the more commonly utilized MAX-BR, which is defined as the requirement that every segment which appears in the base should also appear in the reduplicant. This has the effect of requiring that reduplicants be as large as is possible given the other constraints at work in any given tableau. The base is usually taken for granted as consisting of what I am here calling the "input word". In the case of Yaqui primary reduplication, it appears to be the case that this maximization is relevant only for the syllable that gets copied: the first syllable of the input word. Given that the theory already has an independently motivated constraint for base-reduplicant identity (MAX-BR), and since, under OT assumptions, syllabification does not occur until the output level, the positing of a new constraint appealing to syllable-placement is to be dispreferred over the use of constraints that are already established. If we just assume that in Yaqui primary reduplication the base *is* the first syllable of the input word, then what I have proposed here as "MAX-σ-position" is actually MAX-BR: the base is the first syllable of the input word, and the reduplicant in Yaqui primary reduplication copies the entire base.

In (8) above, violations of "MAX-σ-position" accrued both for codas in the base that were incorrectly not copied (e.g. ***vavamse***), as well as for extra-base onsets which were incorrectly copied as codas on the reduplicant (e.g. ***vusvusa***). With the re-evaluation of this constraint as MAX-BR, only codas in the base (the first syllable of the word) which fail to be copied in the reduplicant can count as violations of this correspondence constraint. Onsets which get copied are not a part of the base, and so they can be ruled out by making another constraint undominated. DEP is a constraint which will do the trick: the DEP family of constraints forbids anything not in an input from appearing in an output. Since the onset to a second syllable in a word is not in the first syllable of the input word (the domain for defining the base), if a word-medial onset is copied then the fact that a segment does not appear in the base but does appear in the reduplicant violates DEP. With MAX-σ-position redefined as MAX-BR and with the addition of DEP, (8) above becomes (9) below. Two candidates have been added (candidate d for each input) which fail to reduplicate the entire base. The first syllable of the input word, which is the base, is underlined.

(9)

Red1 + /vusa/	DEP	Red1=μ	MAX-BR	*Coda
1a. ☺ **vu** vusa				
b. **vus** vusa	*! (s)			*
c. **vusa** vusa	*!* (sa)	*		
d. **v** vusa			u!	

Red1 + /vamse/	DEP	Red1=μ	MAX-BR	*Coda
2a. **va** vamse			m!	
b.☺ **vam** vamse				*
c. **vamse** vamse	*!* (se)	*		
d. **v** vamse			a!m	

While the template constraint itself appears to have no functional role in the tableau as given, I assume that it is the work of this template which defines the base as the first syllable of the input word, and it is this definition which allows the DEP constraint to reject candidates which supersede the base domain, as defined by the template.

In (10) below we see how all of the constraints mentioned so far act in concert to yield an optimal output form. The reduplicant-defining constraints (L-Anchor-BR, AlignRedLWdL, and Red1=μ) are undominated. The only crucial rankings are those mentioned so far:

(10) Primary Reduplication: DEP, Red1=μ >> MAX-BR >> *Coda

/Red1+ bwiika/	L-Anchor BR	AlignRed LWdL	Red1=μ	DEP	Max-BR	*Coda
a. ☺ **bwi** bwika						
b. **bw** bwika					i!	
c. bwika **bwi**		*!				
d. **ka** bwika	*!					
e. **bwik** bwika				*! (k)		*
f. **bwika** bwika			*	*!* (ka)		

This table illustrates the effects of the constraint rankings for the verb *bwiika* in primary reduplication. Candidate b violates MAX-BR, which requires that all segments in the base appear in the reduplicant, and is ruled out. Candidate c incorrectly aligns the reduplicant to the right edge of the base, and this suffixation is a fatal violation of AlignRedLWdL. Candidate d anchors the right edge of the reduplicant with the right edge of the base, and this is a fatal violation of L-AnchorBR. Candidate e has the correct anchoring and alignment, but its inclusion of a coda segment in the reduplicant which is not present in the base violates the DEP constraint, and this rules it out. Since candidate f can be ruled out through two violations of the DEP constraint, it again appears to be the case that the template plays no role in this tableau. But, once again, I assume that the template itself is what defines the base domain, so the inclusion of the template is crucial. The result of this position is that, formally, the DEP constraint can be considered a part of the template constraint (perhaps through conjunction). The winning candidate is a, which survives the constraint evaluation entirely unscathed, and thus is the optimal candidate.

