

Exploring pedagogical strategies for developing orthographic knowledge: A case study of the critically endangered Manchu language

Pedagogical strategies employed for developing orthographic knowledge are intricately tied to how learners approach word reading across writing systems. This empirical case study utilised thick description to document a teacher's pedagogical strategies for developing fundamental writing and reading (decoding) skills among novice learners of the Manchu language at a Chinese university. The teacher implemented a structured instructional procedure involving presentation, demonstration, and, in particular, manipulation to teach the specifics of orthographic writing. In addition, teacher-led chanting, transliteration, and segmentation of symbol blocks were extensively applied to instruct the ways in which phonology is mapped onto orthography and to facilitate reading the mixed grain sizes of the writing system. This study reports for the first time the pedagogical practices documented in other visually complex scripts applied to the instruction of the endangered Manchu language with distinctive orthographic characteristics. In light of the pressing challenges faced by learners and instructors of endangered languages, our findings demonstrate how locally adapted pedagogical strategies are informing language revitalisation efforts.

Keywords: pedagogical strategies, orthography instruction, literacy skills, Manchu language, language revitalisation

Introduction

The Manchu language was historically used by the Manchu people in Northeast China. Manchu is currently classified as “critically endangered” with less than 100 native speakers (United Nations Educational, Scientific and Cultural Organization, 2025). The study of teaching practices for new learners of Manchu is timely given the recent resurgence of interest in ancient scripts (Meyer & Ruppel, 2024) and the sustained efforts towards endangered language revitalisation (Austin & Sallabank, 2014; Hornberger, 2008; Hornberger & De Korne, 2018). It is also because unique features in this understudied script might provide fresh insights into approaches to literacy instruction more broadly (Li & Nag, in press).

The Manchu writing system

The traditional Manchu script was adapted from the Mongolian script in the 1590s and later updated in the 1630s. The fundamental symbol in the traditional script is called *uju hergen*—a symbol block representing the syllables of V, VV, VC, CV, CVV, and CVC. During the Qing dynasty, a set of around 1,400 *uju hergen* were grouped into 12 divisions known as *manju hergen i juwan juwe uju* (Manchu in origin, 满文十二字头 in Mandarin, meaning the Twelve Sections of Manchu Syllabary). These *uju hergen* serve as the basic building blocks for constructing Manchu words and loanwords. The first division, consisting of six vowel syllables and 125 CV syllables, is considered fundamental, with the remaining 11 divisions formed by connecting <-I>, <-R>, <-N>, <-NG>, <-K>, <-S>, <-T>, <-B>, <-O>, <-L> and <-M> to these 131 *uju hergen* from below (refer to Appendix for the annotation). However, the total count of *uju hergen* is estimated to be around 5,600 as each *uju hergen* has four positional variants—the independent, initial, medial, and final forms. Visiting European scholars during the Qing dynasty recognised that *uju hergen* could be further divided into sub-syllabic symbols representing vowel and consonant sounds, not unlike the phoneme representations of their own Latin script. To transliterate these sub-syllabic symbols, the European scholars introduced, alongside the traditional script, the Latin script with six vowel letters (*a, e, i, o, u, ū*) and 18 consonant letters (*n, k, g, h, b, p, s, š, t, d, l, m, c, j, y, r, f, and w*) for rendering Manchu syllables, while 10 other letters were used for rendering Chinese syllables (Möllendorff, 1892). We refer to the sub-*uju hergen* symbols as phoneme markers after a similar description for the sub-syllabic units in the South Asian akshara symbol block (Nag, 2007, 2017a). We identified a total of 83 Manchu phoneme markers based on available documentation (Gorelova, 2002; Li, 2010; Möllendorff, 1892; Norman, 2013). Certain phoneme markers and strokes in Manchu are categorised into masculine (“阳”) and feminine (“阴”) forms. For example, the masculine phoneme markers $k_{\text{阳}}/g_{\text{阳}}/h_{\text{阳}}$ are only paired with

a/o/ū, resulting in a 3×3 combination of CV syllables, while the feminine markers *k*_阴/*g*_阴/*h*_阴 are only followed by *e/i/u*. Similarly, strokes of the rightward “tail” (㇀) and the leftward “tail” (㇁) are identified as masculine and feminine forms, respectively.

Three key features of the Manchu writing system define the task for new learners. First, as an “extensive” orthography (Nag, 2007) with an inventory of around 1,400 *uju hergen*, the Manchu writing system demands a substantial symbol learning focus. Moreover, Manchu has allography with an *uju hergen* having four positional variants for one syllable. This arguably opaque four-to-one relationship could impact ease of mapping phonology to orthography during word reading (Katz & Frost, 1992). Finally, written Manchu is represented in mixed grain sizes (Ziegler & Goswami, 2005): the phoneme markers are in a smaller grain size, the *uju hergen* are in a larger. Learners likely have to make decisions regarding which grain size(s) to utilise to achieve accurate, rapid reading of *uju symbol blocks* and Manchu words.

Approaches to reading symbol blocks across writing systems

Research with novice readers of visually complex scripts has identified different approaches to reading symbol blocks. For example, in a study on the akshara-based Kannada orthography, Nag and Snowling (2012) found that more capable readers performed better on phoneme awareness tasks. This constitutes indirect evidence of an analytic approach by more skilled akshara readers in which they decompose symbol blocks into comprising phoneme markers. Similarly, Liu and colleagues (2010) reported that to recognise Chinese characters, children used an analytic approach when processing the sub-unit orthographic information. For Arabic reading, Asaad and Eviatar (2013) compared the Stroop effect for correct and incorrect written words. First graders showed the same degree of interference with the two groups of words, suggesting that they may use a letter-by-letter analytic strategy in Arabic

reading. However, third and fifth graders showed a much larger Stroop effect for the correctly written words, indicating that at least by third grade they have developed a global strategy to read Arabic words. Reading vowelised and unvowelised symbol blocks in Hebrew also involves different processes (Frost, 1994; Frost et al., 1987). Vowelised symbol blocks are read holistically using an orthographic decoding strategy where the word is recognized as a whole unit. Unvowelised ones are read analytically using phonological recoding strategy that letters are mapped onto their corresponding sounds. Importantly, reading approaches are also associated with instructional strategies for the orthography. For instance, Cho and colleagues (2020) examined the effects of four types of instructional methods for Korean Hangeul reading in emergent, novice, and good readers: (a) whole Korean symbol block called *Gulja*, (b) the component letters within the symbol block, (c) the component CV-coda within the symbol block, and (d) copying whole symbol blocks. The holistic whole *Gulja* instruction proved to be effective for emergent readers, while the analytic instruction of CV-coda sub-syllabic units benefited novice learners.

