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FOX (MESQUAKIE) REDUPLICATION¹

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1. Introduction. The purpose of this paper is to describe two formally distinct patterns of reduplication in the Algonquian language Fox (also known as Mesquakie) which have not yet received a thorough treatment.² Of particular interest is the interaction between the bisyllabic type of reduplication and inflectional morphology: material from a verb's inflectional suffixes may be copied into the reduplicative prefix, but inflectional prefixes are never copied. The structure of the paper is as follows: the remainder of this section covers some general features of Fox reduplication. Background information on Fox phonology and morphology is given in the second section. The third and fourth sections are detailed descriptions of the two types of reduplication, and the fifth section examines the interaction of reduplication and inflection.

The two types of reduplication in Fox will informally be termed monosyllabic reduplication and bisyllabic reduplication.³ Reduplication applies most productively to verbs; the bulk of the discussion below concerns reduplicated verbs. Reduplication is also found on adverbs, numbers, quantifiers, and particles known as PRENOUNS and PREVERBS. It is an extremely salient

¹ Fox (or Mesquakie) is spoken in Iowa. I am indebted to the late Adeline Wanatee for her insights into the Mesquakie language. In addition, I thank Anna Bosch, Anthony Buccini, Ives Goddard, John Goldsmith, Monica Macaulay, Elisa Steinberg, and Jan van Eijk for suggestions and comments on earlier drafts of this paper.

² The existence of reduplication has been noted in earlier works (e.g., Jones 1911:814–15, Michelson 1925:493, Bloomfield 1946:122–23, Voorhis 1971:65, and Goddard 1991a:47–48), but the present paper is the first comprehensive description. Ahenakew and Wolfart (1983) describe reduplication in the Algonquian language Cree; Cree also has two formally distinct reduplication templates (one a light syllable, the other a heavy syllable) with semantic effects comparable to those of Fox reduplication. In the present paper the description of the templates for Fox reduplication is consistent either with a view of reduplication as affixation of the template followed by copy and association of segmental (and other) material (Marantz 1982) or with Steriade's (1988) view that reduplication begins with total reduplication of the base, followed by paring down the reduplicated material to meet a set of static well-formedness conditions on the template.

³ The labels "monosyllabic" and "bisyllabic" are intended merely to describe the prefixes created by reduplication, not as a claim that the rules of reduplication operate only on the syllabic tier.

feature of Fox morphology.⁴ The examples below illustrate monosyllabic and bisyllabic reduplication of verbs. Hyphens set off the reduplicative prefix from the base, and inflectional suffixes from the stem.⁵

Base	Monosyllabic Reduplication	Bisyllabic Reduplication
(1a) <i>nowi--wa</i> 'he goes out'	<i>na--nowi--wa</i>	<i>nowi--nowi--wa</i>
(1b) <i>wi-tamaw-e-wa</i> 'he tells him'	<i>wa--wi-tamaw-e-wa</i>	<i>wi-ta-wi-tamaw-e-wa</i>
(1c) <i>wa-pam-e-wa</i> 'he looks at him'	<i>wa--wa-pam-e-wa</i>	<i>wa-pa-wa-pam-e-wa</i>
(1d) <i>mahkate-wi--wa</i> 'he fasts'	<i>ma--mahkate-wi--wa</i>	<i>mahka-mahkate-wi--wa</i>
(1e) <i>nepe--wa</i> 'he sleeps'	<i>ne--nepe--wa</i>	<i>nepe-nepe--wa</i>

On verbs, monosyllabic reduplication generally indicates continuative or habitual aspect; bisyllabic reduplication indicates iterative aspect, either an action repeated over a period of time or action distributed over a group of subjects or objects.⁶ Reduplication of a verb containing an incorporated noun sometimes reflects plurality of the incorporated noun (an example is

⁴ For example, in one text containing approximately 2,500 clauses (Kiyana ca. 1915), 456 reduplicated forms occur: 202 monosyllabic reduplications, 237 bisyllabic reduplications, and 17 double reduplications.

⁵ Unless otherwise noted, verbs are cited in the independent indicative paradigm with third-person arguments (by convention glossed as 'he' in the English equivalents). The inflectional suffixes most frequently encountered in the examples are *-wa* animate third singular proximate subject of intransitive; *-wi* inanimate singular proximate subject of intransitive; *-e-wa* animate third singular proximate subject acting on animate third (singular or plural) obviative object; *-amwa* animate third singular proximate subject acting on inanimate object. Proximate vs. obviative is a discourse-based opposition within third person in Algonquian languages. Roughly speaking, proximate forms are used for the "main character" of a discourse, while more peripheral third persons are referred to with obviative forms.

⁶ The aspectual distinction is sometimes very subtle. The same real-world situation may often be described either by a monosyllabic reduplication form or by a bisyllabic reduplication form, depending on how the speaker chooses to view the event. For example, consider the two reduplicated forms of *nakiškaw-e-wa* 'he meets him/them': *na--nakiškaw-e-wa* and *naki-nakiškaw-e-wa*. In a situation such as a family reunion, the speaker might emphasize the distributed or iterative nature of the event, meeting one person after another, and choose the bisyllabic reduplicated form. Alternatively, the speaker might choose to view the family reunion as an event extending over an interval of time and use the monosyllabic reduplicated form to indicate that people were continually meeting one another throughout that interval. (See Leer 1991 for discussion of similar issues in Tlingit aspect.)

sa-sa-kini-si-panasite-šin-wa ‘he lies with his toes sticking out’, containing the stem-medial morpheme *-(i)ni-si-panasite-* ‘toe’. Reduplication on numbers or quantifiers indicates distribution (e.g., *ne--nekoti* ‘one each’).

Reduplication on verbs is a derivational process in Fox: it is always optional, and there is a fair amount of lexical idiosyncrasy in the semantics of reduplication.⁷ For example, *wa-wa-pam-e-wa*, the monosyllabic reduplication of (1c), is lexicalized as ‘he selects him’. Consequently, the bisyllabic reduplication form *wa-pa-wa-pam-e-wa* may be used to express either continuative aspect (‘he gazes at him’) or iterative aspect (‘he looks at him over and over’). Another argument for considering Fox reduplication derivational is that it feeds other derivational processes, such as nominalization. For example, *kana-kanawi-ni* ‘(a) speech’ is derived from *kana-kanawi-wa* ‘he gives a (formal) speech’, the lexicalized bisyllabic reduplicated form of *kanawi-wa* ‘he speaks’; *mi-si-mi-si-ha* ‘Jerusalem artichoke’ is derived from the bisyllabic reduplicated form of *mi-si-wa* ‘he defecates’. Non-derived nouns do not undergo reduplication.

