

## A sketch of Atsugewi phonology

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### 0 Introduction

- [1] The purpose of this paper is to give a sketch of Atsugewi phonology, with particular attention to phonological processes found in the verb.
- [2] Atsugewi is a (probably) extinct language of the Hokan stock once spoken in far northern California. It's closest (and only uncontroversial) relative is Achumawi.
- [3] I am deeply indebted to Leonard Talmy for giving me access to his notes on Atsugewi phonology as well as discussing the language with me.<sup>1</sup>
- [4] Many of the descriptive analyses are ultimately attributable to him—here, I am just trying to update them somewhat, bring them together into one place, and provide illustrative examples.
- [5] Topics to be discussed
  - [a] Segment inventory
  - [b] Segmental processes
  - [c] Suprasegmental phonology
  - [d] Some comments on the relationship between phonological and morphological structure

### 1 Segment inventory

[6] The segment inventory of Atsugewi, as reported in Good, MacFarland, and Paster (2003) is given below.

[a] **Vowels**

i	u
(e)	(o)
a	
length :	

<sup>1</sup> I am also thankful to Teresa MacFarland and Mary Paster with whom I also worked in this area.

[b] **Consonants**

p	t	c	k	q	
p <sup>h</sup>	t <sup>h</sup>	c <sup>h</sup>	k <sup>h</sup>	q <sup>h</sup>	
p'	t'	c'	k'	q'	ʔ
	s				ĥ
	s'				h
m	n				
m'	n'				
	l	r			
	l'	r'			
w	y				
w'	y'				

- [7] The segments *e* and *o* are marginally phonemic, with most surfacing occurrences being predictable variants of *i* and *u* respectively. The segment *e* is closer to a true phoneme than *o*. (For example, one instrumental prefix *ce* 'the eye(s), an eye-shaped object' (Talmy 1972:425) has been analyzed as having *e* in its underlying form.)
- [8] The phoneme /c/ ranges phonetically from [ts] to [č].
- [9] Most phonetic instances of glottal stops come from glottalized consonants, though Leonard Talmy (personal communication) has suggested that it does appear to be phonemic in some forms.
- [10] The symbol *ĥ* corresponds to an *h* which does *not* lower an adjacent high vowel to a mid vowel. The *h/ĥ* distinction almost certainly corresponds to a historical situation where a *h/h'* contrast has been lost except for the fact that the historical *h'* triggers vowel lowering. (This was discussed in more detail in Good, MacFarland, and Paster (2003).)
- [11] The phoneme *r* has as an allophone an alveolar implosive [ɖ] word initially and after consonants. An example where it has been observed is in the word *t'ohri* 'cooking basket'.
- [12] Voiceless nasals appear as allophonic variants of the nasal phonemes in at least the following contexts.<sup>2</sup>

<sup>2</sup> The transcription conventions are based on Talmy (1972) and morphological analyses are also those found in Talmy (1972). Both “:” and “.” are used to represent vowel length underlyingly with the distinction being that “:” also causes vowel-lowering. Morpheme-by-morpheme glossing is my own and is, in all likelihood, non-ideal. The free translations are, however, from Talmy (1972).

[a] Word-initially before *c* (but not before *t*)

[i] /n-w-ca-miq'-uww-ay-<sup>a</sup>/ → [n̥cwam-eq'úw-e-]  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-wind-house-part<sub>1</sub>-part<sub>2</sub>-3:3.E<sub>3</sub>  
“The roof blew off from the house.” (Talmy 1972:458)

[ii] /n-w-cu-miq'-mic'-<sup>a</sup>/ → [n̥cum-éq'mic]  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-liquid-house-down-3:3.E<sub>3</sub>  
“The house collapsed from the flood.” (Talmy 1972:462)

[iii] Compare:  
/n-w-ti-swal-ic'-<sup>a</sup>/ → [ntwiswalíc']  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-buttocks-limp-up-3:3.E<sub>3</sub>  
“I see where he’s carrying the rabbits he killed hung from his belt.”  
(Talmy 1972:434)

## [b] Underlyingly glottalized nasals in the second syllable after a vowel

[i] /'-w-hi-m'ur-ik-<sup>a</sup>/ → [w'he'murík-a]  
3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-body-fluid-hither-3:3.F<sub>3</sub>  
“The cow’s birth-sac (amnion) burst from the baby calf inside.”  
(Talmy 1972:450)