The finding of a differentiated approach to decoding symbol blocks fits well with the descriptions of global, analytic and strategic approaches to decoding proposed for the akshara writing system by Nag (2011, 2017a, 2017b). In the global approach symbol blocks are processed as singleton wholes. The analytic approach involves decomposing symbol blocks into constituent markers and decoding them based on symbol–sound mappings. However, relying solely on these two approaches may not be sufficient for reading symbol blocks within a word. This is where the strategic approach comes into play. A strategic approach requires selecting the more appropriate option (e.g., global vs. analytic) to disambiguate the phonology represented by an orthographic unit within a word. The choice of approach depends on the learner’s orthographic knowledge with the global approach useful for familiar

blocks recognised with a high degree of automaticity, and the analytic approach for decoding unfamiliar symbol blocks or new words.

The above lines of evidence of approaches to reading symbol blocks across orthographies seem inconsistent to some extent, as mixed strategies were employed by learners of various language proficiencies. Thus, we were interested in understanding the strategies employed for instructing uju hergen and whether the approach was global-analytic or an alternative.

Conceptual framework

To better understand classroom orthography instruction, we constructed a conceptual framework incorporating the two constructs of *components of orthography knowledge* (i.e., what knowledge was instructed) and *literacy practices in the classroom* (i.e., how knowledge was instructed). This framework drew on the synthesis matrix developed for the meta-ethnography by Nag and colleagues (2016) to tag classroom literacy practices to component skills of literacy, with each sub-category further tagged to teaching as reflected in teacher talk, student talk, literacy practices, and other additional features. In our study, we specifically focused on *components of orthography knowledge* to unpick Manchu orthography instruction in the classroom. Previous studies had identified some key areas of orthography instruction: stroke instruction (e.g., Jin & Cortazzi, 1998; Shen, 2005), providing a vocabulary to master basic orthographic units (Nag & Narayanan, 2019), and bringing focus on symbol–sound mapping that could in turn support essential phonological representation (Nag & Snowling, 2012). We analysed these three components: *writing routines*, *symbol units*, and *symbol–sound mapping*. An open category named *other knowledge* captured relevant instruction not covered by the three.

Our conceptual framework was also informed by theorising about literacy practices. For example, while the traditional notion of a literacy event is valuable for describing what is

involved in reading and/or writing, the concept of literacy practices transcends a simple description by connecting literacy activities to people's activities in a broader social and cultural context. The nature of the practices and the meanings constructed through them are both examined. We thus conceptualised the literacy practices of the teacher and student as a social endeavour undertaken within the context of educational institutions aimed at preserving critically endangered languages such as Manchu. We focussed on three dimensions of *literacy practices in the classroom: explanation* of relevant orthographic knowledge by teacher, *exercises* on reading and writing taken by students, and *evaluation* by assessing whether students have grasped the relevant orthographic knowledge.

Research question

We were interested in providing a thick description of instructional methods for novice learners' Manchu orthographic knowledge. We therefore asked the following research question:

What teaching strategies are employed to teach the endangered Manchu orthography of uju hergen in the participating Chinese university?

Method

Participants

This semester-long case study explored pedagogical strategies employed by a teacher for teaching Manchu orthographic knowledge to novice learners at a Chinese university in 2019. Ethical clearance for the study was received from [authors' institution]. We utilized the critical case approach of purposive sampling (Onwuegbuzie & Collins, 2007), selecting a crucial case involving a teacher able to provide compelling insight about Manchu orthography instruction. The teacher, with over a decade of Manchu teaching experience at the time of our study, had a developed programme of Manchu instruction. Being an ethnic Manchu, a university lecturer, an active Manchu educator, and a passionate advocate for

Manchu language revitalisation, he fully supported our study and willingly participated. The medium of instruction was Mandarin Chinese, with a small vocabulary of Manchu terms (e.g., *uju* and *hergen*) to label parts of the writing system. In the course we observed, there were 196 first-year students ($M_{\text{age}} = 18.79$; 89.8% female), none of whom had any prior experience learning Manchu. These students were enrolled in either the Chinese Language and Literature degree programme ($n = 120$) or the Ideological and Political Education programme in the participating university.

Data collection

Non-participant observation was conducted for 10 lessons at the university. Its purpose was to identify the instructional strategies that the teacher used to teach the orthography of *uju hergen*. The observations, made by the first author who is fluent in Manchu, Mandarin and English, were guided by the conceptual framework encompassing the dimensions of *components of orthography knowledge and literacy practices in the classroom*, i.e., for what aspects of Manchu orthographic knowledge were instructed and *how* they were instructed. Specific to the first dimension was knowledge of (a) writing routines, (b) orthographic units, (c) symbol–sound mapping, and (d) other relevant information. To the second was (a) explanations by teacher (b) exercises of practice by students, and (c) evaluative teacher–student interactions. Each classroom session was also video recorded.

Data organisation and analysis

The data for Manchu orthography instruction were organised in a synthesis matrix (see Table 1). The qualitative data was first organised by the components of orthography knowledge and each component was then further mapped for the classroom literacy practices of (a) explanations by teacher, (b) practice exercises by students, and (c) evaluative teacher–student interactions. The iterative process of coding and recoding in the second and third cycles allowed us to refine the codes, and further subcodes emerged (Saldaña, 2021).

Inter-coder reliability checks on coding. We assigned 30% of the data to a second coder who is a researcher in Manchu for independent coding (O'Connor & Joffe, 2020). This subset was produced by randomly extracting a segment of approximately 15 minutes from each of the ten video-recorded sessions. After independently coding the selected segments, both coders compared their results. Discrepancies were mainly on which codes and subcodes to be applied to the observation data. All discrepancies were discussed until consensus was reached.

Thematic exaction of data. Thematic extraction captured what orthographic knowledge of Manchu was instructed and the ways in which they were taught. “What” refers to the specifics instructed in class (e.g., symbol-to-sound mapping knowledge), while “how” concerns the instructional methods employed (e.g., copywriting).