Turning now to the formal characteristics of the two reduplication patterns, we can make some preliminary observations. As can be seen in the examples in (1), the template for regular monosyllabic reduplication is a single open heavy syllable, prefixed to the base. The vowel of the prefix is *a*·, except before bases with initial *Ce(·)*, where the vowel of the prefix is *e*·. Furthermore, complex onsets may be simplified, as will be shown in 3 below, which describes the monosyllabic type of reduplication in detail. The template for bisyllabic reduplication, on the other hand, is a bisyllabic foot with no prespecified segments. The first syllable of the reduplicative prefix matches the initial syllable of the base exactly: no simplification of onset, nucleus, or coda occurs. The second syllable of the reduplicative prefix, however, is subject to the same constraints that apply to word-final syllables in Fox, as will be seen below in 4, suggesting that the prosodic constituent dominating the bisyllabic reduplicative prefix is in fact the minimal word.

Both reduplication rules may apply to a single token: the output of monosyllabic reduplication functions as the base for bisyllabic reduplication, producing a doubly reduplicated form, as shown in the following example.⁸

⁷ Reduplication of certain pre-nouns (illustrated in 3.3) is obligatory when the pre-noun is compounded with a plural noun.

⁸ Double reduplications following the pattern of (2) are fairly common (see n. 4). A question naturally arises whether double reduplication may be formed by applying the rules in the opposite order: where bisyllabic reduplication applies first, followed by monosyllabic reduplication. For example, *wi-tamaw-e-wa* → *wi-ta-wi-tamaw-e-wa* → *wa-wi-ta-wi-tamaw-e-wa*. My consultant accepted this constructed example (and others following this pattern), reporting that it would mean the same as the form in (2c). However, no spontaneous examples have been recorded of the rules applying in this order, nor have any examples been found in a survey of approximately 2,000 pages of texts.

- (2a) *wi·tamaw-e·wa* 'he tells him'
 (2b) *wa·-wi·tamaw-e·wa* 'he is telling him'
 (monosyllabic reduplication)
 (2c) *wa·wi·[wa·-wi·tamaw-e·wa]* 'he keeps telling him over and over'
 (double reduplication)

The basic verb is *wi·tamaw-e·wa* 'he tells him', given in (2a). It may be reduplicated with the monosyllabic pattern (2b) to convey continuative action. The doubly reduplicated form (2c) conveys both continuative action and iteration; here, brackets have been inserted to indicate the base of the outer reduplication. The bisyllabic reduplicative prefix is a copy of the monosyllabic reduplicative prefix, plus the initial syllable of the original base.⁹

In both types of reduplication, the reduplicative prefix is attached to the left edge of the stem. An inflectional prefix, if any, is attached to the left of the reduplicative prefix. When a short verb stem, such as *mi·n-* 'give', undergoes bisyllabic reduplication, material from the inflectional suffixes is used to fill out the remainder of the reduplicative prefix. Inflectional prefixes, however, are never copied by the reduplication rules.

- (3a) *mi·n·e·wa* *mi·ne·mi·n·e·wa* 'he gives it to him'
 (3b) *ne·mi·n·a·wa* *ne·mi·na·mi·n·a·wa* 'I give it to him'
 (* *nemi·ne·mi·n·a·wa*)

In (3a), the stem *mi·n-* is suffixed with *-e·wa*, expressing third-person singular subject acting on third-person obviative object. The bisyllabic reduplicative prefix in (3a) is a copy of the verb stem plus the first vowel of the inflectional suffix. In (3b), the stem *mi·n-* is surrounded by the affix combination *ne· -a·wa*, expressing first-person singular subject acting on third-person singular object. The reduplicative prefix in (3b) is attached between the inflectional prefix and the verb stem, and is a copy of the verb stem plus the first vowel of the inflectional suffix. The starred form in (3b) shows that the reduplicative prefix cannot be attached to the left of the inflectional prefix, copying the inflectional prefix and part of the stem. The interaction between reduplication and inflection will be examined in detail in 5.

This introductory section has sketched the most salient features of the two types of reduplication in Fox. Before turning to more detailed descriptions of the two patterns, however, some background information on Fox phonology and morphology is necessary.

⁹ Double reduplication in Fox is thus a counterexample to Broselow's (1983) subjacency condition.

2. Phonological and morphological preliminaries. Fox has the following inventory of consonants:

- (4) p t \check{c} k k^w
 s \check{s} h
 m n
 w y

The only aspect of the above chart that requires comment is the listing of k^w as a single segment. Usually, Fox k^w is treated as a consonant–glide cluster (e.g., Goddard 1991*b*). However, its behavior under monosyllabic reduplication provides evidence for its status as a single segment; examples are given in 3.1 below. Voorhis (1982) provides additional arguments for taking k^w to be a single segment in Kickapoo, which is closely related to Fox.

Fox has a four-vowel system, with a distinction between short and long vowels:

- (5) i $i\cdot$ o $o\cdot$
 e $e\cdot$ a $a\cdot$

All words in Fox are at least two syllables long and end in a short vowel. Long vowels are shortened in word-final position, whether or not the word is followed by an enclitic. In addition, most vowels occurring before pause devoicing (see Goddard 1991*b* for details). If, however, a word is followed by one or more enclitics, devoicing applies only to the final vowel of the enclitic string, and not to the final vowel of the host.

Syllables have relatively simple structure: onsets may be either C or CG; an onsetless syllable is possible only word-initially.¹⁰ \check{s} and h are the only consonants that may appear in the coda. \check{s} appears only before a syllable with a k or k^w onset; h appears before stops and w . Long vowels appear in both open and closed syllables.

Three other features of Fox phonology should be noted here. First, (underlying) short i does not occur in word-initial syllables, except in some forms of the intransitive verb i - ‘say’. Second, short e becomes short i in word-initial position, as described in detail in 4.1. Third, short o displays idiosyncratic behavior in some phonological processes, related to the fact that Fox o derives from Proto-Algonquian $*we$ (Bloomfield 1946:87). The peculiarities of monosyllabic reduplication of o -initial stems are discussed in 3.2.

