Using Phasal Syntax to Make Generalizations in Manchu Vowel Harmony

Jack Isaac Rabinovitch and Baoqing Qian

1. Introduction

Manchu (Southern Tungusic) is a nearly extinct agglutinating language spoken in the People's Republic of China with a complex system of vowel harmony, including both primary ATR harmony and secondary labial (rounding) harmony (Zhang 1996). In both linguistic analyses and in traditional pedagogy, Manchu vowel harmony is often considered to be highly irregular, with many words containing vowels which mismatch in [ATR] features. This is particularly true of words which contain the imperfective participal suffix /rA/, which often contradicts the expected vowel harmonic rules (von Möllendorff 1892:10-11, Jì et al. 1986:86, Gorelova et al. 2002:96). With the population of native speakers decreasing, the ability for heritage learners to internalize complex systems effectively and efficiently is advantageous to the continued usage of Manchu among younger speakers.

In this paper, we analyze the vowel harmony of standard Classical Manchu, based on written Manchu, and suggest that much of what was previously considered irregularities in both linguistic analyses and in traditional pedagogies actually follow a regular pattern in which mismatches in vowel class are brought about through early spell-out mediated by a phase head in the form of the imperfective participial suffix. The complement of the imperfective head is sent to PF before more material is attached to the stem, similar to Fenger (2020)'s analysis of stress and pitch accent in Turkish and Japanese verbs respectively. At PF, a filter is imposed which causes high [−ATR] vowels to become [+ATR]. Typically transparent high vowels become opaquely [+ATR], enforcing [+ATR] harmony in any following suffixes, regardless of the [ATR] value of the root. We argue that the existence of the marginal high [−ATR] vowel [ʊ] in Manchu is caused by post-phonemic lowering after uvulars as seen in languages like Quechua (Gallagher 2016). Vowel harmony data was collected from several texts, including novels, poetry, and political and historical documents ranging from 1623 to 1913.

We include an analysis of the pedagogical approach to vowel harmony in four pedagogically oriented grammar books, as well as our preliminary discussions with three Manchu language teachers on how they teach vowel harmony. Traditional pedagogies tend to emphasize a division of vowel classes for which words that contain vowels belonging to multiple classes are considered 'irregular', resulting in a high number of irregular forms which are expected to be memorized. We suggest that the generalizations which arise naturally from this analysis can be adapted for pedagogical purposes and integrated into currently existing curricula to help streamline the internalization process of acquiring vowel harmony.

2. Manchu Vowel Harmony

Written Manchu boasts six vowels, [a], [ə], [i], [ɔ], [u], and [ʊ], represented each with distinct graphemes (with Möllendorff romanization as ⟨a⟩, ⟨e⟩, ⟨i⟩, ⟨o⟩, ⟨u⟩, and ⟨ū⟩[1] respectively), though [ʊ] is often considered an allophone of /u/ (Ligeti 1952; Ard 1984). Both ATR and labial harmony in Manchu

* Jack Isaac Rabinovitch, Harvard University. Baoqing Qian, Newton Chinese Language School. For questions, contact Jack Isaac Rabinovitch at jrabinovitch@g.harvard.com. We would like to thank Ulhisu, Biao Jin, and Shiyao Sun, who gave their invaluable help in discussing traditional Manchu vowel harmony pedagogy with us, as well as the organizers and attendees at the 39th meeting of the West Coast Conference on Formal Linguistics (WCCFL) for their insightful comments.

[1] ⟨ū⟩, representing [ʊ], is also often romanized as ⟨ô⟩ and ⟨v⟩ by other romanization schemes.

 Proceedings of the 39th West Coast Conference on Formal Linguistics, ed. Robert Autry et al., 362-370. Somerville, MA: Cascadilla Proceedings Project.

apply rightward from roots to suffixes. In typical cases of Manchu vowel harmony, [a], [ɔ], and [ʊ] trigger [−ATR] harmony, [ə] triggers [+ATR] harmony, and [i] and [u] are transparent. Dorsal consonants additionally trigger and undergo ATR harmony, where velars are [+ATR] and uvulars are [−ATR]. Two syllable adjacent non-diphthong [ɔ] triggers [+LAB] harmony. High vowels, ([i], [u], and [ʊ]) are opaque to labial harmony and prevent further harmonization rightwards (1).