[ii] /s-'<sup>a</sup>-w-ci-n'uq'-<sup>a</sup>/ → [sc'wi'nóq']  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hands-fold-1:3.F<sub>4</sub>  
“I doubled the cat up.” (Talmy 1972:460)

[iii] Compare:  
/s-'<sup>a</sup>-w-:-ma-hapuk-mic'-<sup>a</sup>/ → [sm'a-hapúk<sup>h</sup>mic']  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-AUG-feet-miss-ground-1:3.F<sub>4</sub>  
“I missed a step as I was walking down the stairs.” (Talmy 1972:456)

## 2 Segmental processes

[13] *w*-infixation

[14] An inflectional affix of form *w*, in some environments, infixes after the first consonant of a word. Examples have been found after *c*, *c'*, *t*, *t'*, *k'*, and *m*.

[a] /n-w-ca-miq'-uww-ay-<sup>a</sup>/ → [n̥cwam-eq'úw-e-]  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-wind-house-part<sub>1</sub>-part<sub>2</sub>-3:3.E<sub>3</sub>  
“The roof blew off from the house.” (Talmy 1972:458)

In some cases, he gives multiple translations—the ones given here are the “casual” translations. Subscript numbers after a morpheme indicate it is one part of a multi-part unit. Numbers separated by colons indicate subject and object agreement. For example ‘3:3’ means third-person subject on third-person object while ‘1:3’ means first-person subject on third-person object. The glossing abbreviation F stands for factual, E stands for evidential, I stands for imperative, and IN stands for intensive.

[b] /'-w-ca-swal-mic'-<sup>a</sup>/ → [c'waswálmic']  
3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-wind-limp-ground-3:3.F<sub>3</sub>  
“The clothes blew down from the clothesline.” (Talmy 1972:432)

[c] /n-w-ti-swal-ic'-<sup>a</sup>/ → [ntwiswalíc']  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-buttocks-limp-up-3:3.E<sub>3</sub>  
“I see where he’s carrying the rabbits he killed hung from his belt.”  
(Talmy 1972:434)

[d] /s-'<sup>a</sup>-w-ti-caqih-tip-asw'-<sup>a</sup>/ → [st'wic-aqéht<sup>h</sup>pasw'a]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-buttocks-legs-open-apart<sub>1</sub>-apart<sub>2</sub>-1:3.F<sub>4</sub>  
“I spread my legs apart.” (Talmy 1972:461)

[e] /s-'<sup>a</sup>-w-ka-lay-im-<sup>a</sup>/ → [sk'wal-ayíw]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-aural-please-thither-1:3.F<sub>4</sub>  
“I find it good-sounding/I like it (e.g., singing).” (Talmy 1972:467)

[f] /n-w-miw-miq'-mic'-<sup>a</sup>/ → [n<sup>o</sup>mwewméq'mic']  
3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-heat-house-down-3:3.E<sub>3</sub>  
“The house burnt down to the ground.” (Talmy 1972:462)

[15] This affix appears as a prefix when the following morpheme begins with a vowel, *h*, *r*, *l*, or *s*.

[a] /'-w-i-puq-asw'-<sup>a</sup>/ → [w'ip-oqásw'a]  
3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-CAUS-dust-all\_about-1:3.F<sub>3</sub>  
“There’s dust swirling about over the road (where the horses had ridden past).” (Talmy 1972:455)

[b] /'-w-u-qput-ic't-<sup>a</sup>/ → [w'oq<sup>h</sup>putíc'ta]  
3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-lin\_swing-dirt-liquid-3:3.F<sub>3</sub>  
“The dirt fell into the creek from a hanging branch swinging into it.”  
(Talmy 1972:181)

[c] /s-'<sup>a</sup>-w-hi-luc-<sup>a</sup>/ → [sw'hel-úch<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-body\_part-detach-1:3.F<sub>4</sub>  
“I scraped some hair off my head when I fell.” (Talmy 1972:447)

[d] /s-'<sup>a</sup>-w-ra-hmup'-m-ik-<sup>a</sup>/ → [sw'rahmúp'mik-a]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_axial-cover-head<sub>1</sub>-head<sub>2</sub>-1:3.F<sub>4</sub>  
“I slung a blanket up over his head.” (Talmy 1972:439)