Fox has an extremely complex system of verb inflection (see Bloomfield 1927 and the paradigms in Goddard 1994:190–207). Verbs are inflected in

¹⁰Except in casual speech: cf. Goddard (1988; 1991*b*).

one of twenty-six paradigms for subject and object; verbs in relative clauses are additionally inflected for the head of the relative clause. Certain aspects of the inflectional system are taken up in detail in 5; a few general comments are worth making here. The choice of inflectional paradigm depends both on syntactic factors (e.g., main vs. subordinate clause) and semantic/pragmatic factors (e.g., mood, tense, negation, evidentiality). Fifteen of the twenty-six verbal paradigms are formed by suffixation alone. Four paradigms are formed by affixation of prefix–suffix combinations. For example, in the independent indicative paradigm, a first-person exclusive plural subject of an intransitive verb is marked by the prefix–suffix combination *ne-pena*, surrounding the verb stem (e.g., *ne-nowi-pena* ‘we go out’, with stem *nowi-* ‘go out’). Seven other verbal paradigms are formed by a combination of suffixation and ablaut of the vowel of the initial syllable of the verb stem. This ablaut process is known as INITIAL CHANGE in the Algonquianist literature. Section 5.2 describes initial change and discusses its significance for reduplication.

Compound verbs, consisting of one or more preverbs plus the verb stem, are extremely common in Fox. The class of preverbs includes various modal-like elements, directionals, and manner adverbials. Although the preverb is a separate phonological word (e.g., the final vowel of the preverb *devoices*), the entire compound is inflected as a single unit: the inflectional prefix, if any, is attached to the left of the first preverb, and the inflectional suffixes are attached to the right of the verb stem. For example, if the preverb *koči* ‘try’ is used with *nowi-* ‘go out’, the first-person exclusive plural inflectional affixes must surround the compound: *ne-koči nowi-pena* ‘we try to go out’. Likewise, if a compound verb is inflected in a paradigm requiring the ablaut rule of initial change, initial change applies to the initial syllable of the first preverb, not to the simple verb stem.

Any member of a compound verb may undergo reduplication. That is, a reduplicative prefix may be attached to the preverb only, to the simple verb only, or to both. The following examples illustrate this. The verb is *wi-seni-wa* ‘he eats’ and the preverb is *mawi* ‘go (in order to)’.

- (6a) *mawi* *wi-seni-wa* ‘he goes to eat’
 (6b) *mawi* *wa--wi-seni-wa* ‘he goes to eat all he wants’
 (6c) *ma--mawi* *wi-seni-wa* ‘he goes often to eat’
 (6d) *ma--mawi* *wa--wi-seni-wa* ‘he goes often to eat all he wants’

The locus of reduplication in the above examples corresponds to the semantic scope of the habitual or continuative aspect expressed by the monosyllabic type of reduplication.

3. Monosyllabic reduplication. Monosyllabic reduplication is less productive than the bisyllabic type: some verbs do not reduplicate with this pattern at all, while others require irregular forms. This section first describes the regular formation of monosyllabic reduplication and then provides a sampling of irregular forms in 3.3.

3.1. C-initial bases. The template for regular monosyllabic reduplication is an open heavy monosyllable. If the vowel of the initial syllable of the base is *e* or *e*·, the vowel of the reduplicative prefix is *e*·. Otherwise, the vowel of the reduplicative prefix is *a*·. Examples of both types of base are given below (the glosses are of the nonreduplicated form of the verbs).

- (7) Bases with *e* and *e*·
- (7a) *keteminaw-e-wa* *ke·-keteminaw-e-wa* 'he blesses him'
- (7b) *me-menat-amwa* *me·-me-menat-amwa* 'he vomits'
- (7c) *neškim-e-wa* *ne·-neškim-e-wa* 'he scolds him'
- (7d) *pesetaw-e-wa* *pe·-pesetaw-e-wa* 'he listens to him'
- (7e) *se-kih-e-wa* *se·-se-kih-e-wa* 'he frightens him'
- (8) Bases with other vowels
- (8a) *či-tapi-wa* *ča·-či-tapi-wa* 'he sits up'
- (8b) *mo-hki-htaw-e-wa* *ma·-mo-hki-htaw-e-wa* 'he attacks him'
- (8c) *nowi·-wa* *na·-nowi·-wa* 'he goes out'
- (8d) *pakam-e-wa* *pa·-pakam-e-wa*¹¹ 'he hits him'
- (8e) *ši-še·-wa* *ša·-ši-še·-wa* 'he hunts'
- (8f) *wa-wane-net-amwa* *wa·-wa-wane-net-amwa* 'he is ignorant of it'

The labiovelar *k^w* behaves like other simple onsets under reduplication: the reduplicative prefix displays *k^w* as the onset.

- (9a) *k^wa·šk^wat-amwa* *k^wa·-k^wa·šk^wat-amwa* 'he drops it [food]
while eating'
- (9b) *k^wi-natawi* *k^wa·-k^wi-natawi* 'at a loss' (preverb)
- (9c) *k^we-hta-nite-he·-wa* *k^we·-k^we-hta-nite-he·-wa* 'he feels terrible'

Underlying /*k^we*/ is realized as *ko*, and *ko*-initial bases also take *k^w* as the onset of the reduplicative prefix:

¹¹ *pa·-pakam-e-wa* has been lexicalized as 'he clubs him to death'.

(10a) *kotwa·šika* *k^wa·-kotwa·šika* ‘six’

(10b) *kotawi·-wa* *k^wa·-kotawi·-wa* ‘he goes under water’

Note, however, that the vowel of the prefixes in (10a) and (10b) is *a*, rather than *e*. *e* might have been expected since the underlying vowel of the initial syllable in the base is *e*.