Results

Finding 1: Presentation, demonstration and manipulation for developing writing knowledge across uju grain sizes

We found the teacher utilised an instructional procedure to teach how to write the four positional variants of uju hergen (the independent, initial, medial, and final forms). This instruction covered the (a) presentation of the target uju hergen, (b) demonstration of stroke order, and (c) manipulation of relevant strokes for transformation. These steps were applied during the teaching of target uju symbol blocks in syllabic vowel and CV structures. Two vignettes illustrate this instructional procedure.

Instruction of syllabic vowel uju symbol blocks. For teaching the six relatively basic uju hergen for vowel syllables (*a, e, i, o, u, and ū*), the teacher focused on the independent and initial forms by presentation, demonstration, and manipulation in teaching their written forms.

Vignette 1 [Session 1, 15:10- 24:16]

The teacher began the instruction by presenting in a slide the independent and initial forms of the vowel uju hergen *a, e, i, o, u, ū* and *iui*. Subsequently, the teacher demonstrated the stroke order by writing the independent <A>.

Teacher: (写出一个略带弧形的线段) 这不是直的，有点弧吧。然后折返，... 这都是弧线吧。别停笔，从左到右，画一条水平的线。... 然后转折，从上到下，写一小段。这一段有多小？越小越好，竖直的。然后继续向下，... 弧度越来越大，... 顿一下笔，然后水平画一个小线段，略微抬起。 [(After writing a slightly curved segment line) It's not straight, but somewhat curved, right? Then, make a turnaround [of the direction and keep writing], ... [this stroke is] also a curve. Don't stop the pen. From left to right, draw a horizontal line. ... Then make a turn [of the writing direction], from top to bottom, write a short segment line. How short should it be? The shorter, the better. [It should be] vertical. Then keep writing downward, ... the curvature increases gradually, ... pause the pen, and then draw a short segment line horizontally, and lift [the final stroke] slightly.]

Following this narration of writing demonstration, the teacher introduced the four strokes that make up the independent <A> — two “curves”, a “short tooth”, a “stem”, and a rightward masculine “tail”. Afterwards, the teacher continued to teach how to write the initial <A-> through stroke transformation.

Teacher: 下边我们要开始把它 [the independent <A>] 变型了。... 还记得最底下这个方框 [里面的笔画] 叫什么吗？ [Now we're going to start

transforming it [the independent <A>]. ... Still remember what the [stroke inside the] bottom box is called?]

Students: (一齐回答) 阳性的字尾。 [(In unison) The masculine “tail”.]

Teacher: 好啦。阳性的字尾它是不是个笔画的名称? ... 阳性的字尾这种笔画永远等于一个短牙。 ... 我们要把 *a* 的独立型变成词头型。 ... 所以我们要把这个向右的尾巴变个型, 让它能连别的字母。 [Alright. The masculine “tail” is a stroke name, right? ... This type of stroke of a masculine “tail” always equals a “short tooth” [in transformation]. We’re going to transform the independent form of *a* into its initial form. ... So we need to change the form of this rightward “tail” to make it able to connect to other letters.]

Teacher: (教师在黑板写出“字冠”和连接的“短牙”后) 向右的尾巴等于什么?

[(After the teacher writes the “crest” and the connecting “short tooth” on the blackboard) What does the rightward “tail” equal to?]

Students: (一齐回答) 一个短牙。 [(In unison) A “short tooth”.]

Teacher: 一个短牙。你再写一个短牙。 [A “short tooth”. Now, you write another “short tooth”.]

Teacher: (教师在“字冠”和“短牙”下连写另一个“短牙”) 这就是 *a* 的词头型的来源。

[(The teacher connects another “short tooth” below the “crest” and the “short tooth”) This is how the initial form of *a* is derived.

Finally, the students were required to practise copywriting the initial <A->.

Vignette 1 exemplifies the instructional procedure for teaching how to write the independent and initial forms of the *a* uju hergen. First, the target uju hergen—the

independent and initial forms of <A> and <A->—were presented on the slides. In demonstration, the teacher wrote the independent form <A> while explaining its stroke sequence to students (i.e., “curves” followed by a “short tooth”, a “stem”, and a rightward masculine “tail”). Afterwards, the teacher manipulated <A> by implicitly segmenting the component strokes into two groups (the “crest” and a rightward masculine “tail”, as shown in Figure 1). The manipulation also involved the application of stroke transformation following the rule that a rightward “tail” = a “short tooth”, resulting in the creation of the initial <A->. This manipulation of stroke transformation played a significant role in the writing instruction, as it established a meaningful relationship between the uju symbol blocks of <A> and <A->, highlighting the inherent connection between the written forms.

Instruction of syllabic CV uju symbol blocks. The central focus of uju hergen orthographic instruction was on the CV syllables, as they constitute a substantial proportion of the target uju symbol blocks. Vignette 2 illustrates how the teacher employed the procedure of presentation, demonstration, and manipulation to teach the writing of the four positional variants of *ka*.

Vignette 2 [Session 3, 12:58-21:25]

The teacher presented in the slides the independent, initial, medial, and final forms of *ka*. Among them, the independent <KA> was segmented into two comprising phoneme markers — <K-> and <-A>. During the subsequent demonstration of the stroke order for <KA>, the teacher said,

Teacher: 第一笔从左上到右下，… 写一个点。第二笔，… 兜一个类似于半圆的结构。… 继续兜然后写一个短牙。…然后顿笔下来。这是这个辅音字母、阳性的<K->的写法。如果我们写<KA>，是不是在下面接一个向右的尾巴就行了啊？ [The first stroke is from upper left to lower

right ... to write a “dot”. The second stroke... is like a “curve”. ... Keep writing another “curve” followed by a “short tooth”. Then, write downward [a “stem”]. This is how the consonant letter masculine <K-> is written. To write <KA>, shouldn't we just connect a “rightward tail” from below?]

Teacher: (在<K->下面接写向右的尾巴) ... 然后我们分析一下：我们要把独立型变成词头型，是不是只需要把最后一个笔画变型啊。向右的尾巴等于什么？[(After writing a “rightward tail” connected to <K-> from below) ... Let's make an analysis. If we want to change the independent form [of *ka*] to the initial form, shouldn't we just need to transform the final stroke [of the “rightward tail”]? What is a “rightward tail” equal to?]

Students: (一些学生一起回答) 一个短牙。[(some students in unison) A “short tooth”.]

Teacher: 非常好啊。我们写一下。[Very good. Let's write it down.]