(1) Triggers for ATR and labial harmony

a, ɔ, ʊ, q, ɢ, χ, ɴ	trigger [−ATR]
ə, k, g, x, ŋ	trigger [+ATR]
u, i	neutral for [ATR]
ɔC(C)ɔ	trigger [+LAB]
ʊ, u, i	opaque to [LAB]

(2) Harmony of Affected Segments

	+ATR −LAB	−ATR −LAB	−ATR +LAB
A	ə	a	ɔ
U	u	ʊ	
I	i		
K/G/H/N	k/g/x/ŋ	q/ɢ/χ/ɴ	

[a] is the [−ATR] counterpart of the [+ATR] [ə], and [ʊ] is the [−ATR] counterpart of the [+ATR] [u]. [ɔ] is the [+LAB] counterpart to [a]. Because the only trigger for labial harmony also triggers [−ATR] harmony, there are no [+ATR, +LAB] segments. [i] does not change depending on environment (2). Roots which contain no ATR specified segments (only having the vowels [i] and [u] and no dorsal consonants) have an arbitrary ATR value, as noted by the difference between the last two columns in (3), with [+ATR] [tutɕi] "to come out" and [−ATR] [ili] "to stand".

(3)

Environment	Result	Example	Gloss
Following /ɔC(C)ɔ/	[−ATR, +LAB]	/tɔqtɔ-HA/ → [tɔqtɔ-χɔ]	be.fixed-PFV
Otherwise following /ɔ/	[−ATR, −LAB]	/dzɻɔ-HA/ → [dzɻɔ-χa]	cut-PFV
Following /ʊ/	[−ATR, −LAB]	/ɢasχʊ-HA/ → [ɢasχʊ-χa]	take.oath-PFV
Following /a/	[−ATR, −LAB]	/ta-HA/ → [ta-χa]	be.caught-PFV
Following /ə/	[+ATR, −LAB]	/tə-HA/ → [tə-xə]	live-PFV
Neutral vowel [+ATR] Roots	[+ATR, −LAB]	/udʑi-HA/ → [udʑi-xə]	nourish-PFV
Neutral vowel [−ATR] Roots	[−ATR, −LAB]	/ili-HA/ → [ili-χa]	stand-PFV

While [u] and [ʊ] are ATR counterparts of one another, except for a few non-productive exceptions, [ʊ] only ever occurs after uvular consonants. We assume, like Ard (1984), that [ʊ] is an allophone of /u/. As a result, /u/ is realized as [u] even in [−ATR] environments, except where there is a preceding uvular consonant; for example, the causative suffix /bu/ is always realized as [bu] regardless of the [ATR] value of the stem it attaches to. Similar to [i], [u] is effectively transparent to ATR harmony (4).

(4)

Environment	Example	Gloss
Following /ɔC(C)ɔ/	/tɔqtɔ-bU-HA/ → [tɔqtɔ-bu-χa]	be.fixed-CAUS-PFV
Otherwise following /ɔ/	/dzɻɔ-bU-HA/ → [dzɻɔ-bu-χa]	cut-CAUS-PFV
Following /ʊ/	/ɢasχʊ-bU-HA/ → [ɢasχʊ-bu-χa]	take.oath-CAUS-PFV
Following /a/	/ta-bU-HA/ → [ta-bu-χa]	be.caught-CAUS-PFV
Following /ə/	/tə-bU-HA/ → [tə-bu-xə]	live-CAUS-PFV
Neutral vowel [+ATR] Roots	/udʑi-bU-HA/ → [udʑi-bu-xə]	nourish-CAUS-PFV
Neutral vowel [−ATR] Roots	/ili-bU-HA/ → [ili-bu-χa]	stand-CAUS-PFV

The only harmony that an intermediate [u] (and the other neutral vowel, [i]) disrupts is labial harmony.

2.1. An Imperfect(ive) System

While this account so far accurately describes most nominal and verbal suffixation, it fails to account the suffixation of the imperfective participial suffix. This suffix, /rA/, while subject to both labial and ATR vowel harmony, patterns differently from other suffixes. Any stem which ends in [i], [u], and [ʊ] (as well as [ɔ] when not in the [ɔC(C)ɔ] form) causes [+ATR] harmony in the imperfective participle, even when the stem is otherwise specified as [−ATR]. As a result, the perfective and imperfective endings for

a given stem often mismatch in their vowel harmomy values (5); the causative imperfective form of all stems is the [+ATR] form due to opacity from the [u] in the causative suffix.