In contrast to the bases beginning with *k* and short *o*, bases in *k* followed by long *o* show no evidence of underlying *k^w*. Only *k* appears in the reduplicative prefix, not *k^w*.¹²

(11) *ko·kenike·-wa* *ka·-ko·kenike·-wa* ‘he does the washing’
**k^wa·-ko·kenike·-wa*

Stems with initial CG onsets have optional copying of the glide in monosyllabic reduplication:

(12a) *kya·t-amwa* *ka·-kya·t-amwa* ‘he keeps it for himself’
kya·-kya·t-amwa

(12b) *pye·taw-e-wa* *pe·-pye·taw-e-wa* ‘he brings it for him’
pye·-pye·taw-e-wa

(12c) *šwa·šika* *ša·-šwa·šika* ‘eight’
šwa·-šwa·šika

In (12a) and (12b), the two forms of the verbs mean the same; the version with no glide in the reduplicative prefix is more common. In (12c), though, the distinct forms have become associated with a subtle semantic difference. *ša·-šwa·šika* means ‘eight each’, while *šwa·-šwa·šika* means ‘by eights, in groups of eight’.¹³

k^w does not pattern with the CG onsets. If *k^w* were a cluster of *k* + *w*, then we would expect that the *w* would be only optionally copied to the onset of the reduplicative prefix. This, however, does not occur:

(13) *k^we·hta-nite-he·-wa* *k^we·-k^we·hta-nite-he·-wa* ‘he feels terrible’
**ke·-k^we·hta-nite-he·-wa*

The ungrammaticality of **ke·-k^we·hta-nite-he·-wa* shows that *k^w* should be analyzed as a single segment.

3.2. V-initial bases. The regular reduplication of vowel-initial bases is slightly more complicated than that of consonant-initial bases. First of all, a word must be said about the range of available examples. There are numerous examples of reduplication of bases beginning with *a*, *a*·, and *o*, but

¹² In the closely related language Kickapoo, however, bases in *ko*· reduplicate as if they began with *k^w*: *kwaakookenikee*- ‘keep doing washing’ (Voorhis 1988:54).

¹³ A similar pairing is *ne·-nekoti* ‘one each’ and the irregular *na·-nekoti* ‘one by one’.

only one example has been found of an *e*-initial base with regular monosyllabic reduplication. No forms beginning in *e*, *i*, *i*·, or *o*· have been found that permit monosyllabic reduplication. This section, therefore, can describe reduplication only for bases beginning in *a*, *a*·, *e*, and *o*.

Since onsetless syllables are possible only word-initially in Fox, reduplication of vowel-initial bases requires insertion of an epenthetic consonant, to supply an onset for the initial syllable of the base. For bases beginning in *a*(·) undergoing monosyllabic reduplication, the epenthetic consonant is *y*, as illustrated below.

- (14a) *a·čimo-wa* *a·-y-a·čimo-wa* 'he tells a story'
 (14b) *a·šo·ka·se·-wa* *a·-y-a·šo·ka·se·-wa* 'he stumbles'
 (14c) *ahk^wi* *a·-y-ahk^wi* 'so far' (preverb)

The single example of monosyllabic reduplication of a base beginning in *e* follows the same pattern as the *a* and *a*· bases:

- (15) *lešawi-wa* / *a·-y-ešawi-wa* 'he does [thus]'¹⁴

The reduplicative prefix consists of the long vowel *a*·, and an epenthetic *y* is inserted between prefix and base. It is surprising that the vowel of the prefix here is *a*·, rather than *e*·, since the first vowel of the base is *e*.

Bases in *o* reduplicate as if the base had an initial onset of *w*.¹⁵ That is, not only does a *w* appear epenthetically between prefix and base to supply an onset for the base-initial syllable, but a *w* also appears as the onset of the syllable in the reduplicative prefix. The vowel of the reduplicative prefix is *a*·.

- (16a) *oči·-wa* *wa·-w-oči·-wa* 'he comes from [there]'
 (16b) *otami* *wa·-w-otami* 'waste time' (preverb)
 (16c) *osa·pam-e-wa* *wa·-w-osa·pam-e-wa* 'he sees him from [there]'

3.3. Irregular forms. There are numerous irregular forms of monosyllabic reduplication in Fox; a representative sample of such forms is given

¹⁴The surface form of the nonreduplicated form is *išawi-wa*; /*e*/ → *i* word-initially. In the glosses here and below, bracketed expressions such as '[thus]' or '[there]' indicate that the verb is subcategorized for an oblique argument of manner or location, respectively. (15) is an elicited example; this form has not been confirmed in a text.

¹⁵The behavior of *o* under reduplication can be traced to its Proto-Algonquian source **we*, but it would be a mistake to analyze Fox *o* as /*we*/ for all synchronic processes. Stems beginning in *o* behave in other respects as if they were vowel-initial. For example, when the first-person inflectional prefix *ne*- is added to vowel-initial stems, a *t* is inserted between prefix and stem. This occurs as well with *o*-initial stems, which argues against analyzing *o* here as underlying /*we*/.

in this section. For example, verbs with an initial closed syllable of *kV-š-* or *kV-h-* copy the entire initial syllable as the reduplicative prefix: *ka-š-ka-škehtaw-e-wa* 'he hears him', *ki-š-ki-škatahw-e-wa* 'he whips him', *ka-h-ka-hkeso-wa* 'he is scorched'.

Other forms take reduplicative prefixes with the following shapes:

- | | | | |
|------|--------------|--------------------------------------|-------------------------------------|
| (17) | <i>Ci-</i> | <i>pi--pemw-e-wa</i> | 'he shoots him' |
| | | <i>ki--ki-wite--wa</i> | 'he stays around' |
| | <i>Ci-h-</i> | <i>či-h-či-pi-k^we--wa</i> | 'he winks' |
| | <i>Ca-</i> | <i>ka-kano-n-e-wa</i> | 'he speaks to him' |
| | | <i>ma-mi-na-we-nem-e-wa</i> | 'he takes particular notice of him' |
| | | <i>na-naki--wa</i> | 'he stops' |
| | <i>Cah-</i> | <i>pah-pawisaht-o-wa</i> | 'he shakes it out' |
| | <i>Ce-</i> | <i>še-šek^watah-amwa</i> | 'he smashes it to pieces' |

Some forms prefix *Ca-* and make the vowel of the base-initial syllable long *a:*:

(18a) *maki ma-ma-ki* 'big' (prenoun)

(18b) *kenwi ka-ka-nwi* 'long' (prenoun, preverb)

(Reduplicated forms of pre-nouns are used with plural nouns.)

Some forms beginning with *Ce* reduplicate by prefixing *Ce-*, lengthening the vowel of the base-initial syllable, and inserting *y* in the onset:

(19a) *kehči ke-kye-hči* 'great' (prenoun)

(19b) *meši me-mye-ši* 'big' (prenoun)

(19c) *nemaso-wa ne-nye-maso-wa* 'he stands'

(19d) *kehkahw-e-wa ke-kye-hkahw-e-wa* 'he designates him'

The preverb *koči* /k^weti/ 'try' also follows this pattern except that no *y* is inserted into the onset of the base-initial syllable: *ko-k^we-či* /k^we-k^we-ti/.