Teacher: (教师在黑板写出<KA->) ... 然后要把词头变词中是不是得变前半截了啊？...我们来分析一下。这个字母是不是带了一个短牙了啊。然后它有一个翘起来的结构看到了吗？上边这个[翘起来的结构]相当于一个短牙，... 那么这个辅音字母等于几个短牙？[(After writing the initial <KA-> on blackboard) ... Now if the initial form is to be changed to the medial form, shouldn't the first part [of <K->] be transformed? Let's make an analysis. This letter [<K->] contains a “short tooth”, right? Can you see it also has a curved stroke? This [curved stroke] on the top is equal to a “short tooth”. ... Then, how many “short teeth” does this consonant letter [<K->] have?]

Students: (有些回答) 三个。[(Some students) Three.]

Students: (另一些大声强调回答) 两个。 [(Other students louder and with emphasis) Two.]

Teacher: 非常好。它就相当于两个短牙。那这个元音字母<-A>是一个短牙，所以在词中的<KA>是…？ [Very good. It is equal to two “short teeth”. Since the vowel letter <-A> has one “short tooth”, the medial <-KA-> has... [how many “short teeth”]?)

Students: (一齐回答) 三个短牙。 [(In unison) Three “short teeth”.]

Teacher: (教师在黑板写出词中型<-KA->) 好。… 我们既然知道词中的<-KA->是三个短牙，并且我们能分析出前两个短牙是阳性的辅音字母<-K->，第三个短牙是元音字母<-A->，那么它的词尾咋写？ [(After writing the medial <-KA-> on blackboard) Good. ... Now that we know the medial <-KA-> has three “short teeth”, and by analysis we know the first two “short teeth” is the masculine consonant letter <-K-> and the third “short tooth” is the vowel letter <-A->, then how should its final form be written?]

Students: (无回答) [(silence)]

Teacher: 把第三个短牙变成什么？ [What should the third “short tooth” [in the medial <-KA->] be transformed to?]

Students: (几个学生) 阳性字尾。 [(Several students) Masculine “tail”.]

Teacher: 向右的阳性的字尾。那还剩几个短牙了？ [Rightward masculine “tail”. So, how many “short teeth” are left [in the final <-KA>]?)

Students: (一齐回答) 两个。 [(In unison) Two.]

Vignette 2 showcased a writing-focussed instruction of the uju hergen *ka*. In presentation, the teacher showed the four positional variants (<KA>, <KA->, <-KA>, and <-KA>) of the target uju hergen *ka*. Then, the teacher demonstrated the stroke sequence by writing the independent form of *ka* on the blackboard. Subsequently, in manipulation, stroke segmentation was made by the teacher per Manchu phoneme marker. For instance, <KA> was divided into a group of strokes constituting <K-> and then the stroke of a rightward “tail” representing <-A>. Furthermore, the teacher manipulated these strokes by transforming their forms based on certain rules. For example, he followed the rule that a rightward “tail” and a “short tooth” are interchangeably transformable in teaching how to write the initial and final forms of *ka*. Figure 2 illustrates the stroke transformation applied in the instruction of writing the four positional variants of *ka*.

Manipulation on the uju form through stroke transformation. A frequently observed instructional strategy was for strokes of target uju hergen to be manipulated through step-by-step writing, typically with a running narration. Instead of treating each variant of a target uju hergen as individual symbol block, the teacher established associations between the related forms by transforming certain strokes from the previous variant to write the new form. This instruction by stroke transformation appears to play a pivotal role in establishing connections between the four variants of the written form for a given sound. The first two lines of a mnemonic formula provided below was observed to be reviewed multiple times by the teacher during Sessions 3, 5, 7 and 9 of the Manchu courses, with students reciting these in chorus.

阳性字尾等于一个短牙!

阴性字尾等于一个字干!

A masculine character tail is equal to a short tooth!

A feminine character tail is equal to a stem! [First author’s translation]

These formula were extensively applied to instruct the steps for writing the vowel phoneme markers contained in the CV uju hergen, such as <NA> and <NE> (Session 2), <SA> (Session 3), <TS'I> and <DZI> (Session 4), <TA> and <TE> (Session 5), and <AT> (Session 6). Manipulation of stroke transformation was being used as a tool to facilitate the learning of uju hergen. This method would facilitate students' easy recall and apply the correct transformations when writing uju symbol blocks. The additional mnemonic formulae served as another helpful guide to enhance the efficiency and accuracy of stroke transformations throughout the writing process.

Manipulation on phoneme markers by segmentation and blending. The teacher seemed to adopt the Manchu phoneme marker as the basic orthographic unit in uju hergen writing instruction. The selection of phoneme marker presupposes the teacher's belief that Manchu was an alphabetic writing system; thus, combining consonant and vowel phoneme markers would yield uju symbol blocks. This belief was implicitly introduced at the beginning of the course, when the teacher claimed in Session 1 that “满文是拼音文字, 它和你学的英文和汉语拼音没有差别, 都是 *a, b, c, d* 拼成的一个个单词” [“Manchu is alphabetic writing, which is no different from the English or Chinese *pinyin* that you have learnt. They all consist of individual words formed by combining [like in *pinyin*] *a, b, c, d*.”]. Then the teacher continued, “...满文有二十多个字母” [“Manchu has over twenty letters”] and “满文有六个元音字母” [“Manchu has six vowel letters”]. These statements demonstrated that the teacher regarded Manchu phoneme markers (or “letters” in the teacher's term) as the basic orthographic units. This pedagogical emphasis on phoneme markers in uju hergen writing instruction is further exemplified by a chart listing 17 consonant phoneme markers in their independent, initial, medial, and final forms. The teacher believed that this approach enables learners to systematically create *all* uju symbol blocks “能把一般辅音字母和元音字母相拼

的所有形式给它写出来” [all the forms [of an uju hergen can be created] by combining consonant letters and vowel letters.]

Finding 2: Chanting, transliteration, and segmentation for developing reading knowledge across uju grain sizes

The teacher adopted a syllabic approach of chanting (choral reading) to instruct the sound-to-uju hergen mapping when teaching the vowel uju hergen reading. In contrast, a phonemic approach was employed for reading the CV uju hergen, with manipulation involving uju hergen segmentation to teach the sound-to-phoneme marker mapping. Importantly, the sound of phoneme markers was taught with the mediation of Latin letters. This cluster of teaching practices is examined at the level of the whole uju symbol block and the component phoneme markers within each block.

