Toward a Reconstruction of Proto-Far-Western-Hmongic

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1. Background

White Hmong (*Hmong Daw*) and Green Hmong (*Hmong Njua*[1]) are two closely related languages of the Far Western Hmongic subgroup (also known as "Hmong Proper") of the Western Hmongic division (Chuanqiandian) of the Hmongic subfamily within the Hmong-Mien (Miao-Yao) language family. These two languages are spoken by the Hmong people group mainly located in the highlands of Laos, Thailand, and Vietnam (Center for Applied Linguistics, 2004, p. 8). A significant population of resettled Hmong expatriates (~200,000) also exists in the United States, with the largest concentrations in California, Minnesota, Wisconsin, North Carolina, and Michigan (CAL, 2004, p. 29). Current (2005) estimates of the number of Hmong in the world put the total around 4.5 million (Lemoine, 2005, p. 7).

White and Green Hmong are largely monosyllabic languages, each possessing an impressive inventory of consonants (40+) and tone/phonation-type contrasts (7+). Every syllable bears contrastive tone/phonation-type, and the only closed syllables are those with nasalized vowel nuclei: in these, [ŋ] appears as the coda. There is a striking lack of allophonic variation in both languages, as prenasalization, aspiration, and nasalization are used contrastively and the rigid syllable structure results in uniform phonotactic environments. This lends itself to a relatively straightforward orthography: the phonetically-based RPA (Romanized Popular Alphabet, developed for Hmong by missionaries) expresses each syllable as consonant/consonant cluster + vowel/diphthong + tone/phonation-type marker. Nasalized vowels are indicated by doubling the vowel symbol. The only segments for which the RPA has no symbols are the glottal stop (the onset for syllables written as vowel-initial) and [ŋ]. An RPA-IPA key can be found in the Appendix.[2]

[1] Also known as *Mong Leng*.

[2] For a more in-depth look at the phonetic inventory of Hmong, specifically Green Hmong, see http://linguistics.berkeley.edu/~dwbruhn/dwbruhn_mong_leng.pdf

2. Procedure

My goal in this undertaking was to apply the method of comparative reconstruction to White and Green Hmong in order to make some claims about their ancestor language, Proto-Far-Western-Hmongic (PFWHm). I therefore adopted the assumptions of regular sound change and of the comparative method, treating White Hmong and Green Hmong as two divergent branches of PFWHm.[3] I proceeded by analyzing approximately 400 entries[4] in four dictionaries, two White Hmong (St. Paul Public Schools; Lo & Lee) and two Green Hmong (Xiong, Xiong, & Xiong, 2002; Lyman, 1974), searching for cognates and noting phonological correspondences.

Section 3 presents the results of the search for correspondences, while my argument for a clear-cut division between White and Green Hmong is given in Section 4. I then propose a preliminary reconstruction of PFWHm in Section 5 and conclude the paper in Section 6.

3. Correspondences

It should be noted that White and Green Hmong are so similar that a search for correspondences is actually a search for "divergences." Where White and Green share an identical form, there is not much to be learned, while the most interesting cases are those in which the cognates differ by at least one segment/tone. It is the latter case on which I will focus, and one may safely assume that, for the most part, unmentioned segments/tones are identical between White and Green Hmong.[5]

3.1 Consonant Correspondences

The first consonant correspondences are unconditional (in both directions) and involve the White Hmong *d* [d] & *dh* [d^h], which correspond to the Green Hmong segments *dl* [tl] & *dlh* [$t\underset{\circ}{l}^h$]:[6]

[3] Evidence suggesting this to be a relatively accurate assumption is provided in Section 4.

[4] Database available upon request.

[5] There are some minor exceptions to this generalization, but the correspondences are not nearly as robust as those presented here (and some might be typos).

[6] Note that, with the exception of coda [ŋ], every phonetic segment/tone in Hmong is contrastive. Due to this general lack of allophony, the symbols [ ] are basically interchangeable with / /.