Some stems beginning with /en-/ 'thus, so' reduplicate by prefixing *a-* (and epenthetic *y*) and changing the base-initial vowel to *a:*: *inekin-wa* 'he is so big'; *a-y-a-nekin-wa*.

4. Bisyllabic reduplication. Bisyllabic reduplication is extremely productive and much more regular than the monosyllabic type.¹⁶ The template

¹⁶I know of only three lexical exceptions, plus a minor form of variation. First, the irregular verb *eha-* ~ *a-* 'go': the reduplication of the *a-* form of the stem is *aya-h-aya-*. (That is, the form of the stem is irregular; the reduplicative prefix is unexceptional.) Second, stems beginning in *tan-* 'there' and *to-t-* 'do [thus] to' reduplicate (and undergo initial change) as if they were underlyingly /etan-/ and /eto-t-/ , with deletion of word-initial short /e/: *tahi-tan-*, *to-hi-to-t-*. This is a residue of pre-PA **ent-* > PA **t-* (Ives Goddard, personal communication).

for bisyllabic reduplication is a bisyllabic foot, prefixed to the base, containing no prespecified segments. No simplification of the initial syllable of the reduplicative prefix occurs, but the second syllable is subject to two types of simplification: long vowels are shortened and codas are deleted. These processes are identical to ones observed in word-final syllables. The following forms provide some straightforward examples of bisyllabic reduplication:

- (20a) *kanawi-wa* *kana-kanawi-wa* ‘he speaks’
 (20b) *menah-e-wa* *mena-menah-e-wa* ‘he makes him drink’
 (20c) *pešeke-nem-e-wa* *peše-pešeke-nem-e-wa* ‘he considers him cute’
 (20d) *šekit-amwa* *šeki-šekit-amwa* ‘he urinates on it’
 (20e) *wanim-e-wa* *wani-wanim-e-wa* ‘he deceives him’

4.1. V-initial bases. With bisyllabic reduplication of a vowel-initial base, an epenthetic *h* is inserted between the bisyllabic prefix and the base. Notice that this is different from the monosyllabic pattern, where *y* or *w* is inserted before vowel-initial bases.

- (21a) *atame--wa* *ata-h-atame--wa* ‘he smokes’
 (21b) *a-čimo-wa* *a-či-h-a-čimo-wa* ‘he tells a story’
 (21c) *e-nikowe--wa* *e-ni-h-e-nikowe--wa* ‘he talks funny’
 (21d) *i-tepihe--wa* *i-te-h-i-tepihe--wa*¹⁷ ‘he goes there’
 (21e) *opite-he--wa* *opi-h-opite-he--wa* ‘he feels happy’

Another difference between the two types of reduplication can be seen above in (21e): no initial *w* is added to the reduplicative prefix added to *o*-initial bases (compare 16).

The behavior of /*e*-initial bases under bisyllabic reduplication is especially interesting. Recall from 2 above that /*e*/ is realized as *i* word-initially. The following examples demonstrate this, using the stem /*ena-pi*-/ ‘look [there]’.

However, if the *n* of *tan-* is mutated by a following *i* to *š*, then the stem reduplicates regularly: *taši-taši-*. (An anonymous referee for this paper points out that if the *to-* of *to-hi-* is taken to be a copy of the second syllable of the base, the reduplication is also irregular in that the rule which shortens vowels in the second syllable of the reduplicative prefix does not apply.)

Finally, some variation between *e* and *a* is found in the second syllable of some reduplicative prefixes (e.g., both the regular *ane-h-anemehke--wa* and the irregular *ana-h-anemehke--wa* are attested as bisyllabic reduplications of *anemehke--wa* ‘he goes off’). The variation does not appear to be significant.

¹⁷ This is an elicited example which has not been confirmed in a text.

(22a) *ne-t-ena-pi* 'I look [there]'

(22b) *ina-pi-wa* 'he looks [there]'

(22a) is inflected for first-person singular with the prefix *ne(t)-*. The presence of the prefix puts the /e/ of the stem in word-medial position, and it consequently is realized as *e*. In (22b), on the other hand, the third-person form of the verb lacks a prefix, so the /e/ of the verb stem is in word-initial position and is therefore realized as *i*.

Now consider the following /e/-initial stems and their bisyllabic reduplications.

(23) /*ena-pi-*/

(23a) *ne-t-ena-h-ina-pi* 'I look [there]'

(23b) *ina-h-ina-pi-wa* 'he looks [there]'

(24) /*ešawi-*/

(24a) *ne-t-eša-h-išawi* 'I do [thus]'

(24b) *iša-h-išawi-wa* 'he does [thus]'

(25) /*ešiso-*/

(25a) *ne-t-eši-h-išiso* 'I am named [thus]'

(25b) *iši-h-išiso-wa* 'he is named [thus]'

(26) /*enowe-*/

(26a) *ne-t-eno-h-inowe* 'I say [thus]'

(26b) *ino-h-inowe-wa* 'he says [thus]'

In the reduplicative prefixes, /e/ is realized as *e* if preceded by an inflectional prefix, and as *i* in the third-person forms, which lack a prefix. This is the same pattern as seen above in (22). What is interesting, however, is that the initial /e/ of the base is invariably realized as *i* following the bisyllabic reduplication prefix. It behaves, in other words, as if a phonological word boundary intervenes between the reduplicative prefix and the stem.¹⁸ Although there is no audible word boundary between the reduplicative prefix and the base, perhaps the realization of /e/ as *i* and the word-final phenomena described in 4.3 can be made to follow from an analysis of the bisyllabic reduplicative prefix as a minimal word.

The realization of /e/ as *i* when preceded by a reduplication prefix is found only with bisyllabic reduplication and not with monosyllabic reduplication. Recall example (15), repeated below:

(27) /*ešawi-*/ *a-y-ešawi-wa* 'he does [thus]'

¹⁸ /e/ also becomes *i* following the proclitics *e-h=* (aorist) or *wi-h=* (future) and after preverbs (e.g., *ne-koči ina-pi* 'I try to look [there]').

Here the initial vowel of *ešawi*- ‘do’ is realized as *e*, not as *i*. In other words, the initial vowel of the base behaves like other word-medial vowels.

