

SOMETHING POSSIBLY UNIQUE IN HUMAN LANGUAGE:

CHEYENNE CROSS-OVER VOWELS

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Cheyenne is a heretofore little-studied member of the Algonquian language family, quite divergent from its relatives. I first learned of this cross-over vowel effect four years ago from Donald Frantz (1972a), whose major work is in the related Blackfoot language, but is a Cheyenne scholar as well, and I have been observing and studying it since then.<sup>1</sup>

The phonemic inventory consists of

Vowels	a	e	o		
Stops	p	t	k	ʔ	(unaspirated)
Nasals	m	n			
Fricatives	v	s	ʃ	x	h

There is also phonemic stress (actually a pitch-accent (Frantz 1972b) ), and the absence of stress on vowels in specific environments allows those vowels to become devoiced, or whispered. In the Cheyenne orthography, which is a modified systematic phonemic system, the accent is written thus ( ' ), and can sometimes mark a singular/plural distinction (hótame = 'dog', hotáme = 'dogs'), and the whisper-mark is written thus ( ʔ ) above vowels--except at ends of words, where devoicing is automatic--and can be heard in such words as mahtóhto = 'ten', náhtáhtóhno = 'my spine', tséhe-méšéméstovéstse = 'my grandfather', and véhpótse = 'leaf'.

All stops (and other consonants) are, as mentioned above, phonemically unaspirated. But there is a phonological process in Cheyenne by which all consonants except h can become phonetically aspirated, that is, by which aspirated consonants are generated by phonological rules.

Aspiration is often shown by a raised h following (usually) stops. This symbolization is particularly appropriate for the Cheyenne language, since the only way aspirated consonants can be generated is in

the concatenation of an unstressed, simple syllable with a second syllable beginning with h

/po/ + /ho/ → /poho/ → poho [p<sup>h</sup>o]  
 /ta/ + /ha/ → /taha/ → taha [t<sup>h</sup>a]  
 /ke/ + /he/ → /kehe/ → kêhe [k<sup>y</sup>h<sub>e</sub>]²  
 /ʔo/ + /ho/ → /ʔoho/ → ʔoho [ʔ<sup>h</sup>o]  
 /na/ + /ha/ → /naha/ → nâha [n<sup>h</sup>a] or [N<sup>h</sup>a]³  
 /xe/ + /he/ → /xehe/ → xeh [x<sup>h</sup>e]

There are some extremely complicated devoicing rules which enter into the picture here (assuming that the syllables at far left above are in antepenultimate or pre-antepenultimate positions within 'words'), the major consequence being that the (unstressed) vowels of the left syllables become devoiced according to the so-called CVF rule 4

The way the words are orthographically spelled in Cheyenne gives an extremely accurate 'feel' of the Cheyenne pronunciation--and although you do not have a full mora of whispered sound before the h, there is a longer "aspiration time" noticeable than with English aspirated stops paha, toho, kaha, šehe, xâha, ʔoho. Even following fricatives, the additional h is phonetically apparent as aspiration

I have so far given only examples in which the internal (or whispered) and external (or voiced) vowels are identical. What if they are not? We discover an amazing array of cross-over vowels (which metathesize with h and become revoiced after being devoiced), and some semi-vowel types that are found nowhere else in the grammar

The Cheyenne word for 'bear', nâhkohe [nâh-koh], with the addition of the regular -oʔo pluralizer, becomes nâhkoheoʔo, with a kohe [k<sup>h</sup>o<sup>y</sup>] complex syllable, the o crosses over the h, and the e becomes a semi-vowel

The Cheyenne word for 'cottontail rabbit' (meaning "yellow feet") is heóve-séʔtáhe [he<sup>y</sup>óWE-séʔtah], with the same -oʔo pluralizer we get heóvé-séʔtáheoʔo, with a [t<sup>h</sup>a<sup>y</sup>] syllable

Occupiers of land are manaho [manah], occupied land, with appropriate vowel change of o to adjectival-e, then has the form manáhé-hoʔe, with the first part pronounced as [man<sup>h</sup>á<sup>e</sup>]<sup>4</sup>. The medial nasal has been described by some as a voiceless nasal, but actually becomes voiceless only when word-initial, as in the word for 'house' máheoʔo [M<sup>h</sup>áʔ], otherwise it is just a nasal-h combination

Notice the word for 'hawk' aénohe [aénoh], and its plural aenóheoʔo [n<sup>h</sup>oʔ], note especially the two full beats of the initial ae sequence, which contrasts with the [a<sup>e</sup>] cited above.