Correspondence (W – G)	White	Green	Meaning
d - tl	*dub* [du^{45}]	*dlub* [tlu^{45}]	black
	daig [daɻ^{33}]	*dlaig* [tlaɻ^{33}]	to stop, plug up
d^{h} - t̬^{h}	*dhos* [d^{h}ɑ^{33}]	*dlhos* [t̬^{h}ɑ^{33}]	to fit together

A second relationship is found in the White Hmong voiceless nasals *hm* [m̥], *hn* [n̥], & *hny* [ɲ̥] and voiced nasals *m* [m], *n* [n], & *ny* [ɲ], with both sets corresponding to the Green Hmong voiced nasals *m* [m], *n* [n], & *ny* [ɲ]:

Correspondence (W – G)	White	Green	Meaning
m̥ - m	*Hmoob* [m̥ɔ̃ŋ^{45}]	*Moob* [mɔ̃ŋ^{45}]	Hmong
	hmo [m̥ɑ^{44}]	*mo* [mɑ^{44}]	night
n̥ - n	*hno* [n̥ɑ^{44}]	*no* [no^{44}]	to pierce
	hnub [n̥u^{45}]	*nub* [nu^{45}]	sun, daytime
ɲ̥ - ɲ	*hnya* [ɲ̥a^{44}]	*nyaa* [ɲãŋ^{44}]	heavy
	hnyuv [ɲ̥u^{24}]	*nyuv* [ɲu^{24}]	intestine
m - m	*mov* [mɑ^{24}]	*mov* [mɑ^{24}]	cooked rice
	mlom [mlo̱^{31}]	*mlom* [mlo̱^{31}]	idol, statue
n - n	*nug* [nu̱^{33}]	*nug* [nu̱^{33}]	to ask, question
	nuv [nu^{24}]	*nuv* [nu^{24}]	to fish
ɲ - ɲ	*nyiaj* [ɲiə^{52}]	*nyaj* [ɲa^{52}]	money, silver
	nyooj [ɲɔ̃ŋ^{52}]	*nyooj* [ɲɔ̃ŋ^{52}]	to grumble, growl

Finally, Green Hmong *nt* [^{n}t] and *ndl* [^{n}tl] both correspond to White Hmong *nt* [^{n}t]:

Correspondence (W – G)	White	Green	Meaning
^{n}t - ^{n}t	*ntug* [^{n}tu̱^{33}]	*ntug* [^{n}tu̱^{33}]	edge, border
	ntom [^{n}to̱^{31}]	*ntom* [^{n}to̱^{31}]	tight, close together
^{n}t - ^{n}tl	*ntub* [^{n}tu^{45}]	*ndlub* [^{n}tlu^{45}]	to doze off
	ntiv [^{n}ti^{24}]	*ndliv* [^{n}tli^{24}]	to flick with finger

3.2 Vowel Correspondences

Vowel correspondences between White and Green are also very evident and robust. Whenever a White Hmong word contains the vowel *ia* [iə], the Green Hmong cognate unconditionally contains *a* [a]:

Correspondence (W – G)	**White**	**Green**	**Meaning**
iə - a	*iab* [ʔiə^{45}]	*ab* [ʔa^{45}]	bitter
	ciav [ciə^{24}]	*cav* [ca^{24}]	pipe, water line
	npliag [^{n}pliə̯^{33}]	*nplag* [^{n}plą^{33}]	slippery / accurate
	hnia [n̥iə^{44}]	*na* [na^{44}]	to smell

Those instances of Green *a* [a] that are not related to White *ia* [iə] find their correspondence in White *ai* [aɪ]. Note, however, that White *ai* [aɪ] corresponds to both Green *a* [a] and *ai* [aɪ]:[7]