(5)

Environment	Perfective	Imperfective	Caus. Perfective	Caus. Imperfective
Following /ɔC(C)ɔ/	[tɔqtɔ-χɔ]	[tɔqtɔ-rɔ]	[tɔqtɔ-bu-χa]	[tɔqtɔ-bu-rə]
Otherwise following /ɔ/	[dʐɔ-χa]	[dʐɔ-rə]	[dʐɔ-bu-χa]	[dʐɔ-bu-rə]
Following /ʊ/	[ɢasχʊ-χa]	[ɢasχʊ-rə]	[ɢasχʊ-bu-χa]	[ɢasχʊ-bu-rə]
Following /a/	[ta-χa]	[ta-ra]	[ta-bu-χa]	[ta-bu-rə]
Following /ə/	[tə-xə]	[tə-rə]	[tə-bu-xə]	[tə-bu-rə]
Neutral vowel [+ATR]	[udʑi-xə]	[udʑi-rə]	[udʑi-bu-xə]	[udʑi-bu-rə]
Neutral vowel [−ATR]	[ili-χa]	[ili-rə]	[ili-bu-χa]	[ili-bu-rə]

This results in some interestingly counterintuitive derivations. For instance, [ɔmi] "to drink" typically spreads [−ATR], unless it is followed immediately by an imperfective participial suffix, in which case the suffix is realized [rə]. However, by adding the associative suffix /tʂA/ (glossed ASS), between the root and imperfective suffix, the intermediate [a] ending enforces [−ATR] spreading into /rA/.

(6)
a. /ɔmi-HA/ > [ɔmi-χa] (drink-PFV, "having drunk")
b. /ɔmi-rA/ > [ɔmi-rə] (drink-IPFV, "drinking")
c. /ɔmi-tʂA-rA/ > [ɔmi-tʂa-ra] (drink-ASS-IPFV, "drinking together")

Any material that subsequently attaches to a stem with /rA/ will follow vowel harmony according to the form of /rA/.

(7)
a. /jabu-rA-lA/ > [jabu-rə-lə] (walk-IPFV-REL, "which one walks (to)")
b. /sa-rA-lA/ > [sa-ra-la] (know-IPFV-REL, "which one knows")

Finally, stems which end in diphthongs act as though the coda glide, namely [w] (in diphthongs, written with the same grapheme as [ɔ], romanized ⟨o⟩) or [j] (in diphthongs, written with the same grapheme as [i], romanized ⟨i⟩), were their high vowel equivalent, [u] and [i] respectively: labial harmony is blocked, while ATR harmony is not, unless followed by the imperfective participial suffix.

(8)

Environment	Stem	Perfective	Imperfective
[ɔ]+glide	/dɔw/, "to cross"	[dɔw-χa]	[dɔw-rə]
[a]+glide	/ɢaj/, "to take"	[ɢaj-χa]	[ɢaj-rə]
[ə]+glide	/nəw/, "to roam"	[nəw-xə]	[nəw-rə]
[u]+glide	/suj/, "to knead"	[suj-xə]	[suj-rə]

3. Analysis

3.1. Explaining the Typical Cases

Gorelova et al. (2002) notes that in other Tungusic languages, [+ATR] [i] contrasts with its [−ATR] counterpart [ɪ]. This is true of several dialects of Evenki (Konstantinova 1964), Even (Novikova & Sunik 1960:52), and Nanai (Avrorin 1959). Additionally, the dialect of Oroqen which Zhang et al. (1989) discusses lacks [i] but has [ɪ] which is neutral for the purposes of vowel harmony. We assume that like its genetic cousins, /ɪ/ and /i/ are distinguished in Manchu underlyingly, but are neutralized upon pronounciation. Vowels pronounced [i] in [−ATR] roots such as [ili] "to stand" can be explained as being underlyingly /ɪ/, deriving their [−ATR] behavior (9). Thus we can derive the 'arbitrariness' of [+ATR] and [−ATR] specification in neutral vowel only stems; similar to the neutralization of strong-i and weak-i in Iñupiaq (Kaplan 1981:31), two distinct phonemes affect phonological processes differently but surface as the same phone.

(9)
a. /udʑi-HA/ → [udʑi-xə] (nourish-PFV, "having nourished")
b. /ɪlɪ-HA/ → [ɪlɪ-χa] → [ili-χa] (stand-PFV, "having stood")

We treat [ʊ] and [u] the same way, with the addendum that /U/ neutralizes to [ʊ] in the case of following a uvular consonant (10). Thus, all vowels are underlyingly affected by ATR harmony.