[e] /s-'<sup>a</sup>-w-ru-luc-<sup>a</sup>/ → [sw'lul-úch<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_ax-detach-1:3.F<sub>4</sub>  
“I pulled a handful of hair out of his head.” (Talmy 1972:446)

- [f] /s-<sup>ʔ</sup>-w-sa-lay-im-<sup>a</sup>/ → [sw<sup>ʔ</sup>sal-ayíw] or [s<sup>ʔ</sup>sal-ayíw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-visual-please-thither-1:3.F<sub>4</sub>  
 “I find it good-looking, pretty/I like it (e.g., a picture).”  
 (Talmy 1972:467)<sup>3</sup>
- [16] When it would follow a labial consonant, -w- is realized as length and/or lowering of an *i* to an *e*. The *w* is sometimes retained segmentally when this occurs.
- [a] /<sup>ʔ</sup>-w-ma-qput-ic<sup>ʔ</sup>t-<sup>a</sup>/ → [m<sup>ʔ</sup>a-q<sup>h</sup>putíc<sup>ʔ</sup>ta]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-foot-dirt-liquid-3:3.F<sub>3</sub>  
 “He kicked the dirt into the creek.” (Talmy 1972:179)
- [b] /s-<sup>ʔ</sup>-w-wi-skit-im-<sup>a</sup>/ → [sw<sup>ʔ</sup>e-skitíw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-teeth-soft snag-into\_body-1:3.F<sub>4</sub>  
 “I got a piece of food caught in my teeth.” (Talmy 1972:449)
- [c] /n-w-miw-miq<sup>ʔ</sup>-mic<sup>ʔ</sup>-<sup>a</sup>/ → [n<sup>ʔ</sup>m<sup>w</sup>ewméc<sup>ʔ</sup>mic<sup>ʔ</sup>]  
 3:3.E<sub>1</sub>-3:3.E<sub>2</sub>-heat-house-down-3:3.E<sub>3</sub>  
 “The house burnt down to the ground.” (Talmy 1972:462)
- [d] Leonard Talmy (personal communication) indicates that the more typical case is for the -w- not to be retained segmentally, as in the first two examples. It is unclear what conditions govern its appearance in the third of three examples just above.
- [17] In some environments, the -w- is not realized. This includes when the following vowel is *u* and when it appears with a consonant cluster beginning with *p* (this latter environment may be more general—I lack examples where the *w* appears with any other type of consonant cluster). (The third example below contains the morpheme *ce* ‘eye-shaped object’, which is the only underlying form Talmy (1972) gives with a mid vowel.)
- [a] /<sup>ʔ</sup>-w-cu-skit-<sup>a</sup>/ → [c<sup>ʔ</sup>uskít<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-liquid-soft snag-1:3.F<sub>4</sub>  
 “Some brush in the stream got snagged on a limb jutting up.”  
 (Talmy 1972:448)
- [b] /s-<sup>ʔ</sup>-w-tu-k<sup>h</sup>ük-<sup>a</sup>/ → [st<sup>ʔ</sup>uk<sup>h</sup>.ókh<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-from\_hands-stomach-1:3.F<sub>4</sub>  
 “I grasped his protruding belly between my hands; I played with the deer’s stomach (that was lying on the ground).” (Talmy 1972:445)
- [c] /s-<sup>ʔ</sup>-w-p-ce-t<sup>ʔ</sup>i-w-ihiy-<sup>a</sup>/ → [sp<sup>ʔ</sup>c<sup>ʔ</sup>et<sup>ʔ</sup>.í-wehè:]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-back-eye-dual-body-1:3.F<sub>4</sub>  
 “I buttoned up.” (Talmy 1972:442)
- [d] /<sup>ʔ</sup>-w-pri-m<sup>ʔ</sup>ur-ik-<sup>a</sup>/ → [p<sup>ʔ</sup>ri<sup>ʔ</sup>murík-a]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-from\_mouth-liquid-hither-3:3.F<sub>3</sub>  
 “He sucked on the woman’s breasts to start the milk-flow.”  
 (Talmy 1972:451)
- [e] /s-<sup>ʔ</sup>-w-p-tu-sc<sup>ʔ</sup>ak<sup>ʔ</sup>-im-<sup>a</sup>/ → [sp<sup>ʔ</sup>t<sup>ʔ</sup>usc<sup>ʔ</sup>ak<sup>ʔ</sup>íw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-MAL-hands-sharp-into\_body-1:3.F<sub>4</sub>  
 “I got a thorn stuck on my finger.” (Talmy 1972:453)
- [18] Most verbs given in Talmy (1972) are marked with this inflectional -w- but a few are not. An example is given below.  
 /s-<sup>ʔ</sup>-ci-m<sup>ʔ</sup>ur-cic/ → [sc<sup>ʔ</sup>i<sup>ʔ</sup>mur<sup>h</sup>cic<sup>h</sup>]  
 1:3.IN<sub>1</sub>-1:3.IN<sub>2</sub>-liquid-go.and  
 “I’ll go milk the cow.” (Talmy 1972:450)
- [19] That a segment of a form like *w* should be involved with infixation is not particularly unexpected. It would appear to be a case of metathesis-induced infixation, as categorized by Yu (2003:217–25).
- [20] **Consonant harmony**
- [21] Len Talmy (notes) gives a rule straightforwardly understood as consonant harmony where an *r* harmonizes with a following *l* or *n*. I only have examples of *r* alternating with *l*.
- [a] /<sup>ʔ</sup>-w-p-ru-swal-ik<sup>ʔ</sup>s-<sup>a</sup>/ → [p<sup>ʔ</sup>luswalík<sup>ʔ</sup>sa]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-MAL-flex\_lin\_att-limp-lat-3:3.F<sub>3</sub>  
 “His penis stayed limp (on him); he couldn’t get an erection.”  
 (Talmy 1972:434)
- [b] /s-<sup>ʔ</sup>-w-pri-lay-im-<sup>a</sup>/ → [sp<sup>ʔ</sup>lil-ayíw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-smell-please-thither-1:3.F<sub>4</sub>  
 “I find it good-smelling/tasting; I like it (e.g., the flower).”  
 (Talmy 1972:467)
- [c] /s-<sup>ʔ</sup>-w-pri-lup-nik-iy-<sup>a</sup>/ → [sp<sup>ʔ</sup>lil-úp<sup>h</sup>nika·]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-mouth\_in-sphere-forth<sub>1</sub>-forth<sub>2</sub>-1:3.F<sub>4</sub>  
 “I rolled the round candy around in my mouth.” (Talmy 1972:438)