Correspondence (W – G)	**White**	**Green**	**Meaning**
aɪ - a	*qaib* [qaɪ^{45}]	*qab* [qa^{45}]	chicken
	hais [haɪ^{33}]	*has* [ha^{33}]	to say / to scoop out
aɪ - aɪ	*faib* [faɪ^{45}]	*faib* [faɪ^{45}]	to share, divide
	hlais [ɬaɪ^{33}]	*hlais* [ɬaɪ^{33}]	to cut

There also exists an unconditional, bidirectional correspondence between White *a* [a] and Green *aa* [ãŋ]:

Correspondence (W – G)	**White**	**Green**	**Meaning**
a - ãŋ	*av* [ʔa^{24}]	*aav* [ʔãŋ^{24}]	dirt, mud
	dab [da^{45}]	*dlab* [tlãŋ^{45}]	demon, ghost
	fav [fa^{24}]	*faav* [fãŋ^{24}]	to dislike, detest
	ncab [^{n}ca^{45}]	*ncaab* [^{n}cãŋ^{45}]	crooked, bent

When a White Hmong word contains *o* [ɑ], the Green Hmong cognate may contain *o* [ɑ] or *u* [u]. When the White word has *u* [u], however, the Green cognate always has *u* [u]:

[7] These correspondence relationships are laid out in a less confusing manner in Section 3.4.

Correspondence (W – G)	White	Green	Meaning
ɑ - ɑ	*choj* [cʰɑ^{52}]	*choj* [cʰɑ^{52}]	bridge
	hmlos [m̰l̰ɑ^{33}]	*mlos* [mlɑ^{33}]	dented, distorted
ɑ - u	*pom* [pɑ̰^{31}]	*pum* [pṵ^{31}]	to see
	nto [ⁿtɑ^{44}]	*ntu* [ⁿtu^{44}]	to spit
u - u	*nruj* [ⁿʈu^{52}]	*nruj* [ⁿʈu^{52}]	tight, tense
	hnyuv [ɲ̰u^{24}]	*nyuv* [ɲu^{24}]	intestine

Finally, although not reflected in the orthography, the Green Hmong pronunciation of RPA *e* is [ɛ], while in White Hmong it is [e]:[8]

Correspondence (W – G)	White	Green	Meaning
e - ɛ	*peb* [pe^{45}]	*peb* [pɛ^{45}]	we / us / our
	nplej [ⁿple^{52}]	*nplej* [ⁿplɛ^{52}]	unhulled rice

3.3 Tone/Phonation-Type Correspondence

A final correspondence involves White Hmong words bearing the mid s-tone: Green Hmong cognates may bear either the same s-tone or the mid breathy g-tone. Some Green Hmong words bearing the mid breathy g-tone, however, are cognate with White Hmong words also bearing the g-tone:

Correspondence (W – G)	White	Green	Meaning
-s – -s	*caws* [caɨ^{33}]	*caws* [caɨ^{33}]	to set a trap
mid – mid	*kas* [ka^{33}]	*kaas* [kãŋ^{33}]	maggots, larva
-s – -g	*kaus* [kaʊ^{33}]	*kaug* [kaṵ^{33}]	sprout, shoot
mid – mid breathy	*dos* [dɑ^{33}]	*dlog* [tlo̰^{33}]	onion
-g – -g	*log* [lo̰^{33}]	*log* [lo̰^{33}]	to bury in the ground
mid breathy – mid breathy	*dag* [da̰^{33}]	*dlaag* [tlãŋ^{33}]	to cheat, deceive

[8] Thanks to John Vang, a speaker of both Green (L1) and White Hmong (L2), for bringing this to my attention.