2.2 *Yaqui Secondary Reduplication*

Let us now turn our attention to Red2, which in each case yields a reduplicant with a closed syllable where the coda of the reduplicant syllable corresponds with the onset segment of the input word (i.e. through gemination). Following Demers et al. (1999), I will assume that for each of these cases the necessary template constraint is "Red2=$\mu\mu$". This constraint should be construed as one which is defined as a single syllable consisting of two moras, and any candidate which fails to have both of its moras in the same syllable (e.g. a candidate with two syllables consisting of 1 mora each) would violate it.[7]

Unlike in primary reduplication, it may not be essential here to assume that the base for reduplication is the first syllable of the input word. As mentioned above, the literature does not

[7] In other words, the template constraints for both Red1 and Red2 are orthographically represented as "Red1=μ" and "Red2=$\mu\mu$", respectively, for convenience, although in fact they could more accurately be written as "Red1=σ/μ" and "Red2=$\sigma/\mu\mu$". I follow Demers et al. (1999) in counting the mora as the unit for reduplication, although syllable onsets and non-moraic codas are also copied.

report on what happens to words with medial consonant clusters (e.g. *vamse* 'hurry'). Thus, for now I will focus on analyzing those words listed above in (2): those with open syllables as first syllables in the input word (e.g. *bwiika* 'sing'), leaving the analysis of other kinds of words open to future research.

How do we get this closed syllable? I will argue that what is needed to account for the reduplicant in secondary reduplication is the combination of the template constraint and two anchoring constraints, wherein each edge of the reduplicant is anchored to the left edge of the base. This yields gemination from the left edge of the input word to the right edge of the reduplicant. The possibility for a double-anchoring analysis first came to my attention through Hendricks' (1999) a-templatic analyses of bare-consonant reduplication, in which reduplicants of the form CC get defined and expressed minimally by anchoring both edges of the reduplicant to opposite edges of the base. Hendricks' compression theory was initially proposed as an alternative to templatic accounts of reduplication. This move was required in order to adequately derive reduplicants in bare-consonant reduplication. In this kind of reduplication, the first and last consonantal segments of a word get reduplicated: the "compression" occurs when Anchoring constraints are ranked higher than constraints such as AlignRootLeft, which demands that the root appear at the far left of the word. For the anchoring constraints to be satisfied, this alignment constraint must be violated. If both anchoring constraints are ranked higher than this alignment constraint, then the minimal unit which could satisfy both constraints anchoring the left and right edge of the base would be a reduplicant with two segments: one corresponding to the left-most segment of the base, satisfying L-AnchorBR, and one corresponding to the right edge of the base, satisfying R-AnchorBR.

As Hendricks shows, this kind of reduplication cannot be accounted for by the use of a template constraint, since the bare-consonant reduplicant does not constitute a prosodic unit. Hendricks' theoretical stance, "compression", accounts for bare-consonant reduplication by using Anchor constraints *without* template constraints (or at least with the template constraints ranked so low as to be irrelevant); the factorial typology of Optimality Theoretic constraint ranking allows for this move, as well as for an extension of this move: the use of Anchor constraints *with* template constraints.[8] In the former case Anchoring occurs on opposite edges of the base; in the latter Anchoring can occur on the same edge.

Secondary reduplication in Yaqui can be accounted for by anchoring both edges of the reduplicant with the left edge of the base. The constraints that will be required are as follows. A template constraint (Red2=$\mu\mu$) will be required to force the reduplicant to surface as a single syllable with two moras, as motivated by Demers et al. (1999). Still considering the verb *bwiika*, so far this will yield an onset and vowel with some consonant as a coda:[9] giving us *bwiC*. Since secondary reduplication is realized as a prefix, it will have the same alignment as primary reduplication: AlignRedLWdL. This will align the reduplicant to the left edge of the word, yielding a prefix: ***bwiC**.bwika*. It is the right-edge anchoring of the secondary reduplicant which differentiates it from the primary reduplicant. Because Red2 has an onset and coda which are copies of the same segment of the base, Red2 requires two anchoring constraints:

[8] Hendricks (among others, see discussion in Hendricks 1999) in fact rejects the use of any (prosodic) templates whatsoever. While the rejection of templatic constraints in some cases seems to be the correct move (as Hendricks has ably shown for bare-C reduplication), I do not share Hendricks' conviction that this entails that the notion of "template" should be abandoned altogether. I would like to keep the notion of "templates", although I agree with Hendricks that morphological templates need not always be prosodic units.