And to show an aspirated velar fricative, é-hesóʔxe means 'it is slick, slippery' When an old form of 'ice' is added so that we have the meaning 'it is icy', we get é-hesóʔxê-haʔomóhta with [xʏ<sup>h</sup>o]. Also, listen to the aspiration following the esh in the middle of 'match' tšéhéšéhaseoʔo [šʏ<sup>h</sup>a].

So whenever we have, in certain positions within the word, the sequence of non-h consonant/ unstressed vowel/ -h-/ vowel, we get an aspirated consonant. If in addition the two vowels are dissimilar, e will always become a semi-vowel in either position, and a and o will always be cross-over vowels. In chart form

páhe [p <sup>h</sup> a <sup>e</sup> ]	póhe [p <sup>h</sup> o <sup>e</sup> ]	póha [p <sup>h</sup> o <sup>a</sup> ]	5
táhe [t <sup>h</sup> a <sup>e</sup> ]	tóhe [t <sup>h</sup> o <sup>e</sup> ]	tóha [t <sup>h</sup> o <sup>a</sup> ]	tséha [ts <sup>h</sup> a] <sup>6</sup>
káhe [k <sup>h</sup> a <sup>e</sup> ]	kóhe [k <sup>h</sup> o <sup>e</sup> ]	koha [k <sup>h</sup> o <sup>a</sup> ]	kéha [kʏ <sup>h</sup> a]
ʔáhe [ʔ <sup>h</sup> a <sup>e</sup> ]	ʔóhe [ʔ <sup>h</sup> o <sup>e</sup> ]	ʔóha [ʔ <sup>h</sup> o <sup>a</sup> ]	ʔéha [ʔʏ <sup>h</sup> a]
máhe [m <sup>h</sup> a <sup>e</sup> ]	móhe [m <sup>h</sup> o <sup>e</sup> ]	móha [m <sup>h</sup> o <sup>a</sup> ]	
váhe [v <sup>h</sup> a <sup>e</sup> ]	vóhe [v <sup>h</sup> o <sup>e</sup> ]	7	
xáhe [x <sup>h</sup> a <sup>e</sup> ]	xóhe [x <sup>h</sup> o <sup>e</sup> ]	xóha [x <sup>h</sup> o <sup>a</sup> ]	xéha [xʏ <sup>h</sup> a]

I have not listed all possible combinations, but other than the Caho form, there are no other surprises, the items given above are representative of all initial consonants (except h, naturally)

In all the above cases, then, although it looks like the middle vowel is whispered, in each case of a or o whispered vowel, that vowel CROSSES-OVER the h, leaving an aspirated consonant in its wake, RE-VOICES, and CAUSES THE FOLLOWING VOWEL TO BECOME A SEMI-SEGMENT

That the second vowel is indeed only a half-mora long is evident from hearing the last part of 'owls' méstaaé?o [-aeo-] in contrast with 'house' máheo?o [-a?o-], or from hearing the two-beat [-oa-] sequence in the old pronunciation of 'buffalo' hotoa?a in contrast with the [-o<sup>a</sup>-] of 'rock' ho?ohanáa?e

The only combination not yet covered is the Caho in this situation, a regular vowel assimilation rule changes the a into an open-o [ɔ]--and also tends to lower the o in that direction, as well. This gives complex syllables such as páho [p<sup>h</sup>ɔ<sup>ɔ</sup>], máho [m<sup>h</sup>ɔ<sup>ɔ</sup>], and táho [t<sup>h</sup>ɔ<sup>ɔ</sup>]. The a still crosses over, and the second vowel o still becomes a semi-segment.