3.4 Summary of Correspondences

These correspondences are summarized as follows:

White	Green
d [d]	*dl* [tl]
dh [d^{h}]	*dlh* [t$\underset{\circ}{\text{l}}^{h}$]
hm [$\underset{\circ}{\text{m}}$]	*m* [m]
m [m]	*m* [m]
hn [$\underset{\circ}{\text{n}}$]	*n* [n]
n [n]	*n* [n]
hny [$\underset{\circ}{\text{ɲ}}$]	*ny* [ɲ]
ny [ɲ]	*ny* [ɲ]
nt [^{n}t]	*nt* [^{n}t]
nt [^{n}t]	*ndl* [^{n}tl]
ia [iə]	*a* [a]
ai [aɪ]	*a* [a]
ai [aɪ]	*ai* [aɪ]
a [a]	*aa* [ãŋ]
o [ɑ]	*o* [ɑ]
o [ɑ]	*u* [u]
u [u]	*u* [u]
e [e]	*e* [ɛ]
-s (mid)	-s (mid)
-s (mid)	-g (mid breathy)
-g (mid breathy)	-g (mid breathy)

4. Green Hmong: Dialect of White or Separate Language?

4.1 Dialect Analysis

Given the tendency of contrasts that appear in White Hmong to be neutralized in Green Hmong, it is tempting to treat Green as merely a dialect of White. Indeed, it is often reported that White Hmong speakers have more difficulty understanding Green Hmong than Green Hmong speakers have with comprehending White Hmong (John Vang, p.c., 9/17/06; Hmong Cultural Center). An analysis of Green as a dialectal divergence from White would be consistent with this observation.

An illustration of this claim can be found in the homophony produced by such contrast neutralizations. For example, the White Hmong forms *lis* [li^{33}] 'to handle, do' and *lig* [l̤i^{33}] 'late, tardy' both correspond to the single Green Hmong word *lig* [l̤i^{33}] 'late, tardy / to take responsibility for, do.' The dialect analysis would propose that *lis* underwent an s-tone > g-tone change after Green split from White, creating a homophone with the existing word *lig*. This type of homophony in Green is very evident in the data:

White	**Green**	**Proposed W > G dialect change**
huv [hu^{24}] 'clean, tidy'	*huv* [hu^{24}]	*o* > *u*
hov [hɑ^{24}] 'to sharpen'	'clean, tidy / to sharpen'	[ɑ] > [u]
mab [ma^{45}] 'raccoon / non-Hmong'	*maab* [mãŋ^{45}]	*hm* > *m*
hmab [m̥a^{45}] 'vine, vines'	'civet-cat / non-Hmong / creeper'	[m̥] > [m]
nab [na^{45}] 'snake'	*nab* [na^{45}]	*hn* > *n*
hnab [n̥a^{45}] 'bag, sack'	'snake / bag, sack'	[n̥] > [n]
neeg [nɛ̤̃ŋ^{33}] 'people, person'	*neeg* [nɛ̤̃ŋ^{33}]	-s > -g
nees [nẽŋ^{33}] 'horse'	'people, person / horse'	mid > mid breathy

There is significant counterevidence to this claim, however, suggesting that Green Hmong and White Hmong are actually separate descendants of a proto language. I present arguments for this alternative analysis in the next section.

4.2 Separate Languages

The first problem with the dialect hypothesis is the fact that an analysis of the proposed changes yields no consistent conditioning environments whatsoever for the non-unconditional

changes. If some White Hmong words with *o* [ɑ] changed to *u* [u] in Green, they did so at random, with no phonotactic triggers. The same is true of the proposed -s (mid) > -g (mid breathy) change. If this were true, it would be a violation of regular sound change – an unnecessary and dangerous conclusion when the comparative method provides us with an alternative.

Second, vowels are known to be common targets for sociolinguistic variation. However, the fact that Green differs from White not only in vowel qualities, but also in phonation types and consonants, indicates that the two must have been separated for a significant amount of time. If Green did indeed split off from White at some point in history and develop consonant/phonation-type changes, then one is forced to admit that this would be long enough for White to do the same, thus necessitating application of the comparative method.