[9] See Demers et al. for reasons for the shortening of the vowel and the shift of the stress. Here I assume that the vowel occupies only one mora.

AnchorRedLBaseL, which requires correspondence between the left edge of the base and the reduplicant (here, generating a *bw* on the left edge of the reduplicant), and AnchorRedRBaseL, which requires correspondence between the right edge of the reduplicant and the left edge of the base (here, generating a *b* on the right edge of the reduplicant[10]).

The OT account of secondary reduplication using these constraints can be seen in detail in (11). Here I omit the constraint MAX-BR, for reasons which I will make clear in section 2.2.1:

(11) Secondary Reduplication with a Doubly-Anchored Reduplicant

Red2+/bwiika/	Red2=μμ	AlignRedL Word L	Anchor RedLBaseL	Anchor RedRBaseL
a. **bwi** bwika	*!			*
b. ☺ **bwib** bwika				
c. bwika **bwib**		*!		
d. **kab** bwika			*!	
e. **bwik** bwika				*!
f. **bwk** bwika	*!			*

Because candidate a is not composed of a syllable with two moras, it is ruled out because it fails to meet the template. Candidate c is ruled out because the suffixation of the reduplicant violates the AlignRedLWdL constraint. Candidate d violates the constraint which forces the left edge of the reduplicant to correspond to the left edge of the base. E is ruled out because the right edge of the reduplicant is not anchored to the left edge of the base. In other words, the effect of the two anchoring constraints acting in conjunction is to yield templatic syllable edges of a certain form: a closed syllable with identical onset and coda. Candidate f, in which the reduplicant is not a well-formed syllable, is ruled out because it violates the template.[11] The only candidate which matches the template and survives the other constraints is candidate b, which is the actual output form. Thus, these constraints correctly predict the correct output form; since the winning candidate violates none of these constraints, their ranking cannot be determined, and is not crucial.

2.2.1 The Importance of Edge-Anchoring for Red2

In (11) above I omitted the constraint MAX-BR, primarily because it is uncertain what the domain for defining the base is in secondary reduplication. This domain would define the scope of the constraint, and is required in order to assess violations of this constraint. What is clearly necessary is the anchoring of the right edge of Red2 to the left edge of the input word, as is seen in the gemination which occurs in this reduplicant.

[10] For the purposes of this analysis I will assume that the *w* in *bw* is strictly an onglide and as such appears only prevocalically; thus, for the purposes of assessing input-output faithfulness, *b* (which only appears syllable-initially on borrowings from English or Spanish) should be considered to be the correspondent of *bw* preconsonantally, and especially in situations of gemination.

[11] Actually, this candidate is a bare-consonant reduplicant, and the violation here is really a Peak violation, which I assume is contained covertly in the template constraint: RED must be a *well-formed* syllable with two moras. Presumably, at least the first consonant in this case would be an onset, which does not carry moraic weight.

The importance of this right edge anchoring can be seen by contrasting Red2 in Yaqui with its counterpart in a hypothetical (but possible) related language, which could have re-ranked two constraints to yield a differently shaped reduplicant for Red2. I will call this hypothetical language *Yaqui. This hypothetical equivalent of Yaqui secondary reduplication is not amenable to my anchoring analysis, since its secondary reduplication does not anchor both edges of the reduplicant with the left edge of the base. In other words, the second mora required by the template in secondary reduplication is not filled through gemination, but through the copying of further consonantal material from the input word, as seen in (12) (c.f. (3)):

(12) **Yaqui Reduplication*

/bwiika/		'to sing'
	aapo bwiika	'he is singing'
Red1	aapo **bwi**bwika	'he sings'
Red2	aapo **bwik**bwika	'from time to time he sings'