(10) a. /ara-bU-HA/ → [ara-bʊ-χa] → [ara-bu-χa] (write-CAUS-PFV, "having made write")
b. /ana-KU/ → [ana-qʊ] (push-NMZ, "key")

The allophony between [ʊ] and [u] can be explained as lowering after uvulars, something which has a typological precedent (Gallagher 2016). As Tawney (2007) notes, dorsals palatalize before [i], and thus the uvular (q, ɢ, ɴ, χ) and velar (k, g, ŋ, x) series merge into the palatal series (c, ɟ, ɲ, ç). As a result, while [ʊ] forms an allophone of /u/ in post-uvular contexts, there are no contexts in which [i] lowers to [ɪ], hence, while [ʊ] appears on the surface in Manchu, [ɪ] does not.

(11) a. VH: Apply ATR and labial harmony rightwards
b. Filter: [+HI] vowels are realized as [+ATR]
c. Lowering: [+HI] vowels are realized as [−ATR] when after [−ATR] consonants (uvulars)

We schematize the entire process as three steps described in (11). First, vowel harmony applies rightwards through the considered domain, then a filter applies which results in high non-ATR vowels becoming [+ATR], and finally, high vowels lower after uvular consonants, resulting in the allophony of [u] and [ʊ]. Glides are considered to be phonemically equivalent to high vowels, consistently neutralizing to [+ATR] in the filter, and being pronounced as glides upon pronounciation when following another vowel.

3.2. Phases Cause Opacity

To account for the difference between the imperfective participial head and other heads, we adopt an approach similar to Fenger (2020)'s approach to stress assignment in Turkish and pitch accent in Japanese verbs with the progressive aspect particle. As Fenger (2020) observes, within the class of 'accented' verbs in Japanese, a low pitch accent is assigned to the last syllable of a word (12). However, even when more bound material follows, the progressive aspect particle *te* forces 'early' low pitch accent assignment (13).

(12) a. (L H H H H L)
he. da. ta. ra. se. ru
b. [hedatar -sase -ru]
be.distant -CAUS -PRS
'To make it distant'
[Japanese, Fenger 2020:25 (26)]

(13) a. ((L H H L) L)
he. da. ta. te. ru
b. [hedatar -te -ru]
be.distant -PROG -PRS
'It is being distant'
[Japanese, Fenger 2020:28 (38)]

Fenger (2020) assumes a verb internal syntax, in which suffixes are their own heads forming phrasal projections which make up the word. Fenger (2020) argues that for Japanese, the progressive head is a phase head, and argues that its projection must be fully processed (in a minimalist theory, sent to logical form (LF) and phonological form (PF)), before being combined with additional material. Pitch accent assignment happens at PF, and so the introduction of a phase head causes 'early' pitch accent assignment. For (12), there is no phase head, and so pitch accent assigns a low pitch on the final syllable. However, for (13) the progressive phrase *hedatate*, consisting of the root and the progressive head, is sent to PF and assigned a low pitch before the present tense head *ru* is added.

We argue that a similar mechanism exists for Manchu vowel harmony, in which the imperfective head is a phase head. We differ from Fenger (2020)'s approach in that the spell-out domain in Manchu does not include the phase head itself. Before attaching the imperfective participial suffix /rA/, a stem must first be sent off to PF. This triggers not only vowel harmony (VH), but also the aforementioned filter, ensuring that any underlyingly [+HI, −ATR] segments are realized as [+ATR]. As a result, stems which end in high vowels (/i/, /ɪ/, /u/, and /ʊ/) become opaquely [+ATR], and when vowel harmony continues rightwards, that [+ATR] value is transmitted to the participial suffix, which is realized as [rə]. Compare (14) which only has one spell out domain, and (15) which has two spell out domains.

(14)

Gloss:	(stand	-PFV)
Underlying:	(ɪlɪ	-HA)
VH:	(ɪlɪ	-χa)
Filter:	(ili	-χa)

(15)

Gloss:	((stand)	-IPFV)
Underlying:	((ɪlɪ)	-rA)
VH:	((ɪlɪ)	-rA)
Filter:	((ili)	-rA)
VH:	((ili)	-rə)
Filter:	((ili)	-rə)

To account for instances of [+ATR] harmony after the [−ATR] vowel [ʊ], we argue that high vowel lowering is a phonetic phenomenon, which happens after PF spellout. Thus the introduction of a phase head does not trigger lowering, and so a surface [ʊ] is [u] at spellout, resulting in the transfer of the [u]'s [+ATR] feature to the imperfective participial suffix before lowering occurs (17).