Third, another problem for the dialect analysis involves the White *nt* [ⁿt] – Green *nt* [ⁿt] / *ndl* [ⁿtl] correspondence, which shows homophony in the White forms:

White	**Green**	**Proposed W > G dialect change**
ntas [ⁿta^{33}] 'to make waves / a carrying pole'	*ndlaas* [ⁿtlãŋ^{33}] 'to make waves'	semantics-sensitive *nt* [ⁿt] > *nt* [ⁿt] / *ndl* [ⁿtl] split?
	ntaas [ⁿtãŋ^{33}] 'a carrying pole'	
ntub [ⁿtu^{45}] 'to doze off / to wet'	*ndlub* [ⁿtlu^{45}] 'to fall asleep'	
	ntub [ⁿtu^{45}] 'to wet, moisten'	

If Green were a development of White, one would have to propose that phonemic sound change has the ability to split homophones into two phonetically distinct words – not very likely.

The fact that homophones seem to be more prevalent in Green than in White Hmong is likely due to the fact that my primary Green dictionary (Xiong, et al., 2002) is much smaller than most White dictionaries.[9] It is reasonable to assume that, with a larger Green dictionary, one would discover many more homophones in White corresponding to separate words in Green.

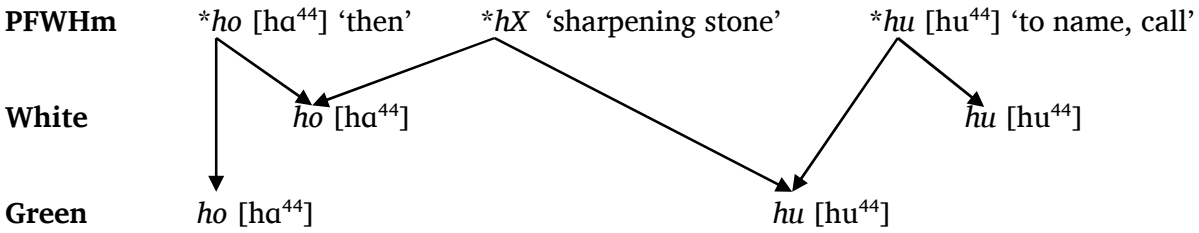
[9] White Hmong being the more socially dominant form of Hmong, this is not surprising. Even the word "Hmong," in fact, is the White form: in Green, the word is *Moob* "Mong." This tends to be a point of contention among the (H)mong. (In America, at least, where they're not being hunted down by the Lao government and have time to debate terminology.)

A final nail in the coffin of the dialect hypothesis also serves as evidence for a proto-language analysis. In certain pairs of forms in White Hmong, the first word has an extra meaning that seems to have "jumped" to the second word in the Green correspondents, where the second word in Green could be a correspondent of either the first or second word in White. This is schematized and exemplified below (C = correspondent, M = meaning):

White	Green
C_1: M_1, **M_3**	C_1: M_1
C_2: M_2	$C_{1,2}$: M_2, **M_3**

White	**Green**
ho [hɑ^{44}] 'then / **sharpening stone**'	*ho* [hɑ^{44}] 'then'
hu [hu^{44}] 'to name, call'	*hu* [hu^{44}] 'to name, call / **sharpening stone**'
cos [cɑ^{33}] 'wart / **treadmill for pounding rice**'	*cos* [cɑ^{33}] 'wart, pimple'
cug [cɯ^{33}] 'to collect in container'	*cug* [cɯ^{33}] 'to collect in vessel / **treadmill**'
ntuag [^{n}tɔ̯ə̯^{33}] 'to rip, tear / **hemp**'	*ndluag* [^{n}tlɔ̯ə̯^{33}] 'to rip, tear'
ntuas [^{n}tɔə^{33}] 'to lecture, advise'	*ntuag* [^{n}tɔ̯ə̯^{33}] 'to advise, teach / **hemp**'