Instruction at the level of the whole symbol block. The teacher engaged students in explicit “reading aloud” of an uju hergen through teacher-led chanting. For example, in Session 1, the teacher required students to read after him multiple times /a/, /ə/, /i/, /ɔ/, /u/ and /ʊ/, while pointing to the slide displaying the uju symbol blocks alongside their Latin transliteration of *a, e, i, o, u* and *ū* [Session 1, 13:07]. Similarly, in Session 3, the teacher guided students to repeatedly read lists like /ka/, /kɔ/, /kʊ/, /ga/, /gɔ/, /gʊ/, /ha/, /hɔ/, and /hʊ/ while presenting on a slide “*k_阳 + a/o/ū*”, “*g_阳 + a/o/ū*” and “*h_阳 + a/o/ū*” [Session 3, 11:00]. The sub-scripted forms in this instruction sequence taught a further aspect of the orthography: the masculine form (“阳”) of *k, g, h* is only followed by *a, o, and ū*, while the feminine form (“阴”) of *k, g, h* is only followed by *e, i, and u*. These teaching practices suggested the implementation of a global approach (Nag, 2017a, 2022) to uju hergen reading instruction, where the uju hergen (e.g., <A>) was treated as a whole unit by the teacher, and the corresponding sound was directly instructed through choral reading (e.g., /a/ – <A>).

However, such instruction of mapping the whole uju hergen to sound through teacher-led choral reading was observed only twice over the ten sessions. This limited utilisation of a global approach to symbol block teaching could potentially be attributed to an assumption about the challenges faced by a novice learner with no prior knowledge of the Manchu language or orthography. Just using several rounds of teacher-led choral reading may not be enough to memorize the sounds mapped onto the visually complex uju symbol blocks. Instead, the preferred approach was to use segmentation. This approach is described next.

Instruction at the level of phoneme markers. The focus on phoneme markers initially seemed somewhat unexpected because there was no explicit “reading aloud” of phoneme markers over the ten sessions of Manchu orthography instruction. Instead, phonemic instruction was incorporated in the display of uju hergen segmentation while writing. Examples of this instructional method of segmentation while writing can be seen in Vignettes 3 and 4 below.

Vignette 3 (Session 2, 27:15)

During the instruction of the uju hergen <NE>, the teacher wrote <NE> on the blackboard and drew a horizontal line to segment it into <N-> and <-E> (see Figure 3). The teacher explained, “我切一刀，上面是辅音字母 *n*，下面是元音字母 *e*” [“I knife-cut it. The upper part is the consonant letter *n*, and the lower part is the vowel letter *e*.] He then wrote the Latin transliteration of *n* and *e* next to their respective phoneme markers.

Vignette 4 (Session 4, 13:10)

After teaching how to write the final position <-M>, the teacher wrote <AM> on blackboard (see Figure 4).

Teacher: “... 这个念啥?” [“How do you read it?”]

Students: (In unison) “/am/”.

Teacher: (Segmenting <AM> into <A-> and <-M> with a horizontal line) “一定要会切，是吧。前边这两个“牙”是/a/，下边这个是/m/”。 [“[You] must know how to cut it, right? The first two “short teeth” is /a/, and the one below is /m/”.]

The key words used to communicate segmentation were “knife-cut” and “cut” in the vignettes. These observations of explicit segmentation instruction of dividing an uju hergen into its constituent phoneme markers shows (a) how an analytic approach to uju symbol blocks reading may emerge, and (b) how the phoneme marker may begin to be considered as the basic orthographic unit in uju hergen reading.

It is worth noting, however, that the teacher did not segment all uju hergen into their constituent phoneme markers during instruction. For example, the observation revealed that segmentation was not applied to uju hergen such as <CA>, <JA>, <YA>, <RA>, <FA>, <FI>, <WA>, <TS‘A>, <DZA>, <ŽA>, < TS‘I> and <DZI>. As these uju hergen were in Consonant(s) + *a* and Consonant(s) + *i* structures, which the learners had become familiar with during instruction, it is possible that they spontaneously were delegated to a global approach (Nag, 2017a, 2022) based on knowledge already acquired through the analytical technique learned from the teacher.

Multiscriptal instruction also brings focus on phonemes and the phoneme markers. The teacher repeatedly utilised Latin letters to instruct the sounds associated with phoneme markers in uju hergen. For example, during Session 1, before demonstrating how to write the target uju hergen <A>, <E>, <I>, <O>, <U>, and <Ū>, the teacher initially wrote the Latin letters *a*, *e*, *i*, *o*, *u* and *ū* on the blackboard. Then, the teacher explained, “我上面写的这些拉丁字母是拉丁满文, 在手机、电脑上大家用这个东西觉得比较方便” [“These Latin letters written by me are Latinised Manchu. People find it more convenient to use them on mobile

phones and computers”.] (Session 1, 15:06). This statement suggests that Latin letters were used as a more accessible alternative and a means of transliterating the traditional Manchu script. This function of Latin letters can be seen across all vignettes. Furthermore, the Latin letters prompted a phonological instruction that was more sub-syllabic in focus as illustrated in Vignettes 5 and 6.

Vignette 5 (Session 3, 44:01)

Following the teacher’s demonstration of the stroke order of writing <-S> on the blackboard, he continued to write -s next to <-S> (see Figure 5) and explained,

Teacher: 这个就是写在单词尾的/s/。 [This represents the word-final /s/.]

Vignette 6 (Session 4, 13:10)

After demonstrating the stroke order for writing <-M> on blackboard, the teacher said,

Teacher: (while simultaneously writing -m on the blackboard) 注意，这是/m/。

[Please note, this is /m/.]

In both vignettes, the letters *s* and *m* should not be misunderstood as transliterations for <-S> and <-M>, as the teacher would have then used their letter names (i.e., /es/ and /em/). What was used instead was their corresponding letter sounds (i.e., /s/ and /m/). While conventionally the representation of sounds often employs symbols such as the International Phonetic Alphabet, the teacher seemed to adopt his own notation for the uju hergen and phoneme markers. This loose yet practical use of transliteration as a teaching tool was also extended to two other local orthographies: the teacher also used *pinyin* and Chinese characters to represent sounds of the uju symbol blocks. For example, the *pinyin* /ü/ was used to phonologically represent *iu* (Session 1, 16:02), and the Chinese characters “七” [tɕʰi], “鸡”

[tɛi], and “西” [ɛi] were used to represent the sounds of *ci*, *ji*, and *si*, respectively (Session 4, 44:08).