So the form *bwika* 'to sing' yields the reduplicated forms ***bwi**bwika* and ***bwik**bwika*. In *Yaqui, this can be explained by considering the entire input word as the base, and by using the constraint MAX-BR the correct output is predicted. This is shown in (13), where the left Anchor constraint is assumed:

(13) *Yaqui Secondary Reduplication: MAX-BR >> AnchorRedRBaseL

Red2+/bwika/	Red2=μμ	AlignRedLWdL	MAX-BR	AnchorRed RBaseL
a. **bwi** bwika	*!		ka	*
b.☺ **bwik** bwika			a	*
c. **bwika** bwika	*!			*
d. bwika **bwik**		*!	a	*
e. **bwib** bwika			k!a	
f. **bwb** bwika	*!		ika	

In this tableau, candidates a, c and f are ruled out for violating the template constraint: they are not comprised of a single syllable comprised of two moras. Candidate d is ruled out because the reduplicant is incorrectly suffixed, violating the left-alignment constraint for the reduplicant. The two interesting candidates are b and e, each of which fulfills the template. The difference between these two lies in how they fulfill the template: candidate b fulfills the template by copying as much of the base (here, the entire input word) as will fit, giving it one violation of MAX-BR, and one violation of the lowly-ranked AnchorRedRBaseL. Candidate e does the opposite: it sacrifices an extra violation of MAX-BR in favor of AnchorRedRBaseL. Since MAX-BR is a gradient constraint, and because it is crucially ranked higher than the R-Anchor constraint, this second violation of MAX-BR rules candidate e out in favor of candidate b.

Turning back to actual Yaqui, we see how the re-ranking of two constraints yields the different outputs generated by two closely related grammars: by re-ranking the AnchorRedRBaseL constraint above MAX-BR, the opposite result holds (and here the L-Anchor constraint is again assumed):

(14) Yaqui Secondary Reduplication: AnchorRedRBaseL >> MAX-BR

Red2+/bwika/	Red2=μμ	AlignRedLWdL	AnchorRed RBaseL	MAX-BR
a. **bwi** bwika	*!		*	
b. **bwik** bwika			*!	a
c. **bwika** bwika	*!*		*	
d. bwika **bwik**		*!	*	a
e.☺ **bwib** bwika				ka
f. **bwb** bwika	*!			ika

Once again candidates a, c and f get ruled out for violating the template, and d for suffixing instead of prefixing. In the Yaqui grammar the constraint requiring the anchoring of the right edge of the reduplicant to the left edge of the base is crucially ranked higher than MAX-BR, so the candidate which violates the former instead of the latter (here, b) does so at its peril: the candidate (here, e) which does not violate the higher-ranked constraint is deemed more optimal than the one that does violate the higher-ranked constraint. Because of this crucial ranking, the domain for defining the base is irrelevant: since e does not violate anything before MAX-BR comes into play, e is the winning candidate.

3 Conclusions and Areas for Further Research

As mentioned in the introduction, one area for future analysis is the integration of the data that I have covered here with the facts of vowel shortening and stress (pitch accent) shift. Considering only the shape of the two Yaqui reduplicants, I see several interesting implications for OT. First, Yaqui Red1 indicates that explicit notions of consonantal moraicity are needed for constructs, such as reduplicative templates, which require reference to moraicity. Second, the explication of what constitutes the "base" in reduplication needs to be clear for each analysis of each set of data: as demonstrated by the comparison of the data from Yaqui Red1 and Red2, the base is not always necessarily defined in the same way, even within the grammar of a given language. Third, the effect of the current analysis is to demonstrate that the tools used to force compression, Edge Anchoring, rather than circumventing the need for templates, actually can define the realization of templates. In the present analysis, the two anchoring constraints, AnchorRedLBaseL and AnchorRedRBaseL, acting in conjunction, define the edges of a reduplicative syllable template: Yaqui Red2. How this analysis can handle the secondary reduplication of verbs with word-medial consonantal clusters is not presently known: I have not yet found data of this kind. Thus, for example, whether the data will actually yield ***vav.**vamse* or ***vamv.**vamse* (or some other possibility) from *vamse* is an empirical question which can only be answered by gathering more data. I hope to gather such data to supplement the analysis found in this paper in the near future, and to expand this analysis to include the effects of vowel shortening and the interaction of pitch accents.

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