This cannot be explained by any sort of White > Green or Green > White development hypothesis, but each set provides clear evidence for the presence of an extra segment/tone in Proto-Far-Western-Hmongic that merged with one segment/tone in White and another in Green. For instance, the first example lends itself to the following reconstruction, where *X* represents an unknown vowel between *o* [ɑ] and *u* [u]:

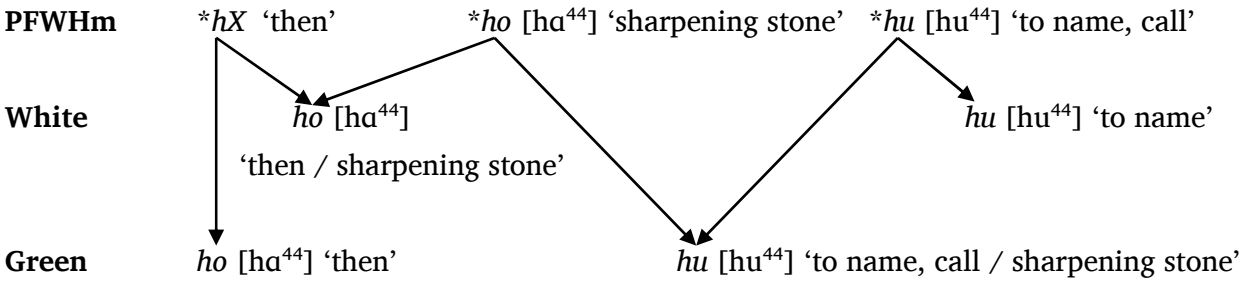


The overwhelming body of evidence therefore points to Green Hmong and White Hmong as descendants of a common ancestor language. I present a preliminary reconstruction of PFWHm in the next section.

5. Proposed Reconstruction of Proto-Far-Western-Hmongic

5.1 Rationale

It is important to note that the reconstruction depicted in the previous section, in which the PFWHm form **hX* diverges in White and Green, is not the only option. One might also propose the following development in which the proto-forms are different:



In the above analysis, PFWHm **X* merges with *o* [ɑ] in White, yielding the homophone *ho* [hɑ^{44}] 'then / sharpening stone,' while PFWHm **u* [u] remains *u* [u] in White. In Green, PFWHm *o [ɑ] merges with *u* [u] (yielding the homophone *hu* [hu^{44}] 'to name, call / sharpening stone'), thereby allowing (or reacting to) PFWHm **X* > Green *o* [ɑ].

However, this reconstruction violates Occam's razor by positing three changes, two of which are common innovations in separate languages:

PFWHm **X* > White *o* [ɑ]

PFWHm **X* > Green *o* [ɑ]

PFWHm **o* [ɑ] > Green *u* [u]

(Note that the PFWHm **X* > *o* [ɑ] change must be a common innovation, and cannot be said to have occurred within PFWHm. Otherwise, there would be no way to explain the divergent behavior of the now-merged PFWHm **o* in White and Green.)

The previous analysis (Section 4.2), in contrast, only posits two changes, which are different for White and Green: PFWHm **X* > White *o* [ɑ] and PFWHm **X* > Green *u* [u]. This type of reconstruction, therefore, in which two divergent segments in a set of three correspondences are assumed to be reflexes of an entirely different proto-segment, is the one I will present.[10]

[10] It is interesting to note that the reconstruction which violates Occam's razor is the exact behavior of the Romani sibilants (Ling 230 handout from 4/30), so perhaps one should not rule it out so quickly.