<sup>3</sup> Talmy (1972) does not give the first phonetic form in this example, only the second. The source for the first form is Leonard Talmy (personal communication).

- [d] /s-<sup>ʔ</sup>-w-ra-luc-<sup>a</sup>/ → [sw<sup>ʔ</sup>lal-ú<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-plane\_lat-detach-1:3.F<sub>4</sub>  
 “I scraped the fur off the hide.” (Talmy 1972:446)

[22] Compare:

- [a] /<sup>ʔ</sup>-w-pri-m<sup>ʔ</sup>ur-ik-<sup>a</sup>/ → [p<sup>ʔ</sup>ri<sup>ʔ</sup>m<sup>ʔ</sup>urík·a]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-from\_mouth-liquid-hither-3:3.F<sub>3</sub>  
 “He sucked on the woman’s breasts to start the milk-flow.”  
 (Talmy 1972:451)
- [b] /s-<sup>ʔ</sup>-w-p-ra-skit-<sup>a</sup>/ → [sp<sup>ʔ</sup>raskít<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-MAL-lin\_obl-soft\_s nag-1:3.F<sub>4</sub>  
 “I caught my shirt on a nail.” (Talmy 1972:448)

[23] The first example shows that the harmony can pass over intervening consonants.

[24] Morphologically, the examples all show harmony affecting instrumental prefixes.

[25] If understood as a uniform process, harmony where *r* alternates with *l* or *n* appears to be rare—for example, Hansson (2003) does not list such harmony within his typological classification of consonant harmony. (However, nasal harmony and liquid harmony are individually discussed.)

[26] This consonant harmony could contribute to a better understanding of some problems in Hokan linguistics.