Therefore, in terms of Cheyenne phonology, a CROSS-OVER VOWEL is defined as the former of two dissimilar non-front vowels in an unstressed and devoicing CVhV environment (where C ≠ h)--which vowel, instead of becoming merely devoiced as usual

- a) is fully voiced
- b) following the h-aspiration sound,
- c) forcing the second vowel to become a half-mora semi-segment within the resultant diphthong

#### POST-CONFERENCE POSTSCRIPT

Certain comments and discussions right after and since the presentation of this paper have caused me to re-think my interpretation of the above data. I think it will be more honest--as well as perhaps more instructive--to add a substantial postscript instead of totally revising this paper.

Vicki Fromkin, immediately following presentation, gently challenged me as to why my interpretation viewed the vowels as crossing over rather than the h crossing over. At the time, I could not defend my position, at this time, I can defend it even less.

After all, h-movement (or "h-hop", thanks to Wayne Leman) is a phenomenon attested in other languages, and while that indeed does not rule out a priori the "cross-over vowels" I have discussed here, I believe I can show here some data and formulations which will tend to confirm h-hop.

First, some diachronic information although there is a distinct



does the \*y become [+syl] as e (if so, this is the only example of such), or do \*ya together become e (have one other example)? I cannot solve this problem without more data--such as what the full PA plural word-shape looks like. Nonetheless, we have another example which tends us toward h-movement--if, indeed, there is any movement at all in these, my only PA cognates for this phenomenon

Wayne Leman (personal communication) has attempted a sequence of rules which might lead to the desired outcome. With his permission, I present below my own reformulation of his rules, and extend my thanks and appreciation to him for getting me thinking on these lines

The information presented in this paper can be accounted for by three rules (as well as various phonetic readjustments and the late devoicing rules--shown as #4 below)

#1--"h-hop"      C  $\begin{bmatrix} V \\ -\text{front} \\ -\text{stress} \end{bmatrix}$  h V [ ]      1 3 2  $\begin{bmatrix} 4 \\ -\text{syl} \end{bmatrix}$  5  
                   1    2    3 4 5       $\Rightarrow$       COND 1  $\neq$  3

(This rule will hop the h to the left over a or o, but will leave e to become a semi-vowel in #1A below. The end element, 5, is needed to prevent this process from happening phrase-final. The second vowel automatically becomes a semi-vowel after the hop. This rule could logically precede the devoicing rules, so that there is no need for de-voicing and then re-voicing vowels.)

#1A--"e-raising"      C  $\begin{bmatrix} V \\ +\text{front} \end{bmatrix}$  h V [ ]      1  $\begin{bmatrix} 2 \\ -\text{syl} \end{bmatrix}$  3 4 5  
                   1    2    3 4 5

#2--"pal-rul"      a    k  $\rightarrow$  k<sup>y</sup> /   e  
                   b    h  $\rightarrow$  h<sup>y</sup> / e   V, where V  $\neq$  e  
                   c    e  $\rightarrow$  y / V   V, where V  $\neq$  e

(The first two of these sub-rules are necessary for the grammar anyway, only the last being specific to the crossed-over vowel phenomenon. The output of sub-rule-b is often reprinted as a voiceless Y. Sub-rule-c then turns the e-semivowel into a y when surrounded by non-front vowels.)