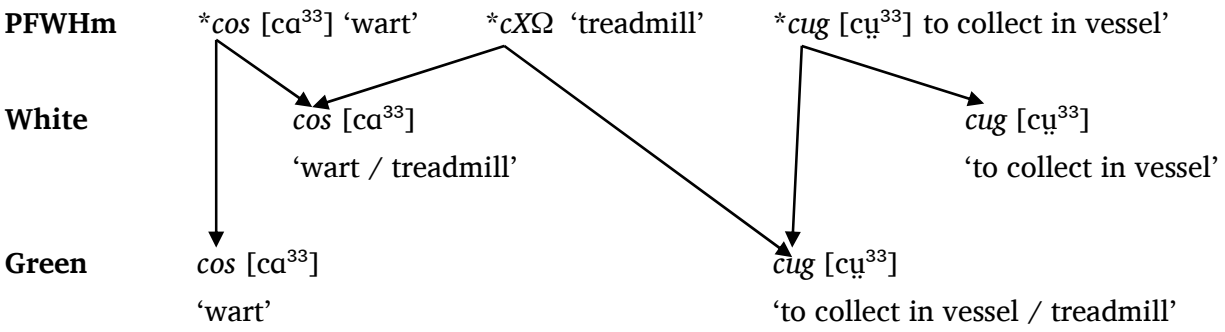
5.2 Reconstructed Segments

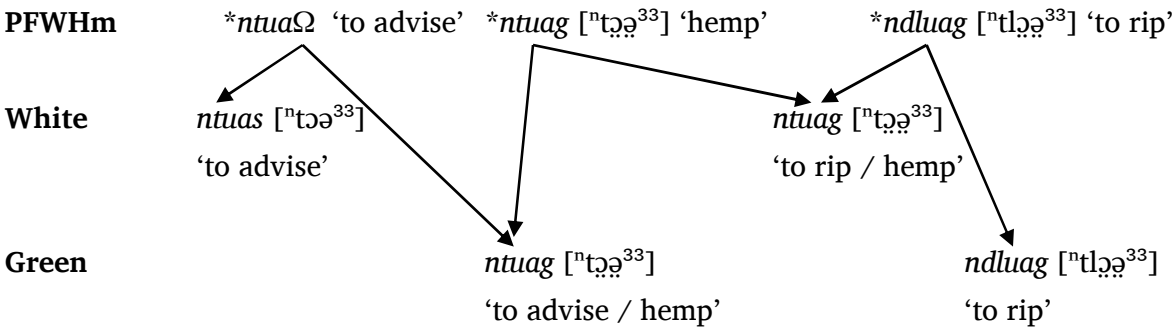
In the reconstruction that follows, I have (perhaps futilely) attempted to ascertain the original phonetic qualities (à la Hock, but contra Bloomfield):

White	Green	PFWHm	Comments
d [d]	*dl* [tl]	**Dl* [dl]	([l]-cluster simplified in White; [d] devoiced in Green)
dh [d^{h}]	*dlh* [t$\underset{\circ}{\text{l}}^{h}$]	**Dlh* [d$\underset{\circ}{\text{l}}^{h}$]	([l]-cluster simplified in White; [d] devoiced in Green)
hm [m̥]	*m* [m]	**hm* [n̥]	(voicing contrast neutralized in
m [m]	*m* [m]	**m* [m]	Green but preserved in White)
hn [n̥]	*n* [n]	**hn* [n̥]	(voicing contrast neutralized in
n [n]	*n* [n]	**n* [n]	Green but preserved in White)
hny [ɲ̥]	*ny* [ɲ]	**hny* [ɲ̥]	(voicing contrast neutralized in
ny [ɲ]	*ny* [ɲ]	**ny* [ɲ]	Green but preserved in White)
nt [^{n}t]	*nt* [^{n}t]	**nt* [^{n}t]	([l]-cluster contrast neutralized
nt [^{n}t]	*ndl* [^{n}tl]	**ndl* [^{n}tl]	in White, preserved in Green)
ia [iə]	*a* [a]	**ia* [iə]	(monophthongized in Green)
ai [aɪ]	*a* [a]	**A* [ɑɪ]	(merged with W [aɪ] & G [a])
ai [aɪ]	*ai* [aɪ]	**ai* [aɪ]	(preserved in both W & G)
a [a]	*aa* [ãŋ]	**a* [a]	(nasalized in Green)
o [ɑ]	*o* [ɑ]	**o* [ɑ]	
o [ɑ]	*u* [u]	**X* [ɔ]	(orig. vowel between [ɑ] & [u])
u [u]	*u* [u]	**u* [u]	
e [e]	*e* [ɛ]	**e* [e]	(laxed in Green)