- [a] While *l*, *n*, and *r* in Atsugewi often correspond with *l*, *n*, and *r*, respectively, in Achumawi (a close relative), Olmsted (1964:16–18) indicates a number of cases where there are other correspondances between these segments: like Atsugewi *r* with Achumawi *l*, Atsugewi *n* with Achumawi *l*, and Atsugewi *r* with Achumawi *n*.
- [b] This process in Atsugewi may shed some light on processes given the label “consonantal symbolism” for Hokan by Kaufman (1988:103). Kaufman reconstructs alternations between *l*, *n*, and *r* to Proto-Hokan—perhaps they ultimately derive from some type of consonant harmony. An example of such a consonantal symbolism process, diminutivization in Northern Yana is given below.

*liili-mau-na* → *niini-mau-p’a*  
 nose-NZ-ABS    nose-NZ-DIM                      (Sapir and Swadesh 1960:124)

[27] **Echo-vowels**

[28] After *r*, and before another consonant, in some circumstances echo vowels are observed to appear which have the same features as the preceding vowel.

- [a] /s-<sup>ʔ</sup>-ci-m<sup>ʔ</sup>ur-cic/ → [sc<sup>ʔ</sup>i<sup>ʔ</sup>m<sup>ʔ</sup>ur<sup>u</sup>cic<sup>h</sup>]  
 1:3.IN<sub>1</sub>-1:3.IN<sub>2</sub>-liquid-go\_and  
 “I’ll go milk the cow.” (Talmy 1972:450)
- [b] /s-<sup>ʔ</sup>-w-tu-m<sup>ʔ</sup>ur-<sup>a</sup>/ → [st<sup>ʔ</sup>u<sup>ʔ</sup>m<sup>ʔ</sup>ur<sup>u</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hand-fluid-1:3.F<sub>4</sub>  
 “I made the milk squirt out of the cow’s teat by squeezing it in my hand.”  
 (Talmy 1972:450)

[29] **Coda aspiration**

[30] Non-glottalized stops are aspirated in coda position

- [a] /s-<sup>ʔ</sup>-w-hi-k<sup>h</sup>ük-<sup>a</sup>/ → [sw<sup>ʔ</sup>hek<sup>h</sup>·ó<sup>h</sup>k<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-body-stomach-1:3.F<sub>4</sub>  
 “I bumped into his protruding belly.” (Talmy 1972:445)
- [b] /s-<sup>ʔ</sup>-w-uh-k<sup>h</sup>ük-wam-im-<sup>a</sup>/ → [sw<sup>ʔ</sup>ohk<sup>h</sup>ókú<sup>ʔ</sup>maw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_pivot-stomach-body<sub>1</sub>-body<sub>2</sub>-1:3.F<sub>4</sub>  
 “I hit him in his big stomach with my fist.” (Talmy 1972:445)
- [c] /<sup>ʔ</sup>-w-ma-qput-ic<sup>ʔ</sup>t-<sup>a</sup>/ → [m<sup>ʔ</sup>a<sup>q</sup>putíc<sup>ʔ</sup>ta]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-foot-dirt-liquid-3:3.F<sub>3</sub>  
 “He kicked the dirt into the creek.” (Talmy 1972:179)

[31] **Superscript *a***

[32] Most of the examples in Talmy (1972) are indicated as being suffixed underlyingly with an inflectional superscript *a*.

[33] This suffix often does not surface as anything, but it surfaces as *a* when the verb would otherwise end in a complex coda (including a geminate consonant) or a superheavy syllable (i.e. long vowel plus coda).

- [a] /s-<sup>ʔ</sup>-w-uh-st<sup>ʔ</sup>aq<sup>ʔ</sup>-i-w-<sup>a</sup>/ → [sw<sup>ʔ</sup>ost<sup>ʔ</sup>aq<sup>ʔ</sup>i·wa]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_pivot-icky-dual-1:3.F<sub>4</sub>  
 “I slammed together hunks of clay I held in either hand.”  
 (Talmy 1972:435)

- [b] /s-<sup>-</sup>-w-ci-st'aq'-ik's-<sup>a</sup>/ → [sc'wist'aq'ík'sa]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hands-icky-horiz\_lat-1:3.F<sub>4</sub>  
 “I patted some mud against the wall.” (Talmy 1972:436)
- [c] /s-<sup>-</sup>-w-tu-swal-ic'-<sup>a</sup>/ → [stuswalíc']  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hand\_in-limp-up-1:3.F<sub>4</sub>  
 “I picked up the rag.” (Talmy 1972:433)

### 3 Suprasegmental phonology

#### [34] Syllable structure

[35] Atsugewi allows fairly complex syllable structure, as can be seen in all the examples to this point.