4.2. No simplification of the initial syllable. Bisyllabic reduplication does not simplify the structure of the initial syllable of the reduplicative prefix. For example, complex onsets may appear:

- (28a) *mya·šinawe-h-e-wa* *mya·ši-mya·šinawe-h-e-wa* ‘he makes him
feel bad’
- (28b) *pye-taw-e-wa* *pye-ta-pye-taw-e-wa* ‘he brings it for
him’
- (28c) *pye-ta-nemat-wi* *pye-ta-pye-ta-nemat-wi* ‘it [wind] blows
hither’

Likewise, long vowels in the initial syllable are reproduced in the bisyllabic prefix:

- (29a) *k^wi-nom-e-wa* *k^wi-no-k^wi-nom-e-wa* ‘he longs for
him’
- (29b) *po-tetone-hpw-e-wa* *po-te-po-tetone-hpw-e-wa* ‘he kisses him’
- (29c) *te-pesi-wa* *te-pe-te-pesi-wa* ‘he is content’
- (29d) *wa-pašim-e-wa* *wa-pa-wa-pašim-e-wa* ‘he ridicules
him’

Closed initial syllables, with *š* or *h* in the coda, are also carried over to the bisyllabic reduplicative prefix:

- (30a) *ašk^wat-amwa* *ašk^wa-h-ašk^wat-amwa* ‘he has [food]
left over’
- (30b) *ka-škehtaw-e-wa* *ka-ške-ka-škehtaw-e-wa* ‘he hears him’
- (30c) *ni-škesi-wa* *ni-ške-ni-škesi-wa* ‘he is over-
burdened’
- (30d) *ki-hpoče--wa* *ki-hpo-ki-hpoče--wa* ‘he eats his
fill’
- (30e) *mehk^winawe-m-e-wa* *mehk^wi-mehk^winawe-m-
e-wa* ‘he reminds
him’
- (30f) *pehk^wako-te--wi* *pehk^wa-pehk^wako-te--wi* ‘it hangs in a
bunch’

4.3. Restrictions on the second syllable. In contrast to the initial syllable, the second syllable of the reduplicative prefix is subject to certain restrictions. These restrictions are identical to restrictions on final syllables of words in Fox. For example, a long vowel in the second syllable of the bisyllabic prefix must be shortened, just like long vowels in word-final position.

- (31a) *a-mi--wa* *a-mi-h-a-mi--wa* 'he moves camp'
 (31b) *či-pi-k^we--wa* *či-pi-či-pi-k^we--wa* 'he winks'
 (31c) *ka-si-k^we-hw-e-wa* *ka-si-ka-si-k^we-hw-e-wa* 'he_i wipes his_j face'
 (31d) *kok^wa-ške--wa* *kok^wa-kok^wa-ške--wa* 'he is jerked'
 (31e) *mayo--wa* *mayo-mayo--wa* 'he cries'
 (31f) *we-ne-haki* *we-ne-we-ne-haki* 'who?' (plural)

If the second syllable of the base is closed, the coda is not copied into the reduplicative prefix. Again, this parallels the requirement that words in Fox must end in a vowel.

- (32a) *nenehke-nem-e-wa* *nene-nenehke-nem-
e-wa* 'he thinks about
him'
 (32b) *nakiškaw-e-wa* *naki-nakiškaw-e-wa* 'he meets him'
 (32c) *aneškenataw-e-wa* *ane-h-aneškenataw-
e-wa* 'he fills a pipe for
him'

Consonant-glide clusters in the onset of the second syllable of the base are copied into the reduplicative prefix:¹⁹

- (33a) *opwe-heti--waki* *opwe-h-opwe-heti--waki* 'they make merry
together'
 (33b) *po-swe-kesi-wa* *po-swe-po-swe-kesi-wa* 'he cries louder'
 (33c) *anwe-we-se--wa* *anwe-h-anwe-we-se--wa* 'he makes noise'
 (33d) *ne-nye-maso-wa* *nenye-ne-nye-maso-wa* 'he keeps standing'
 (33e) *opye-ni* *opye-h-opye-ni* 'slowly' (preverb)

Another similarity between word-final syllables and the second syllable of the reduplicative prefix may be mentioned here. Sequences of CyŃ, as in (33d) and (33e), are rare in Fox. The only other environments in which this sequence is found are word-final position and stems in which the causative suffix *-n* has been added to a base ending in *Cye-*, changing the long *e-* to short *a*. (A word-final example is *na-mi nepye* 'in the middle of the water'; a causative example is *aškepyan-* 'drown' [trans.], from *aškepye-* 'drown' [intrans.].)

5. Reduplication and verb inflection. The preceding sections have described the templates for the two types of reduplication in detail. I now turn

¹⁹ (33d) is a double reduplication, formed via the irregular monosyllabic reduplication of *nemaso-wa* 'he stands' (3.3). For (33e), it should be noted that the glide of the second syllable may be omitted in the reduplicative prefix: *ope-h-opye-ni* is also possible, as is *opa-h-opye-ni*. The latter seems to be an example of the *a ~ e* variation pointed out in n. 16.

to an examination of the interaction between reduplication and inflectional morphology, looking first at the attachment of inflectional suffixes and prefixes, then at the ablaut process of initial change, and finally at phonological processes triggered by specific inflectional morphemes.

5.1. Inflectional affixes. As mentioned in the introduction to this paper, the inflectional suffixes attached to a Fox verb must be analyzed as part of the base for bisyllabic reduplication: if the verb stem is less than two full syllables, material from the inflectional suffixes is used to fill out the template for bisyllabic reduplication. Inflectional prefixes, however, never undergo copying by the reduplication rules.²⁰

The following examples illustrate the copying of material from inflectional suffixes into the bisyllabic reduplicative prefix. Unless otherwise noted, the inflected verb forms are from the independent indicative paradigm.

- (34a) *amw-e-wa* *amwe-h-amw-e-wa* ‘he eats him’
 (34b) *ay-o·ya-ni* *ayo-h-ay-o·ya-ni* ‘I use it’, conjunct²¹
 (34c) *i-wa* *iwa-h-i-wa* ‘he says’
 (34d) *kot-aki* *kota-kot-aki* ‘he swallows it’, conjunct
 (34e) *mi-n-e-wa* *mi-ne-mi-n-e-wa* ‘he gives it to him’

The verbs in (34) are built on stems which are less than two full syllables. In order to fill out the template for bisyllabic reduplication, some or all of the material from the inflectional suffixes must be used. In (34a), for instance, the stem *amw-* ‘eat’ can provide the initial syllable and the onset for the second syllable of the template, but the nucleus of the second syllable of the reduplicative prefix must be supplied by the first vowel of the inflectional suffix. (34c) is a more dramatic example: here the verb stem is simply *i-* ‘say’. In order to meet the requirements of bisyllabic reduplication, all of the inflectional suffix *-wa* is copied into the reduplicative prefix.