-s (mid)	-s (mid)	*-s (mid)
-s (mid)	-g (mid breathy)	*-Ω (mid tense)
-g (mid breathy)	-g (mid breathy)	*-g (mid breathy)

As a final example of the complicated semantic relationships among PFWHm, White Hmong, and Green Hmong, here are schematized reconstructions of the other two forms from the table in Section 4.2:





6. Conclusion

In this paper, I have attempted to apply the comparative method in reconstructing several segments/tones of Proto-Far-Western-Hmongic, based on some of the correspondences I discovered between White Hmong and Green Hmong. The presence of homophony in the daughter languages was both a key factor in eliminating the hypothesis that Green Hmong is a dialect of White Hmong as well as a crucial aid to determining the presence of extra segments in PFWHm.

It is important to note, however, that such an analysis relies on the assumption of semantic stability. It is therefore possible that an investigation of semantic shifts in White and Green Hmong would yield results necessitating drastic alteration of the reconstruction developed here. However, I will leave that investigation for the future.

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Appendix: RPA-IPA key

The following modified version of the RPA accommodates both White and Green Hmong:

Rimes

RPA	IPA
i	i
w	ɨ
u	u
e	e ; ɛ
a	a
o	ɑ
ai	aɪ
au	aʊ
aw	aɨ
ia	iə
ua	ɔə
aa	ãŋ
oo	ɔ̃ŋ
ee	ẽŋ

Tones/Phonation-Types

RPA	IPA
-b	˥ (45)
-j	˦˥ (52, tense)
-v	˦ (24)
-	˧ (44)
-s	˧ (33)
-g	˨˨˧ (33 breathy)
-m	˨̰˩ (31 creaky)
-d	˩˦ (213)

Onsets

RPA	IPA
p	p
ph	p^h
np	^{n}p / mp
nph	$^n p^h$ / mp^h
t	t
th	t^h
nt	^{n}t / nt
nth	$^n t^h$ / nt^h
d	d
dh	d^h
r	ʈ
rh	$ʈ^h$
nr	^{n}ʈ / ɳʈ
nrh	$^n ʈ^h$ / $ɳʈ^h$
c	c
ch	c^h
nc	^{n}c / ɲc
nch	$^n c^h$ / $ɲc^h$
k	k
kh	k^h
nk	^{n}k / ŋk
nkh	$^n k^h$ / $ŋk^h$

RPA	IPA
q	q
qh	q^h
nq	^{n}q / ɴq
nqh	$^n q^h$ / ɴq^h
f	f
v	v
x	s
s	ʃ
z	ʒ
xy	ç
h	h
m	m
hm	m̥
l	l
hl	ɬ
n	n
hn	n̥
ny	ɲ
hny	ɲ̥
y	j
tx	ts
txh	ts^h
ntx	^{n}ts / nts
ntxh	$^n ts^h$ / nts^h
ts	tʃ
tsh	$tʃ^h$
nts	^{n}tʃ / ntʃ
ntsh	$^n tʃ^h$ / $ntʃ^h$
pl	pl
plh	$pl̥^h$

RPA	IPA
npl	^{n}pl / mpl
nplh	$^n pl̥^h$ / $mpl̥^h$
dl	tl
dlh	$tl̥^h$
ndl (nkl)	^{n}tl / ntl
ndlh (nklh)	$^n tl̥^h$ / $ntl̥^h$ (unattested)
ml	ml
hml	m̥̥l̥