(16)

Gloss:	(take.oath	-PFV)
Underlying:	(ɢasχʊ	-HA)
VH:	(ɢasχʊ	-χa)
Filter:	(ɢasχu	-χa)
Lowering:	(ɢasχʊ	-χa)

(17)

Gloss:	((take.oath)	-IPFV)
Underlying:	((ɢasχʊ)	-rA)
VH:	((ɢasχʊ)	-rA)
Filter:	((ɢasχu)	-rA)
VH:	((ɢasχu)	-rə)
Filter:	((ɢasχu)	-rə)
Lowering:	((ɢasχʊ)	-rə)

This so far accounts for all of the data in (5) and (8) except for the non-[ɔC(C)ɔ] stem which ends in [ɔ], as in [dzo̱-rə] "having cut", which we expect to transfer [−LAB, −ATR] vowel harmony, resulting in *[dzo̱-ra]. We leave an explanation for why this is the case for later investigation, though we note that the number of these verbs is incredibly low, with only nine distinct verbs in the entire corpus.

4. Generalizations and Pedagogy

In this section we discuss how Manchu vowel harmony is traditionally taught, and how we hope to apply the generalizations that can be made through our analysis to the currently existing pedagogy. In Section 4.1, we discuss the ways in which vowel harmony is discussed in pedagogically oriented grammar books. In Section 4.2, we introduce the generalizations which our analysis provides, and compare them to those which grammar books suggest. In Section 4.3, we summarise discussions with three Manchu language educators on how they adapt and modify the generalizations in grammar books for teaching purposes, and the possibility of incorporating the generalizations in this paper to their own teaching.

4.1. Vowel Harmony as Depicted in Grammar Books

Due to the highly endangered nature of Manchu, most teaching materials are written in Mandarin, which the vast majority of ethnic Manchus speak. Thus, three of the grammar books which we discuss are written in Mandarin: Aisin Gioro (1983), Jī et al. (1986), and Liu et al. (1997); the other, written in English, is von Möllendorff (1892). Of the grammar books discussed, two explicitly state in their preface that their main purpose is to preserve Manchu language in order to make the Manchu documents accessible, and to provide a systematic documentation of Manchu grammar with modern linguistic theories in order to help researchers compare Manchu with other Altaic languages (Jī et al. 1986:1-2, Liu et al. 1997:1-2). In addition to teaching document reading, a third grammar book notes that the targets of the grammar book are Manchu heritage speakers who want to learn more about their language (Aisin Gioro 1983:1-4). The fourth, von Möllendorff (1892), was written for the purposes of teaching English speakers how read Manchu documents; we include von Möllendorff (1892) in our discussion as it introduces one of the more widely used romanization systems (the Möllendorff romanization system), and has been adapted for teaching materials in Mandarin for heritage learners.

The Mandarin language grammar books discuss vowel harmony in terms of three vowel classes, called '*yin*', 'neutral', and '*yang*' vowels, corresponding roughly with [+ATR], neutral, and [−ATR] vowel classes,[2] with [u] belonging to either the *yin* or neutral class depending on grammar book.

(18) The use of different class divisions in different pedagogical Manchu grammar books

	ə	u	i	a	ʊ	ɔ
Jǐ et al. 1986:86, Liu et al. 1997:87	yin	neutral		yang		
Aisin Gioro 1983:24	yin		neutral	yang		

In all three of these grammar books, suffixes sensitive to vowel harmony are taught as agreeing in vowel class with the last non-neutral vowel in the stem, with the addition of labial harmony imposed on suffixes attached to stems with a final /ɔ/. Even when [u] is taught as neutral, [ʊ] is still taught as its *yang* counterpart. Anything which does not conform to this rule is taught as an irregularity. As a result, any stem which ends in [u], [ʊ], or [i] and contains [−ATR] vowels is considered to have an 'irregular' imperfective participial form. Stems which only consist of neutral vowels are taught as naturally having *yin* endings. As a result, while [−ATR] specified neutral vowel only stems (such as [ili] "to stand") are considered regular for their imperfective participial form, they are considered irregular in combination with any other ATR unspecified suffix.

Instead of using the *yin-yang* classification, von Möllendorff (1892) instead lists seven rules which more accurately describe vowel harmony, describing the result for the imperfective and perfective participial separately, and includes a (non-comprehensive) list of exceptions. The rule with the most listed exceptions is (19c), where all of the listed exceptions are either due to the lack of a disyllabic trigger, or the fact that the graphemic ⟨o⟩ is being used to represent the glide [w], in which case labial harmony is blocked. No rule is mentioned regarding ⟨ū⟩ [ʊ], nor neutral vowel only stems.