#3--"semi-vowel reduction"

$$\begin{array}{ccc}
 \left[ \begin{array}{c} V \\ \alpha h_1 \\ \beta b k \\ +s y l \end{array} \right] & & \left[ \begin{array}{c} V \\ \alpha h_1 \\ \beta b k \\ -s y l \end{array} \right] \\
 \\ 
 \left[ \begin{array}{c} V \\ \alpha h_1 \\ \beta b k \\ -s y l \end{array} \right] & (C) & \left[ \begin{array}{c} V \\ \alpha h_1 \\ \beta b k \\ -s y l \end{array} \right] \\
 1 & & 2 \Rightarrow 1 \quad \emptyset
 \end{array}$$

(This accomplishes two things at once (a) it gets rid of such phonetically disprovable sequences as  $\underline{e}^e$ ,  $\underline{a}^a$ , and  $\underline{o}^o$ , and (b) when  $\underline{y}$ -semivowels are created from various sources and appear next to each other, the second one drops )

#4--"devoicing rules" I can accept this as a logical place to have these rules, my research shows de-voicing as very surfacey, late rules anyway They are much too complex to enter into this discussion (see forthcoming article, "Devoicing in Cheyenne"), but their effects will be shown in Figure 1

Considering the fact that I could show no phonological mechanism for my original interpretation, considering the fact that my original interpretation had the vowel devoicing and then re-voicing, and considering the fact that the only other interpretation and mechanism I have heretofore seen (Frantz 1972a) seems transformingly mystical to me--I must now join my critics in endorsing (for various reasons) the h-movement versus the vowel-movement Accordingly, I hereby re-christen this paper by the new title, "CHEYENNE CROSSED-OVER VOWELS".

	'coyote'	'shoes'	'house'	'nest'	'stone'
phonemic shape	/oʔkonome/	/moʔkehanote/	/maheoʔo/	/voheʔso/	/hoʔohánaaʔe/ <sup>1</sup>
phonetic readj	oʔkohome	moʔkehanotse	maheoʔo	woheʔso	hoʔohánaaʔe
#1--"h-hop"	oʔkho <sup>0</sup> me	moʔkehanotse	mha <sup>e</sup> oʔo	who <sup>e</sup> ʔso	hoʔho <sup>a</sup> náaʔe
#1A--"e-raise"		moʔkʏhanotse			
#2--"pal-ru1"		moʔkʏhʏanotse <sup>2</sup>	mhaʏoʔo		
#3--"reduction"	oʔkhome	moʔkʏhanotse			
#4--"devoicing"	oʔkhomE	moʔkʏhan0tsE	Mhaʏoʔ0	Who <sup>e</sup> ʔs0	hoʔho <sup>a</sup> náaʔE
secondary stress placement	[oʔkhomE]	[mɔʔkʏhán0tsE]	[Mhǎʏðʔ0]	[Whðeʔs0]	[hðʔho <sup>a</sup> nááʔE]

<sup>1</sup>Given the historical discussion in the Postscript of this word, we can alternatively give a phonological shape here of /hoʔhoanáaʔe/, in which case it would have to be allowed into the second (semivowel-creation) change in Rule #1, or the two processes of h-hop and semivowel-creation will have to be split into two rules

<sup>2</sup>We can assume here that either this rule "peeks" transderivationally, or it is ordered before the h-hop, but I decided to do it anyway to show possible effects of rules #3-4

Figure 1    EXAMPLES FOR NEW RULES IN CHEYENNE CROSSED-OVER VOWELS



## NOTES

<sup>1</sup>This research was supported in part by H. E. W.'s E. S. E. A. Title VII (Bilingual Education) on the Northern Cheyenne Reservation, where I held the position of Project Linguist for four years.

<sup>2</sup>Front vowel normally palatalizes k-

<sup>3</sup>See the sixth paragraph below for environments in which nasals become fully voiceless (devoiced). The notation N is used rather than phonetic n throughout this paper to show voicelessness.

<sup>4</sup>As with the following examples, the semi-vowel [e] becomes a [y] when followed by a non-front vowel.

<sup>5</sup>There is a curious, systematic lack of combinations involving labial-consonants and front-vowels as first syllable, as \*péha

<sup>6</sup>Palatalization would normally be expected here in accordance with the other forms, as [tsy<sup>h</sup>a], the e which would become palatalization is perhaps blocked by the sibilant. /te/ always → [tse]

<sup>7</sup>Perhaps through oversight, I do not have an example of a vôha combination, and therefore do not list it in this chart.

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