Discussion

Our classroom observation found that both holistic and analytic strategies were applied in teaching the Manchu orthography. The global approach of uju hergen choral reading was accompanied by the analytic approach of uju hergen segmentation and stroke transformation of phoneme markers in uju hergen. Using just the holistic approach to present each uju symbol blocks globally would arguably be a less effective method for teaching Manchu because it is not plausible to instruct the phonological information encoded in around 1,400 uju hergen within the allocated ten sessions in the semester. With incomplete instruction, learners would not have access to the phonology of the *untaught* uju hergen. However, the analytic strategy of instruction with phoneme markers (only 83 compared to the 1400ish uju hergen) allows learners to directly develop knowledge of phoneme marker-sound mapping that may be applied to decoding both taught and untaught uju hergen. Taken together, we saw a judicious mix of the analytic and global approaches to uju symbol block instruction for the “extensive” inventory size. Applying the mix of global and analytic approaches has also been reported for other extensive orthographies such as Chinese (McBride, 2016) and Kannada (Nag et al., 2014), in which many symbols were not explicitly taught but the learners nevertheless acquired their internal details (Nag, 2007).

Applying only a holistic or analytic approach may not be optimal for reading the Manchu writing system. A strategic approach, in which orthographic knowledge is applied to disambiguate encoded phonology depending on a word context (Nag, 2011, 2017a, 2017b), could facilitate Manchu reading. For example, in the Manchu word *abka* “sky, heaven”, the first comprising uju hergen 𐎠 (<AB->) can be regarded as mapped onto the syllable /ab/, or alternatively, onto the two phonemes of /a/ and /b/. Similarly, the second comprising uju

hergen 𐰃 (<-KA>) consists of the phonemes /k/ and /a/ but includes ambiguities (see below). If these two constituent uju hergen in *abka* are processed holistically, it could potentially produce three challenges for the novice learner. First, both uju hergen are visually complex with confusable visual elements and thus cognitively demanding to decode. Second, the uju hergen 𐰄 (<AB->) had not been included in the course curriculum. Since classroom instruction is probably the only channel for learning the Manchu orthography knowledge, this meant the symbol block might go unrecognised. On the other hand, however, if the word *abka* is read analytically then the component phoneme markers of 𐰁 (<A->) and 𐰂 (<-B->) were taught, and they each represent only one sound and are hence completely transparent. Third, decoding the symbol 𐰃 in the second uju hergen 𐰃 (<-KA>) is cognitively more demanding for readers as it is in multiple mappings with /a/, /ə/ or /n/; thus, readers have to determine the sound based on the neighbouring phoneme marker. Furthermore, while 𐰁 is only mapped onto /k/, graphically it consists of two “short teeth” 𐰁, which in its own right is also a Manchu phoneme marker encoding /a/, /ə/ and /n/. All these points of opacity are likely to cause confusion for novice learners of Manchu, and a global approach of learning the whole uju hergen undifferentiated may be the most efficient. Taken together, a strategic approach rather than solely a holistic or analytic approach, seems a more effective option: the alphabetic principle is efficient to analyse the transparent one-to-one mapping of the first symbol block but the second uju hergen is better treated as a whole unit. Put differently, the mixed orthography-phonology mapping in Manchu could be to the novice learners’ advantage if approached strategically, flexibly adopting the optimal orthographic unit for decoding when reading Manchu. However, within the one semester time window of our observation study, students may not have become strategic in their decoding approach. In

other words, they may not be aware that moving between the orthographic units of phoneme markers and uju hergen can facilitate reading Manchu.

Our study focused on instructional strategies for teaching novice learners how to read the symbol blocks of uju hergen, which represent the relatively simple V, CV, and CVC syllables. However, it is unclear if the same collection of instruction strategies would be employed by the specialist teacher for polysyllabic Manchu words that then have a higher density of phoneme markers, allographs and mapping complexity [Author(s)]. This includes Manchu words with syllabic patterns such as <CVC.CV> (e.g., *bithe*, “word”, “book”), <V.CV.CV> (e.g., *agūra*, “utensil”), <CV.CV.CV> (e.g., *muduri*, “dragon”), <VC.CVC.CV> (e.g., *amgambi*, “to sleep”), and <CVC.CV.CV.CV.CVC.CV> (e.g., *bontoholobumbi*, “fail to make something happen as planned”). It would be valuable for future studies to compare the instruction for reading Manchu words like these with our description of introductory uju hergen instruction.

Conclusion

In conclusion, our study, for the first time, explored the pedagogical strategies employed for teaching orthographic knowledge to novice learners of Manchu at a Chinese university. The findings revealed that the teacher utilized a three-step instructional procedure, consisting of written presentation, written demonstration, and written manipulation to instruct the specifics of the orthography. Techniques such as teacher-led choral reading, transliteration, and segmentation of symbol blocks were employed to highlight the mixed grain sizes of the orthography and the range of possible phonology-orthography mapping. The classroom literacy practice included a combination of explanations, practice exercises, and ongoing teacher-student interactions to assess orthographic knowledge. This research provides descriptive evidence of teaching practices for an understudied orthography showing commonalities with instruction observed in other visually complex scripts. The teacher

appeared to have developed a toolkit of strategies for the education of endangered languages with several unique orthographic characteristics. In another study with 192 of this teacher's students, we examined reading performance of uju symbol blocks selected for their syllable type, visual complexity, and frequency [Author(s), in preparation]. We found evidence for an analytic approach to Manchu symbol blocks reading, a learning outcome likely linked to the three-step strategies of symbol presentation, written demonstration, and written manipulation used by the teacher.

Finally, this study provides a framework to systematically record pedagogical practices for teaching the writing system of an endangered language. The insights from such an exercise are strategically useful for urgently needed scale-up of revitalisation efforts at two levels. First, evidence can begin to be built up on which specific practices support greater student attainments in the endangered language. Second, professional development programmes for teachers of endangered languages can include evidence-informed pedagogical practices. Importantly, this study highlights the significance of *local pedagogical solutions* in informing language revitalisation efforts, considering the challenges (e.g., time constraints) faced by both learners and instructors of endangered languages. Although the case study is of a teacher with over a decade's experience in teaching the Manchu language, it is possible that other teachers may employ different strategies. We call for future research to seek out Manchu teachers for a more comprehensive collation of current Manchu pedagogical practices. Similar targeted case studies on what-is-taught-and-how could be equally insightful for other endangered languages."