(19) Based on von Möllendorff 1892:10-11

a. verbs ending in ⟨a⟩ [a] have perfective [χa] or [qa] and imperfective [ra]
b. verbs ending in ⟨e⟩ [ə] have perfective [xə] or [kə] and imperfective [rə]
c. verbs ending in ⟨o⟩ [ɔ] have perfective [χɔ] or [qɔ] and imperfective [rɔ]
d. verbs ending in ⟨u⟩ [u] containing ⟨a⟩ [a] have perfective [χa] or [qa] and imperfective [rə]
e. verbs ending in ⟨i⟩ [i] containing ⟨a⟩ [a] have perfective [χa] or [qa] and imperfective [rə]
f. verbs ending in ⟨u⟩ [u] containing ⟨e⟩ [ə] have perfective [xə] or [kə] and imperfective [rə]
g. verbs ending in ⟨i⟩ [i] containing ⟨e⟩ [ə] have perfective [xə] or [kə] and imperfective [rə]

4.2. Generalization from Phase Theory

Through the analysis discussed in Section 3, we can produce a small set of generalizations which covers all of the data so far. We suggest a schema for visualizing Manchu vowel harmony rules through the flowchart in Figure 1, where the perfective form can stand in for all other suffixes affected by vowel harmony. Given a stem, the querent may first check whether or not the stem only consists of neutral vowels. If this is the case, then the ATR value is unknown, and only the imperfective ending (which will invariably be [rə]) can be determined; from this, unless the querent has memorized the stem, they may need to consult a dictionary. Second, they may check to see if labial harmony applies to the stem, if this fails; then they check whether the stem ends in [a] (the only condition where the imperfective is pronounced [ra]) and finally whether or not the stem is [+ATR] (the rightmost non-neutral vowel being [+ATR]) or [−ATR] but ending in a neutral vowel (the rightmost non-neutral vowel being [−ATR]).

The generalizations made in Figure 1 are able to predict all roots which we have come across with two exceptions: the first, already mentioned, is distinguishing ATR harmony in neutral vowel only roots.

[2] The Manchu words for the concepts of *yin* and *yang* are aptly ⟨e⟩ [ə] and ⟨a⟩ [a] respectively.

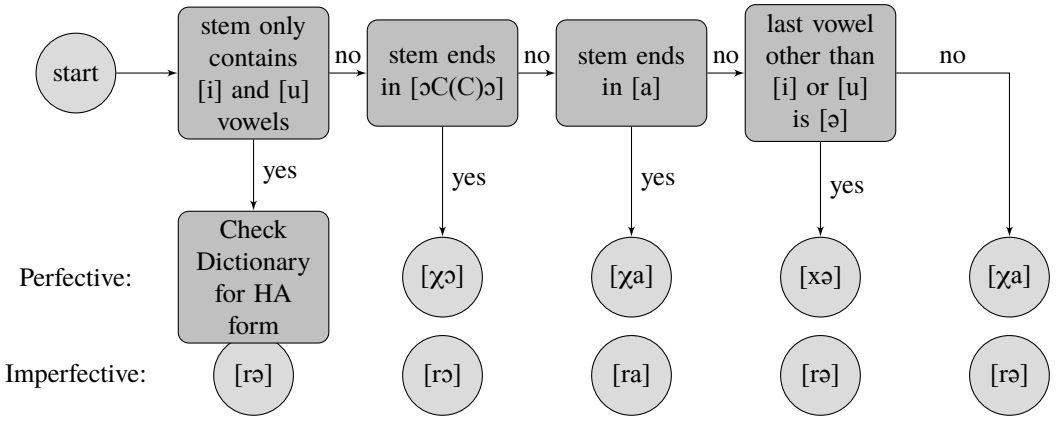

Figure 1: Flowchart to find perfective and imperfective participial suffix vowel harmony.

The second is for what we consider to be 'true' irregularities, allomorphs which differ in not only vowel but also often have additional syllables and are typically also have irregular imperative or perfective converb forms. For example, the stem [ɔ] "to become" has the perfective participle form [ɔχɔ] and the imperfective participle form [ɔdz̯ɔrɔ]. A comparison of the generalizations represented by Figure 1 and the generalizations of both the *Yin-Yang* method and von Möllendorff (1892) are shown in (20).