In contrast to the behavior of inflectional suffixes, inflectional prefixes are never copied by the reduplication rules. Rather, they attach to the left edge of the reduplicative prefix, as seen in these examples of bisyllabic reduplication:

²⁰ This could be captured in a derivational model by ordering reduplication after inflectional suffixation and before inflectional prefixation. However, such an ordering is unappealing in that it orders a derivational process after (part of) inflection and because it breaks up the affixation of discontinuous inflectional morphemes into two nonadjacent levels. A nonderivational approach stating well-formedness conditions on the reduplicative templates seems more promising and will be the subject of a future paper.

²¹ Conjunct refers to a set of inflectional paradigms used primarily in subordinate clauses. In actual use, conjunct forms such as (34b) are almost always preceded by a proclitic (either *e-h=* aorist or *wi-h=* future). In citing conjunct examples in this paper I have omitted the proclitics, since they do not bear on the issues examined here.

- (35a) *ne-t-amw-a-wa ne-t-amwa-h-amw-a-wa* 'I eat him'
 (35b) *ne-mi-n-a-wa ne-mi-na-mi-n-a-wa* 'I give it to him'
 (35c) *ke-nepa ke-nepa-nepa* 'you sleep'
 (35d) *ke-t-a-čimo ke-t-a-či-h-a-čimo* 'you tell a story'
 (35e) *ne-s-i-pena ne-s-ipe-h-i-pena* 'we [excl.] say'
 (35f) *ne-s-i* [no reduplicated form] 'I say'

The verb stem *i-* 'say' in (35e) and (35f) is unusual in that it causes a preceding epenthetic *t* to mutate to *s* (elsewhere, *t* → *č* preceding *i*). In (35e), the bisyllabic reduplicative prefix is *ipe*, a copy of the stem *i-* plus the first syllable of the inflectional suffix. In (35f), however, the first-person singular form of 'say' has no reduplicated form. The stem *i-* is not long enough to fill out the template for reduplication, and there is no inflectional suffix to supply additional material.

Inflectional prefixes also attach to the left edge of monosyllabic reduplicative prefixes:

- (36a) *ne-t-a-čimo ne-t-a-y-a-čimo* 'I tell a story'
 (36b) *ke-mahkate-wi ke-ma-mahkate-wi* 'you fast'
 (36c) *ne-nepači ne-ne-nepači* 'I am cold'
 (36d) *ke-wi-seni ke-wa-wi-seni* 'you eat'

Before we leave the topic of inflectional affixes, special mention must be made of the transitive verb stem 'say [thus] to', which has two allomorphs, /en-/ and \emptyset . Forms of 'say [thus] to' with the /en-/ allomorph reduplicate like the other short verb stems that we have already seen. The reduplicative prefix contains a copy of the stem, plus as much of the inflectional suffixes as needed to fill out the template.

- (37a) *ne-t-en-a-wa ne-t-ena-h-in-a-wa* 'I say to him'
 (37b) *ke-t-en-a-wa ke-t-ena-h-in-a-wa* 'you say to him'
 (37c) *in-e-wa ine-h-in-e-wa* 'he says to him [obv.]'

(Recall from 4.1 that /e/ → *i* word-initially and after the bisyllabic reduplicative prefix.)

The \emptyset allomorph of 'say [thus] to' occurs preceding one of the following inflectional suffixes: *-ek^w-* (inverse theme sign),²² *-ek^wi-* (inanimate sub-

²²"Inverse theme sign" is an Algonquianist term. Algonquian verb inflection is described as being sensitive to a hierarchy of person, on which first and second person outrank third person. Third person is further divided into proximate third person (the central third person participant in the discourse) and obviative third person (more peripheral participants). Proximate

ject), and *-en(e)-* (second-person object). Compare the forms in (37) with the following set, whose members all contain the zero allomorph of 'say to', followed by the inverse theme sign *-ek^w*- as part of the complex of inflectional suffixes.

- (38a) *ne-t-ek^wa* *ne-t-ek^wa-h-ik^wa* 'he says to me'
 /*ne-t-∅-ek^wa*/
- (38b) *ke-t-ek^wa* *ke-t-ek^wa-h-ik^wa* 'he says to you'
 /*ke-t-∅-ek^wa*/
- (38c) *ik^wa* *ik^wa-h-ik^wa* 'he [obv.] says to him'
 /*∅-ek^wa*/

The simple inflected form of (38a) consists entirely of inflectional morphemes: the inflectional prefix *ne-*, the inflectional suffixes *-ek^wa*, and the epenthetic *t*, required since *ne-* is prefixed to a vowel-initial base. The reduplicated form of (38a) has the reduplicative prefix attached in the usual place, between the inflectional prefix and the stem. Since the stem here is zero, the two syllables of the reduplicative template are filled entirely by material from the inflectional suffixes. (38b) and (38c) follow the same pattern.

5.2. Initial change. As mentioned in 2 above, certain verbal inflectional paradigms are formed by a combination of suffixation and ablaut of the vowel of the initial syllable. This ablaut rule, known as initial change, is present throughout the Algonquian family. In Fox, initial change affects both the quality and quantity of short vowels but leaves long vowels unchanged. Short *a*, *e*, and *i* become long *e·* by initial change, while short *o* becomes *we·*.²³

There is a formal similarity between the verbal paradigms formed by initial change plus suffixation and those formed by a combination of prefixation and suffixation. In both, reference must be made to the left edge of the verb stem (for prefixation or initial change), as well as to the right edge

outranks obviative on the person hierarchy. A transitive verb containing the inverse theme sign as part of its complex of inflectional suffixes will have an object which ranks higher on the person hierarchy than its subject. For example, a verb inflected for a third-person subject acting on a first-person object (in the independent order) will contain the inverse theme sign, as will one inflected for obviative third-person subject acting on proximate third-person object (in both the independent and the conjunct order).