References

Author(s). (in preparation).

- Asaad, H., & Eviatar, Z. (2013). The effects of orthographic complexity and diglossia on letter naming in Arabic: A developmental study. *Writing Systems Research*, 5(2), 156–168. <https://doi.org/10.1080/17586801.2013.862163>
- Austin, P. K., & Sallabank, J. (Eds.). (2014). *Endangered languages: Beliefs and ideologies in language documentation and revitalization*. Published for The British Academy by Oxford University Press. <https://doi.org/10.5871/bacad/9780197265765.001.0001>
- Cho, J.-R., McBride, C., & Kim, B. (2020). Effective teaching instructions for Hangul learning among Korean kindergartners. *Reading and Writing*, 33, 1791–1808. <https://doi.org/10.1007/s11145-019-09985-0>
- Frost, R. (1994). Prelexical and postlexical strategies in reading: Evidence from a deep and a shallow orthography. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20(1), 116–129. <https://doi.org/10.1037/0278-7393.20.1.116>
- Frost, R., Katz, L., & Bentin, S. (1987). Strategies for visual word recognition and orthographic depth: A multilingual comparison. *Journal of Experimental Psychology: Human Perception and Performance*, 13(1), 104–115. <https://doi.org/10.1037/0096-1523.13.1.104>
- Gorelova, L. M. (2002). *Manchu grammar*. Brill. <https://doi.org/10.1163/9789047401148>
- Hornberger, N. H. (Ed.). (2008). *Can schools save indigenous languages? Policy and practice on four continents*. Palgrave Macmillan. <https://doi.org/10.1057/9780230582491>
- Hornberger, N. H., & De Korne, H. (2018). Is revitalization through education possible? In L. Hinton, L. Huss, & G. Roche (Eds.), *The Routledge handbook of language revitalization* (1st ed., pp. 94–104). Routledge. <https://doi.org/10.4324/9781315561271-12>
- Jin, L., & Cortazzi, M. (1998). Dimensions of dialogue: Large classes in China. *International Journal of Educational Research*, 29, 739–761. [https://doi.org/10.1016/s0883-0355\(98\)00061-5](https://doi.org/10.1016/s0883-0355(98)00061-5)

- Katz, L., & Frost, R. (1992). The reading process is different for different orthographies: The orthographic depth hypothesis. In L. Katz & R. Frost (Eds.), *Orthography, phonology, morphology, and meaning* (pp. 67–84). Elsevier. [https://doi.org/10.1016/S0166-4115\(08\)62789-2](https://doi.org/10.1016/S0166-4115(08)62789-2)
- Li, B., & Nag, S. (in press). Learning to read the Manchu writing system. In H. Winskel & H. K. Pae (Eds.), *Springer handbook of nonlinear writing systems: Complex processes and learning challenges*. Springer.
- Li, G. R. (2010). *Manchu: A textbook for reading documents* (2nd ed.). National Foreign Language Resource Center University of Hawai'i.
- Liu, P. D., Chung, K. K. H., McBride-Chang, C., & Tong, X. (2010). Holistic versus analytic processing: Evidence for a different approach to processing of Chinese at the word and character levels in Chinese children. *Journal of Experimental Child Psychology*, 107(4), 466–478. <https://doi.org/10.1016/j.jecp.2010.06.006>
- McBride, C. A. (2016). Is Chinese special? Four aspects of Chinese literacy acquisition that might distinguish learning Chinese from learning alphabetic orthographies. *Educational Psychology Review*, 28, 523–549. <https://doi.org/10.1007/s10648-015-9318-2>
- Meyer, R., & Ruppel, A. (2024). Teaching the languages of Asia. An introduction. *Cahiers Du Centre De Linguistique Et Des Sciences Du Langage*, 68, 7–15. <https://doi.org/10.26034/la.cdclsl.2024.6138>
- Möllendorff, P. G. (1892). *A Manchu grammar: With analysed texts*. Printed at American Presbyterian Mission Press.
- Nag, S. (2007). Early reading in Kannada: The pace of acquisition of orthographic knowledge and phonemic awareness. *Journal of Research in Reading*, 30(1), 7–22. <https://doi.org/10.1111/j.1467-9817.2006.00329.x>

- Nag, S. (2011). The akshara languages: What do they tell us about children's literacy learning? In R. Mishra & N. Srinivasan (Eds.), *Language-cognition: State of the art* (pp. 272–290). Lincom.
- Nag, S. (2017a). Learning to read alphasyllabaries. In K. Cain, D. L. Compton, & R. K. Parrila (Eds.), *Theories of reading development* (pp. 75–98). John Benjamins Publishing Company. <https://doi.org/10.1075/swll.15.05nag>
- Nag, S. (2017b). Learning to read Kannada and other languages of South Asia. In L. Verhoeven & C. Perfetti (Eds.), *Learning to read across languages and writing systems* (pp. 104–126). Cambridge University Press. <https://doi.org/10.1017/9781316155752.005>
- Nag, S. (2022). Reading the akshara writing system. In M. J. Snowling, C. Hulme, & K. Nation (Eds.), *The science of reading: A handbook* (2nd ed., pp. 372–389). Wiley. <https://doi.org/10.1002/9781119705116.ch17>
- Nag, S., & Narayanan, B. (2019). Orthographic knowledge, reading and spelling development in Tamil: The first three years. In M. Joshi & C. McBride (Eds.), *Handbook of literacy in akshara orthography* (pp. 55–83). Springer. https://doi.org/10.1007/978-3-030-05977-4_4
- Nag, S., & Snowling, M. J. (2012). Reading in an alphasyllabary: Implications for a language universal theory of learning to read. *Scientific Studies of Reading*, 16(5), 404–423. <https://doi.org/10.1080/10888438.2011.576352>
- Nag, S., Snowling, M. J., & Asfaha, Y. M. (2016). Classroom literacy practices in low- and middle- income countries: an interpretative synthesis of ethnographic studies. *Oxford Review of Education*, 42(1), 36–54. <https://doi.org/10.1080/03054985.2015.1135115>
- Nag, S., Snowling, M., Quinlan, P., & Hulme, C. (2014). Child and symbol factors in learning to read a visually complex writing system. *Scientific Studies of Reading*, 18(5), 309–324. <https://doi.org/10.1080/10888438.2014.892489>