(20)

Verb Stem	Meaning	Perfective Participle	Imperfective Participle	Memorization Required		
				Yin-Yang	Möllendorff	This Paper
[ɔ]	become	[ɔ-χɔ]	[ɔ-dz̯ɔrɔ]	✓	✓	✓
[ili]	stand	[ili-χa]	[ili-rə]	✓	✓	✓
[sudzu̯]	rush	[sudzu̯-χə]	[sudzu̯-rə]	✗	✓	✓
[fali]	tie	[fali-χa]	[fali-rə]	✓	✗	✗
[ɢasχʊ]	take an oath	[ɢasχʊ-χa]	[ɢasχʊ-rə]	✓	✓	✗
[dz̯ɔ]	cut	[dz̯ɔ-χa]	[dz̯ɔ-rə]	✓	✓	✗
[dɔw]	cross	[dɔw-χa]	[dɔw-rə]	✓	✓	✗

[ɔ] represents 'true' irregular stems, while [ili] and [sudzu̯] represent neutral vowel only [−ATR] and [+ATR] stems respectively. As the *Yin-Yang* method assumes that neutral vowel only stems are [+ATR], [sudzu̯] does not require memorization, while [ili] must be noted as an exception. [fali] represents [−ATR] stems with [+ATR] high vowel endings, predictable by the generalizations in von Möllendorff (1892) and in our approach but not in the *Yin-Yang* method, in which [fali-rə] is irregular. [ɢasχʊ] represents [ʊ] final stems, [dz̯ɔ] represents non-[ɔC(C)ɔ] stems ending in [ɔ], and [dɔw] represents [−ATR] roots which end in a diphthong, all predictable through the rules in Figure 1 but in neither of the other approaches.

4.3. Pedagogical Methods and Discussion

The Manchu teachers who we interviewed were greatly inspired by the grammar books which we discussed above. Teachers distinguished two main methods of teaching vowel harmony. The first, 'implicit' method has more similarities with the three Mandarin language grammar books, whereby the *Yin-Yang* classification is taught, and no more explicit rules are given. When encountering exceptions to the *yin-yang* classification, teachers describe the exception as 'irregular', explaining that Manchu vowel harmony being 'incomplete'. Students are expected to remember these exceptions, and the patterns discussed in this paper, such as the imperfective/perfective alternation, are expected to be learned implicitly as the student practices the language. The second, 'explicit' method, emphasizes a set of rules which govern both the imperfective and the perfective (and thus by extension, any other ATR underspecified suffix), similar to but generally more extensive than von Möllendorff (1892). These rules number between 8 and 13, and are generalizations based on the experiences of each teacher. Some generalizations which the educators made were more specific than our theory; one included a

generalization that roots with only [u] vowels resulted in [+ATR] harmony, a rule which our theory doesn't predict, and which has only three exceptions.

Teachers reported that they tended to mix the two methods in the classroom, believing that both 'implicit' and 'explicit' teaching are useful in the internalization of vowel harmony, and students benefit from a combination of methods. The classification system of the *Yin-Yang* method was adopted by all of the teachers, who agreed that the majority of words which students encounter at an elementary level can be dealt with through generalizations which come from the *Yin-Yang* method, or are 'true' irregular stems. While teachers agreed that the 'explicit' method of teaching gives students a more concrete anchor at the beginning of their study, one educator made sure to mention that due to the complexity and number of these kinds of rules, they may disencourage students and generally take away from the 'core' of vowel harmony, which lies in the *yin-yang* distinction. Additionally, as 'true' irregular stems are among the very first verbs learned, the expectation of irregularity is already in place for many students.

Orthography also potentially played an issue. Teachers emphasize learning the script before even simple grammar, and as a result, even after mastering pronunciation, students are primed to view diphthongs and clusters by how they are represented graphically rather than phonetically. For instance, teachers reported that giving a rule such as 'two adjacent [ɔ] sounds trigger [ɔ] harmony' was overgeneralized by students who took the diphthong [ɔw], represented graphically as two adjacent ⟨o⟩ graphemes in the Manchu script, to be included as triggers for labial harmony. Reliance on the script is typical of Manchu revitalization projects, where standard Classical Manchu pronunciation is transparent with respect to the written standard. Sibe, a sister language of Manchu, and often considered a dialect of Manchu, has a very similar standard orthography, but is much less transparent. It may be useful to compare vowel harmony pedagogy in the two languages; we leave this to later work.

The generalizations in this paper are fewer and more precise than the detailed rule-based grammar of von Möllendorff (1892); as a replacement for the 'explicit' method, it may lighten the burden of remembering 8–10 rules. Additionally, the knowledge that Manchu underlying has a fairly regular system may help to encourage students to continue to learn Manchu. Multiple processes rely on the distinction between high and non-high vowels: high vowels trigger [+ATR] harmony in imperfectives and block labial harmony generally. We suggest the integration of a high and non-high distinction into the *Yin-Yang* method, which may help students to differentiate the fairly easy-to-remember processes surrounding [a], [ə], and [ɔ] from the 'less regular' processes involving [i], [u], and [ʊ].