²³ The initial change of *o* is another vestige of PA **we* > Fox *o*. An unusual pattern of initial change is found in the irregular monosyllabic reduplications *ma-ma-k-* 'big' and *ka-ka-nw-* 'long': the short *a* of the initial syllable changes to long *a·* when used in a participle with no head noun (Ives Goddard, personal communication). If, however, the participle modifies a head noun, the regular initial change of *a* to *e·* applies.

(for suffixation). In the previous section it was demonstrated that the inflectional prefixes are not part of the base of reduplication but rather attach to the left edge of the reduplicative prefix. In the same way, the inflectional process of initial change applies to the leftmost syllable of the reduplicative prefix and not to the base.

Stem	Reduplication with initial change
(39a) <i>amw-</i> 'eat'	<i>e·mwa-h-amw-a·čihi</i> 'the ones whom they (repeatedly) eat'
(39b) <i>ašam-</i> 'feed'	<i>e·ša-h-ašam-a·či</i> 'that which he (repeatedly) feeds him'
(39c) <i>leti-/-</i> 'say to each other'	<i>e-ti-h-iti-·-ye·k^we</i> 'that which you [pl.] say (repeatedly) to each other'
(39d) <i>kanawi-</i> 'speak'	<i>ke-na-kanawi-ta</i> 'the one who gives speeches'
(39e) <i>tak^waho-taw-</i> 'set trap for'	<i>te·k^wa-tak^waho-taw-akiki</i> 'the ones I (repeatedly) set traps for'

All the examples in (39) bear conjunct participle inflection, used for verbs in relative clauses. The conjunct participle paradigm is one requiring a combination of initial change and suffixation; the suffixes express features of the subject (and object) of the verb, and features of the head of the relative clause. For example, (39d), formed from *kanawi-* 'speak', is suffixed with *-t*, indicating animate third singular subject, and *-a*, indicating animate third singular head of the relative clause. Bisyllabic reduplication copies the first two syllables of the base (*kana-*); initial change applies to the leftmost syllable of the reduplicative prefix, changing *a* to *e*.

Initial change also applies to syllables created by monosyllabic reduplication, but here the interaction is more difficult to observe. The productive pattern of monosyllabic reduplication creates a prefix containing a long vowel and the Fox rule of initial change leaves long vowels unchanged. Some of the irregular forms of monosyllabic reduplication (3.3), however, take a short vowel in the reduplicative prefix which can be affected by initial change. An example is the conjunct participle *ke-·kye-ta·ška-·čiki* 'the ones who keep flying out'. The basic form of the stem is *keta·ška-* 'fly out'. The monosyllabic reduplication of this stem prefixes *ke-* and alters the form of the base-initial syllable by lengthening the vowel and inserting *y* in the onset. Participle inflection then suffixes *-čiki* (third plural subject and third plural head of the relative clause) and applies initial change to the reduplicative prefix, lengthening *e* to *e·*.

5.3. Phonological rules triggered by inflectional suffixes. There are a number of phonological rules triggered by the presence of inflectional suffixes. For example, the final *n* of some stems mutates to *š* when followed by *i*, and the *w* of stems ending in *Cw* coalesces with a following *e* to form short *o*. These phonological rules may be observed in the bisyllabic reduplicative prefix as well:

(40a) *ke-t-eš-ipena ke-t-eši-h-iš-ipena* ‘you say to us’
/ke-t-en-ipena/

(40b) *amokoči amo-h-amokoči* ‘he [obv.] eats him’, conjunct
/amw-ekoči/

The fact that mutation and coalescence of *w* + *e* occur in the reduplicative prefixes is not particularly surprising. After all, the vowel triggering the phonological change is copied as well into the reduplicative prefix, so the environment for the phonological rule is met both in the reduplicative prefix and in the base.

There are, however, two other phonological rules triggered by inflectional suffixes that are of greater interest for this study of reduplication. The first is a contraction rule and the second changes long *a* to long *e*. In both cases, bisyllabic reduplication copies the output of the rule but not the environment which triggers the rule. I begin by describing the contraction rule. Certain inflectional suffixes beginning with short *e* contract with a preceding *aw* to long *o*. *-ene*, used in the independent indicative affix combination *ke- -ene* (first singular subject, second singular object) is one such suffix; another is the conjunct suffix *-ehki* (third singular or plural subject, second singular object).²⁴

(41a) *ke-na-to-ne* ‘I go after it for you’
/ke-na-taw-ene/

(41b) *ke-pye-to-ne* ‘I bring it for you’
/ke-pye-taw-ene/

(41c) *na-to-hki* ‘he goes after it for you’, conjunct
/na-taw-ehki/

(41d) *pye-to-hki* ‘he brings it for you’, conjunct
/pye-taw-ehki/

²⁴ Both may be analyzed as containing the theme sign *-en(e)-*, for second-person object. There are other *e*-initial suffixes (e.g., the inverse theme sign *-ek^w-*) which trigger contraction of *aw-e* → *a*, but the contraction to *a* does not provide such compelling evidence for ordering reduplication after inflectional suffixation as the contraction to *o* does.

- (44b) *na·k^wa·-wa·či* *na·k^wa·na·k^wa·-wa·či* ‘they leave’, conjunct
 (44c) *nepe·-wa* *nepe·nepe·-wa* ‘he sleeps’
 (44d) *ke·nepa·-pwa* *ke·nepa·nepa·-pwa* ‘you [pl.] sleep’

In (44a) and (44c), where the stem-final vowel has changed to *e*, the vowel of the second syllable of the reduplicative prefix is *e*. But in (44b) and (44d), in which the vowel change rule fails to apply, the vowel of the second syllable of the reduplicative prefix is *a*.

6. Conclusion. Two reduplicative patterns—monosyllabic and bisyllabic—have been described for Fox. Both are derivational processes primarily used to express aspect on verbs. Besides the differences in the templates themselves, there are distinct phonological processes associated with the two types of reduplication. Monosyllabic reduplication triggers glide epenthesis on vowel-initial bases, while bisyllabic reduplication requires epenthesis of *h*. Several features of bisyllabic reduplication may be explained if we posit a phonological word boundary between the reduplicative prefix and the base; with monosyllabic reduplication, there is no evidence for such a boundary. Inflectional suffixes must be taken as part of the base (at least for the bisyllabic type of reduplication), but inflectional prefixes and the ablaut rule of initial change are not part of the base for reduplication. Finally, a secondary result of the analysis presented here is that *k^w* functions as a single segment in Fox, rather than as a CG cluster.

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