[36] There appears to be a restriction against long vowels appearing with coda consonants.

[37] One instance of a long vowel followed by a coda stop was found (given below). This long vowel is derived via *w*-infixation. Also, it is in an instrumental prefix. We will see below that instrumental prefixes may represent a special domain for phonological phenomena in the language.

- /<sup>-</sup>-w-ma-qput-ic'<sup>t</sup>-<sup>a</sup>/ → [m'a-q<sup>h</sup>putíc'ta]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-foot-dirt-liquid-3:3.F<sub>3</sub>  
 “He kicked the dirt into the creek.” (Talmy 1972:179)

[38] Otherwise, all instances of long vowels followed by potential coda consonants involve *s*. Since *s* can clearly be part of a complex onset word-initially, this suggests that these potential coda *s*'s may, in fact, be syllabifying with the onset of the vowel following them when they appear word-medially.

- /s-<sup>-</sup>-w-ci-n'uq'-a-sy'-<sup>a</sup>/ → [sc'wi'ḥoqá-sy'a]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hands-fold-multiply-1:3.F<sub>4</sub>  
 “I made a fist.” (Talmy 1972:460)

[39] The data involving superscript-*a*, seen above, indicates that complex codas might be generally disallowed. The best possible instances of them which were found involve verbs containing suffixes with morphophonemically reduced *i*'s.

- /n-w-uh-miq'-tip-asw'-<sup>a</sup>/ → [nohméq't<sup>h</sup>pasw'a]  
 3:3E<sub>1</sub>-3:3E<sub>2</sub>-gravity-house-apart-3:3E<sub>3</sub>  
 “The house fell apart.” (Talmy 1972:458)

[40] Nasals do not appear to be allowed in codas. There are examples of *m* alternating with *w* in codas and Talmy (notes) indicates that *n* alternates with *r*.

- /s-<sup>-</sup>-w-ra-st'aq'-im-<sup>a</sup>/ → [sw'rast'aq'íw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_axial-icky-thither-1:3.F<sub>4</sub>  
 “I slung away the rotten tomatoes, sluicing them off the pan they were in.” (Talmy 1972:435)

#### [41] Stress

[42] Instrumental prefixes are never stressed. (The instrumental prefixes are generally the first non-inflectional affix in the examples seen here.)

[43] Stress is marked on the first heavy syllable of the stem.

- [a] /<sup>-</sup>-w-cu-skit-<sup>a</sup>/ → [c'uskít<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-liquid-soft\_snag-1:3.F<sub>4</sub>  
 “Some brush in the stream got snagged on a limb jutting up.” (Talmy 1972:448)
- [b] /s-<sup>-</sup>-w-p-tu-sc'ak'-im-<sup>a</sup>/ → [sp't'usc'ak'íw]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-MAL-hands-sharp-into\_body-1:3.F<sub>4</sub>  
 “I got a thorn stuck on my finger.” (Talmy 1972:453)
- [c] /<sup>-</sup>-ra-swal-im-a-<sup>a</sup>/ → [l'aswal<sup>o</sup>wá]  
 2:3I<sub>1</sub>-2:3I<sub>3</sub>-lin\_lat-limp-thither-2:3I<sub>3</sub>  
 “Push that dead snake away.” (Talmy 1972:432)
- [d] /<sup>-</sup>-w-hi-miq'-ic'w-<sup>a</sup>/ → [w'hem-eq'íc'wa]  
 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-body-house-up-3:3.F<sub>3</sub>  
 “The kid crawling under the pile of boards from the torn down house lifted them up as he stood.” (Talmy 1972:463)
- [e] /s-<sup>-</sup>-w-uh-st'aq'-i-w-<sup>a</sup>/ → [sw'ost'aq'í'wa]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_pivot-icky-dual-1:3.F<sub>4</sub>  
 “I slammed together hunks of clay I held in either hand.” (Talmy 1972:435)
- [f] /s-<sup>-</sup>-w-uh-t'<sup>i</sup>-a-sy'-<sup>a</sup>/ → [sw'ohtá-sy'a]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-plane\_flush-plane-mult\_together-1:3.F<sub>4</sub>  
 “I patched a hole in the wall with the boards.” (Talmy 1972:441)
- [g] /s-<sup>-</sup>-w-ci-hmup'-pik-ayw-<sup>a</sup>/ → [sc'wehmúp'<sup>h</sup>kaywa]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-hands-cover-around<sub>1</sub>-around<sub>2</sub>-1:3.F<sub>4</sub>  
 “I tucked the kids in.” (Talmy 1972:439)