5. Conclusion

In this paper, we have argued that much of what is considered irregular vowel harmony both among linguists and teachers can actually be explained as a product of the imperfective suffix's identity as a phase head. Like Fenger (2020) argues with other phonological processes in Japanese and Turkish, a word-internal phase head in Manchu causes early spell-out of vowel harmony, resulting in opacity of high vowels, which undergo a filter to become [+ATR]. From this theoretical perspective, we are able to provide more precise generalizations of Manchu vowel harmony. We go over the current teaching methods surrounding vowel harmony and its 'irregularities' both in pedagogically oriented grammar books and among three interviewed teachers. We then suggest that the generalizations in this paper, made clear as a result of our phase head approach, can be integrated into the pedagogical approaches of Manchu teachers to streamline the internalization of vowel harmony.

References

Aisin Gioro, Ulhicun (1983). *Grammar of Manchu*. Inner Mongolia People's Press, Hohhot.

Ard, Josh (1984). Vowel Harmony in Manchu: A Critical Overview. *Journal of Linguistics* 20:1, 57–80.

Avrorin, Valentin A. (1959). Grammatika nanaiskogo jazyka [Grammar of Nanai language]. *Leningrad: Izd. AN SSSR* 2.

Fenger, Paula (2020). *Words within Words: The Internal Syntax of Verbs*. Ph.D. thesis, University of Connecticut, Storrs.

Gallagher, Gillian (2016). Vowel height allophony and dorsal place contrasts in Cochabamba Quechua. *Phonetica* 73:2, 101–119.

Gorelova, Liliya M., Denis Sinor, Nicola DiCosmo, Bertold Spuler & Hartwig Altenmüller (eds.) (2002). *Manchu Grammar*, vol. 7 of *Handbook of Oriental Studies Central Asia*. Brill, Leiden.

Jì, Yǒnghǎi, Xiànjǐng Liú & Liùshēng Qū (1986). *Manchu Grammar*. Publishing House of Minority Nationalities, Beijing.

Kaplan, Lawrence D. (1981). *Phonological Issues in North Alaskan Inupiaq*. No. 6 in Alaska Native Language Center Research Papers, ERIC.

Konstantinova, Ol'ga Aleksandrovna (1964). *Ěvenkijskij jazyk: fonetika: morfologija [The Evenki language. Phonetics. Morphology]*. Nauka, Moscow.

Ligeti, Louis (1952). A propos de l'écriture mandchoue. *Acta Orientalia Academiae Scientiarum Hungaricae* 2:2/3, 235–301.

Liu, Jingxian, Aping Zhao & Jinchun Zhao (1997). *Manyu yanjiu tonglun =: Manju gisun-be hendu sibkihe bithe = General Manchu studies*. Heilongjiang Chaoxian minzu chubanshe, Haerbin.

Novikova, Klavdiâ Aleksandrovna & Orest Petrovič Sunik (1960). *Očerki dialektov èvenskogo âzyka: Ol'skij govor. Č. 1 [The Dialects of the Even Language]*. Izdatel'stvo Akademii nauk SSSR.

Tawney, Brian (2007). *Reading Jakdan's Poetry: An Exploration of Literary Manchu Phonology*. AM Thesis, Harvard University.

von Möllendorff, Paul Georg (1892). *A Manchu Grammar: With Analysed Texts*. The American Presbyterian Mission Press, Shanghai.

Zhang, Xi (1996). *Vowel Systems of the Manchu-Tungus Languages of China*. PhD Thesis, Univ. Toronto, Toronto.

Zhang, Yanchang, Bing Li & Xi Zhang (1989). *The Oroqen Language*. Jilin University Press, Jilin.

Proceedings of the 39th West Coast Conference on Formal Linguistics

edited by Robert Autry,
Gabriela de la Cruz Sanchez,
Luis A. Irizarry Figueroa,
Kristina Mihajlovic, Tianyi Ni,
Ryan Smith, and Heidi Harley

Cascadilla Proceedings Project Somerville, MA 2024

ISBN 978-1-57473-481-2 hardback

Ordering information

Orders for the printed edition are handled by Cascadilla Press.
To place an order, go to www.lingref.com or contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA
phone: 1-617-776-2370, fax: 1-617-776-2271, sales@cascadilla.com

Web access and citation information

This entire proceedings can also be viewed on the web at www.lingref.com. Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Rabinovitch, Jack Isaac and Baoqing Qian. 2024. Using Phasal Syntax to Make Generalizations in Manchu Vowel Harmony. In *Proceedings of the 39th West Coast Conference on Formal Linguistics*, ed. Robert Autry et al., 362-370. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #3649.