- Norman, J. (2013). *A comprehensive Manchu-English dictionary*. Harvard University Asia Center.
<https://doi.org/10.1163/9781684170692>
- O'Connor, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods*, 19, 1–13.
<https://doi.org/10.1177/1609406919899220>
- Onwuegbuzie, A. J., & Collins, K. M. T. (2007). A typology of mixed methods sampling designs in social science research. *The Qualitative Report*, 12(2), 281–316.
<https://doi.org/10.46743/2160-3715/2007.1638>
- Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). Sage.
<https://doi.org/10.1002/9780470975220.ch1>
- Shen, H. H. (2005). An investigation of Chinese-character learning strategies among non-native speakers of Chinese. *System*, 33, 49–68. <https://doi.org/10.1016/j.system.2004.11.001>
- United Nations Educational, Scientific and Cultural Organization. (2025, February 20). *The world atlas of languages (beta version)*. <https://en.wal.unesco.org/languages/manchu>
- Ziegler, J. C., & Goswami, U. (2005). Reading acquisition, developmental dyslexia, and skilled reading across languages: A psycholinguistic grain size theory. *Psychological Bulletin*, 131(1), 3–29. <https://doi.org/10.1037/0033-2909.131.1.3>

Appendix

Annotation of Manchu

1. “CAPITAL” letters are used for annotating the traditional Manchu script and “lowercase” letters for transliteration.
2. Uju hergen and Manchu phoneme markers are enclosed in angle brackets, such as <KA> and <M>.

3. The independent, initial, medial, and final forms of an uju hergen are denoted by hyphens respectively (e.g., <KA>, <KA->, <-KA->, and <-KA>).
4. Similarly, the initial, medial, and final positions of phoneme markers within an uju symbol block are denoted by hyphens respectively (e.g., <M->, <-M->, and <-M>).

Table 1. A synthesis matrix for organising classroom observation data.

Components of orthographic knowledge (What)			
1. Writing routines	2. Symbol units	3. Symbol–sound mapping	4. Other relevant knowledge
1a. Stroke combination	2a. Uju hergen	3a. Symbol-to-sound	4a. Linguistics
1b. Stroke transformation	2b. Manchu phoneme markers	3b. Sound-to-symbol	4b. History
1c. Stroke order			
Literacy practices in the classroom (How)			
5. Explanation (by teacher)			
5a. Introduction			
5b. Presentation			
5c. Demonstration			
5d. Manipulation			
5e. Transliteration			
6. Exercises of practice (by students)			
6a. Choral reading			
6b. Copywriting			
7. Evaluation (by teacher-students interaction)			
7a. With students’ response			
7b. Without students’ response			

Note. Adapted from Nag et al. (2016), p. 54.

Figure 1. Segmentation of the strokes comprising <A> and transformation of the rightward “tail” to a short “tooth” to write <A->.

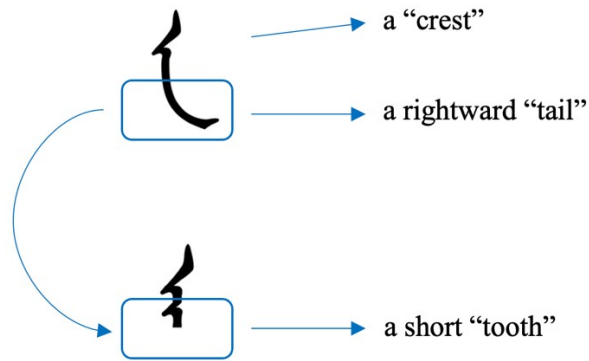


Figure 2. Manipulation by stroke transformation applied to *ka*.

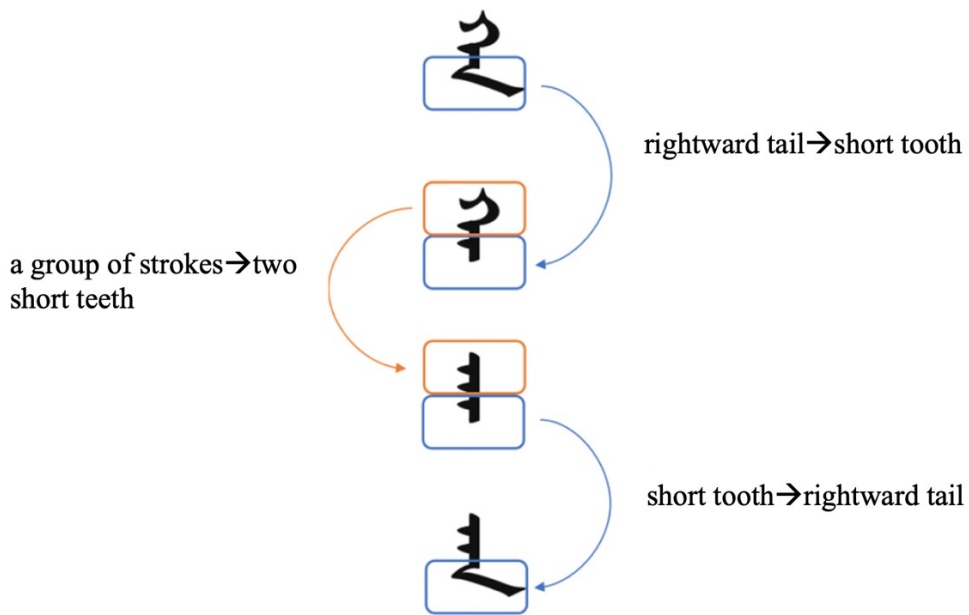
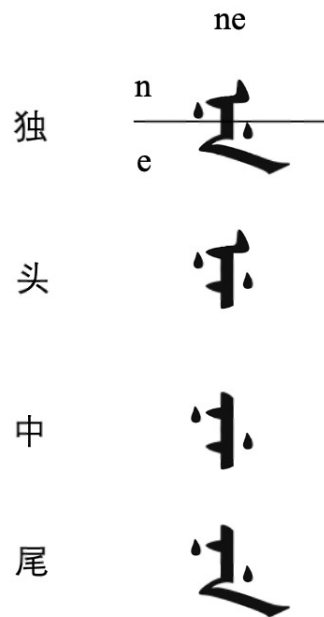


Figure 3. Segmentation of <NE> into <N-> and <-E>.



Note. The Chinese characters indicate the independent, initial, medial, and final forms.

Figure 4. Segmentation of <AM> into <A-> and <-M>.



Figure 5. Blackboard presentation of <-S> and -s.