- [b] /s-<sup>ʔ</sup>-w-p-ce-t<sup>i</sup>-i-w-ihiy-<sup>a</sup>/ → [sp<sup>ʔ</sup>c<sup>ʔ</sup>et<sup>ʔ</sup>.í.wehè-]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-back-eye-dual-body-1:3.F<sub>4</sub>  
“I buttoned up.” (Talmy 1972:442)
- [c] /s-<sup>ʔ</sup>-w-ma-luc-<sup>a</sup>/ → [sm<sup>ʔ</sup>a-lúc<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-foot-detach-1:3.F<sub>4</sub>  
“I skinned the rabbit accidentally by stepping on it.” (Talmy 1972:447)
- [d] /s-<sup>ʔ</sup>-w-ra-luc-<sup>a</sup>/ → [sw<sup>ʔ</sup>la-lúc<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-plane\_lat-detach-1:3.F<sub>4</sub>  
“I scraped fur off the hide.” (Talmy 1972:446)
- [44] We saw above that *s* could appear as a potential coda after a long vowel. This indicated, perhaps, that it syllabified with the following onset. The example below indicates that, at least after a short vowel, *s* should be treated as belonging to the coda with respect to the generalization made above for stress.
- /<sup>ʔ</sup>-w-i-puq-asw<sup>ʔ</sup>-<sup>a</sup>/ → [w<sup>ʔ</sup>ip-oqásw<sup>ʔ</sup>a]  
3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-CAUS-dust-all\_about-1:3.F<sub>3</sub>  
“There’s dust swirling about over the road (where the horses had ridden past).” (Talmy 1972:455)
- [45] I found no example in Talmy (1972) of a stem not containing at least one heavy syllable. Talmy (personal communication) has described stress in a way which indicates that, if such a scenario is morphologically possible, stress would be final in such a stem.
- [46] Secondary stress is found on alternating syllables on both sides of the stressed syllable (Talmy notes).
- [47] **“First-syllable” restriction**
- [48] There is an interesting restriction on Atsugewi verbs which can be roughly described as causing the first syllable to be heavy.
- [49] Talmy (1972) does not have many examples of this restriction producing alternations, but some can be seen below. The restriction is observed to lengthen consonants if the first syllable of the verb would not otherwise be heavy.
- [a] /s-<sup>ʔ</sup>-w-uh-k<sup>h</sup>ük-wam-im-<sup>a</sup>/ → [sw<sup>ʔ</sup>ohk<sup>h</sup>okú<sup>ʔ</sup>maw]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-lin\_pivot-stomach-body<sub>1</sub>-body<sub>2</sub>-1:3.F<sub>4</sub>  
“I hit him in his big stomach with my fist.” (Talmy 1972:445)
- [b] /s-<sup>ʔ</sup>-w-hi-k<sup>h</sup>ük-<sup>a</sup>/ → [sw<sup>ʔ</sup>hek<sup>h</sup>.ók<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-body-stomach-1:3.F<sub>4</sub>  
“I bumped into his protruding belly.” (Talmy 1972:445)
- [c] /s-<sup>ʔ</sup>-w-ma-n<sup>ʔ</sup>uq<sup>ʔ</sup>-ic<sup>ʔ</sup>t-<sup>a</sup>/ → [sm<sup>ʔ</sup>a<sup>ʔ</sup>noq<sup>ʔ</sup>íc<sup>ʔ</sup>ta]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-foot-fold-liquid-1:3.F<sub>4</sub>  
“I shoved the reluctant cat into the water with my foot getting him doubled up as I did so.” (Talmy 1972:464)
- [d] /s-<sup>ʔ</sup>-w-ma-n<sup>ʔ</sup>uq<sup>ʔ</sup>-mic<sup>ʔ</sup>-<sup>a</sup>/ → [sm<sup>ʔ</sup>a<sup>ʔ</sup>noqmic<sup>ʔ</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-foot-fold-down-1:3.F<sub>4</sub>  
“As he was sitting there, I bent his head down to the grounds with my foot.” (Talmy 1972:464)
- [e] /s-<sup>ʔ</sup>-w-ma-puq-<sup>a</sup>/ → [sm<sup>ʔ</sup>a<sup>ʔ</sup>póq<sup>h</sup>]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-feet-dust-1:3.F<sub>4</sub>  
“I kicked up dirt as I walked along.” (Talmy 1972:454)
- [50] Nasals given as underlyingly glottalized interact with this restriction in an interesting way. They surface as a glottal stop followed by a voiceless nasal. This sequence allows the heavy syllable restriction on the first syllable to be fulfilled. The appearance of this sequence also seems to block vowel lengthening that might otherwise be caused by *w*-infixation.
- [51] This restriction only appears to apply to conjugated verbs and, perhaps, is restricted to the boundary between an instrumental prefix and the stem.
- /-caqih<sup>ʔ</sup>-w-i-im-ak-<sup>a</sup>/ → [caqéh<sup>ʔ</sup>w<sup>ʔ</sup>ì<sup>ʔ</sup>māk<sup>h</sup>]  
legs\_open 3:3.F<sub>1</sub>-3:3.F<sub>2</sub>-go-thither-CONT-3:3.F<sub>3</sub>  
“The frog went jumping along.” (Talmy 1972:466)
- [52] This restriction does not affect an initial syllable created by an epenthetic schwa, but rather affects the following syllable. This further indicates that this heavy-syllable restriction may be conditioned by the boundary between the instrumental prefix and the rest of the stem rather than strictly affecting the first syllable.
- /s-<sup>ʔ</sup>-w-sa-lay-im-<sup>a</sup>/ → [s<sup>ʔ</sup>sal-ayíw]  
1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-visual-please-thither-1:3.F<sub>4</sub>  
“I find it good-looking, pretty/I like it (e.g., a picture).” (Talmy 1972:467)

- [53] This restriction does not appear to interact in any way with stress, another phenomenon which, as we saw above, is sensitive to syllable weight.
- [54] This restriction, like one of the examples discussed above for stress, indicates that *s* can be in the coda of a syllable with a short vowel.
- /ʔ-w-cu-skit-<sup>a</sup>/ → [cʰuskít<sup>h</sup>]  
 1:3.F<sub>1</sub>-1:3.F<sub>2</sub>-1:3.F<sub>3</sub>-liquid-soft\_s-nag-1:3.F<sub>4</sub>  
 “Some brush in the stream got snagged on a limb jutting up.”  
 (Talmy 1972:448)

#### 4 The relationship between phonological and morphological structure

- [55] Based on the phenomena discussed above, one can say a few things about the relationship between phonological and morphological structure.
- [56] Talmy (notes) has worked out some aspects of this in more detail than what is seen below, which is limited to statements which can be made based on the data seen above.
- [57] There is an asymmetry in the Atsugewi verbs between instrumental prefixes and following affixes.
- [a] Instrumental prefixes are subject to root-controlled consonant harmony (though the details of consonant harmony are not completely clear).
  - [b] Instrumental prefixes are never stressed.
  - [c] Instrumental prefixes appear to trigger an initial heavy syllable restriction which does not hold for verbs without instrumental prefixes.

[58] A broad morphological schematization of the Atsugewi verb is given below.

[ ]<sub>INFL</sub> [ ]<sub>INST</sub> [ ]<sub>ROOT</sub> [ ]<sub>DIR</sub> [ ]<sub>DERIV</sub> [ ]<sub>INFL</sub>

[59] While the morphophonological structure is, in all likelihood more elaborate, (for example, I have not discussed here a number of vowel-insertion/deletion phenomena affecting directional suffixes), we can tentatively schematize the morphophonology of the Atsugewi verb as below.

[ [ ]<sub>INFL</sub> [ ]<sub>INST</sub> ]<sub>PREF</sub> [ [ ]<sub>ROOT</sub> [ ]<sub>DIR</sub> [ ]<sub>DERIV</sub> [ ]<sub>INFL</sub> ]<sub>STEM</sub>

[60] The stem is the domain of, among other things, stress, and the prefixal domain is subject to a heavy syllable requirement (which can be fulfilled by a consonant which is, morphologically, part of the stem domain).

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